BROWNFIELD CLEANUP PROGRAM REMEDIAL INVESTIGATION WORK PLAN

Site No. C203056
285 East 138th Street
Bronx, New York

November 2011

Prepared for:

EAST ONE THIRTY EIGHTH HOUSING DEVELOPMENT FUND COMPANY, INC.
2345 Broadway
New York, NY 10024

Prepared by:

ENVIRONMENTAL RESOURCES MANAGEMENT
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CERTIFICATION

I, Ernest Rossano, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Professional Geologist/Remediation Professional # 8225 Date 11/21/2011

Ernest Rossano

Ernest Rossano, C.P.G

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°C	Degrees Celsius
°F	Degrees Fahrenheit
%D	Percent Difference
%RSD	Percent Relative Standard Deviation
ACGIH	American Conference Of Governmental Industrial Hygienists
AOCs	Areas Of Concern
ANSI	American National Standards Institute
APP	Accident Prevention Plan
APR	Air Purifying Respirator
ASP	Analytical Services Protocol
ASTM	American Society For Testing And Materials
ACBM	Asbestos Containing Building Material
BZ	Breathing Zone
CPP	Citizen Participation Plan
CPR	Cardio Pulmonary Resuscitation
CRQLs	Contract Required Quantitation Limits
CRZ	Contamination Reduction Zone
DO	Dissolved Oxygen
DQO	Data Quality Objectives
ELAP	Environmental Laboratory Accreditation Program
ERM	Environmental Resources Management
ESA	Environmental Site Assessment
EZ	Exclusion Zone
FEV	Forced Expiratory Volume
FTL	Field Team Leader
FVC	Forced Vital Capacity
GC/MS	Gas Chromatograph/Mass Spectrophotometer
GW	Ground Water
HASP	Health And Safety Plan
HAZWOPER	Hazardous Waste Operations And Emergency Response
HSO	Health And Safety Officer
ICP	USEPA Method 6010a
LBP	Lead-Based Paint
LIMs	Laboratory Information Management
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MSDSs	Material Safety Data Sheets
MSHA	Mine Safety And Health Administration
MW	Monitoring Well
NIOSH	National Institute For Occupational Safety And Health
NYSDEC	New York State Dept. Of Environmental Conservation

NYSDOH	New York State Department Of Health
OSHA	Occupational Safety And Health Administration
OV	Organic Vapor
OVA	Organic Vapor Analyzer
PARCC	Precision, Accuracy, Representativeness, Completeness And Comparability
Phase I	Phase I Environmental Assessment
Phase II	Phase II Environmental Assessment
PM	Project Manager
PPE	Personal Protection Equipment
PID/FID	Photoionization Detector / Flameionization Detector
QA/QC	Quality Assurance/Quality Control
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation And Recovery Act
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SAP	Sampling And Analysis Plan
SCBAs	Self-Contained Breathing Apparatus
SDG	Sample Delivery Group
SHSC	Site Health And Safety Coordinator
SOPs	Standard Operating Procedures
SPLP	Synthetic Precipitation Leaching Procedure
SVOCs	Semi-Volatile Organic Compounds
SZ	Support Zone
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristics Leaching Procedure
TICs	Tentatively Identified Compounds
TLV	Threshold Limit Values
TSCA	Toxic Substance Control Act
TVOCs	Total Volatile Organic Compounds
TWA	Time Weighted Averages
US	United States
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VCP	Voluntary Cleanup Program
VOA	Volatile Organic Analysis
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

Environmental Resources Management (ERM) has prepared this Brownfield Cleanup Program (BCP) Remedial Investigation Work Plan (RIWP) on behalf of East One Thirty Eighth Housing Development Fund Company, Inc. (the Volunteer) to fulfill the requirement to investigate the Site under the New York State Department of Environmental Conservation (NYSDEC) BCP. The Volunteer entered into a Brownfield Cleanup Agreement (BCA) with NYSDEC for the Borinquen Court site located on East 138th Street in Bronx, New York (the Site). A location map showing the Site and the surrounding area is presented as Figure 1-1. An aerial photograph of the site and surrounding area is provided as Figure 1-2.

This work plan presents a summary of previous environmental investigative activities conducted at the Site along with the proposed additional investigative work that is needed for the Site. The additional work proposed in this work plan was based on ERM's review of the existing environmental information and a visit to the site with the NYSDEC on 15 August 2011.

Based on the previous investigations conducted at the Site, four areas of concern have been identified. As discussed later in this work plan, additional groundwater, soil and soil vapor sampling are needed to complete the environmental characterization of the Site. All existing data gaps will be addressed in this work plan.

1.1 ORGANIZATION OF WORK PLAN

This work plan is organized into seven sections and contains five Appendices. Section 1.0 contains the introduction to the Remedial Investigation Work Plan. Section 2.0 presents background information and planned future use of the property. Section 3.0 summarizes the results of previous environmental investigations conducted at the Site. Section 4.0 sets forth the proposed investigative elements. Section 5.0 provides a schedule for the implementation of the various phases of the BCP process. Section 6.0 provides a brief description of the reporting deliverable, i.e., the Remedial Investigation Report (RIR). Section 7.0 lists references used to prepare this document.

Appendix A contains a copy of the Standard Operating Procedures (SOP) for the proposed fieldwork. The Health and Safety Plan (HASP) is included as Appendix B while the Community Air Monitoring Plan (CAMP) is presented in Appendix C. The sampling Quality Assurance

Project Plan (QAPP) is presented in Appendix D. The Citizen Participation Plan and the Scoping Sheet are presented in Appendix E. The Project Team Profiles are presented in Appendix F.

2.0 *SITE DESCRIPTION AND SITE HISTORY*

Borinquen Court is a seven-story, 145-unit, 137,800 sq. ft. low-income senior housing complex in the Mott Haven section of the South Bronx in New York City. The building is of block and plank construction, with a slab on grade foundation and a brick façade. The Site occupies approximately 1.8 acres of land on Third Avenue between East 138th Street and East 139th Street in the Bronx. The building entrance is on East 138th Street. The structure consists of three residential wings surrounding a centralized core. An open, paved parking lot that accommodates 33 cars is located on the southeast portion of the site and to the west is an open, landscaped area. The site is legally defined as Tax Block 2314, Lot 1. A Site location map is presented as Figure 1-1. The properties surrounding the Site are used primarily for residential purposes, with some commercial and industrial uses as well. Immediately to the west of the Site is the intersection of Morris and Third Avenues and immediately to the east is the New York City Police Department's 40th Precinct. North of the Site, across East 139th Street, are three and four story residential buildings and one manufacturing building and south of the Site is a high rise New York City Housing Authority complex, the Mayor John Purroy Mitchell Houses, surrounded by parking lots. The MTA #6 train runs adjacent to the property along East 138th Street with a station entrance on the corner of 138th and Third Avenue.

According to a March 2009 Impact Environmental Phase I Environmental Site Assessment Report, Block 2314 Lot 1 contained: a gasoline filling station from about 1935 through 1968; an automobile repair facility from about 1935 to 1978; a mattress factory/manufacturer from 1944 to 1978 and a metal works facility from about 1951 to 1978. The original sponsor of the housing project, the South Bronx Housing Corporation, constructed the building and obtained a Certificate of Occupancy on July 9, 1981. In February of 2011, U.S. Department of Housing and Urban Development (HUD) transferred ownership of the building to East One Thirty Eighth Housing Development Fund Company, Inc. (hereafter referred to as East 138th HDFC, Inc. or the Volunteer).

The proposed future use of the Site is to provide safe, affordable housing and supportive services to older adults. The Volunteer is currently in the process of rehabilitating the building structure and grounds. Priorities include kitchen and bath upgrades throughout the building, upgrading of the electrical and heating systems, sidewalk repair, roofing and parapet replacement, public area painting, mechanical equipment replacement, elevator repair and window replacement. In addition, several of the apartments on the first floor are being completely renovated.

2.1 GEOLOGY AND HYDROGEOLOGY

Topography

The elevation of the Site, as presented on the United States Geologic Survey (USGS), Bronx Quadrangle Map is approximately 40 feet above sea level. The USGS Map, which was base dated in 1954, photo revised and field checked in 1966, and photo revised again in 1979, did not show any structure on the Site (the property is within an area in which only landmark buildings were mapped).

Regional Geology

The Site is located within the New England Uplands physiographic province, which is geologically complex and exhibits moderate topographic relief. Throughout the area, the rock has been folded, deformed and faulted during structural upheaval, and chemical alterations associated with a plate subduction and dynamothermal metamorphism has occurred. The province includes high-grade metamorphic rocks of Silurian age, including the Hudson Schist and the Yonkers Gneiss Formations. These rock formations include politic schists (sillimanite-garnet-muscovite-biotite-quartz-plagioclase), gneisses and amphibolites. The province also includes sedimentary (parent) rock types including sandstones, siltstones, limestones, shales and quartz conglomerates.

The soil characteristics of the county are a function of the glacial geology of Bronx County. Bronx County was completely covered by a continental glacier, which probably reached maximum thickness about 27,000 years ago. All preglacial landforms were modified by this glaciation and the subsequent deposition of till that occurred when the ice margin withdrew from the county about 14,000 years ago. In general, the soil mineralogy of the region is a reflection of the underlying bedrock. Recessional moraines, kames, eskers, crevasse, fillings, and other ice contact deposition features occur in the county and cause many localized hydrologic effects.

Site-Specific Geology

Based on previous investigations conducted by Impact Environmental and MACTEC, the Site lies within an area classified as Urban Land. This soil type consists of urbanized areas where the majority of the surface is covered with buildings, roads, driveways, parking lots, and other manmade structures. During MACTEC's Limited Phase II Environmental Site Assessment, soil borings were advanced in the southeast, northwest and southwest portions of the Site. Debris buried beneath the ground surface (large crushed rocks, concrete, brick and wood) was found in most borings when withdrawn from the refusal depth. This made advancement of most borings to the depth of groundwater impossible.

Regional Hydrology

The groundwater resources of Bronx County are in unconfined sand and gravel deposits of glacial origin and in unconsolidated rock. The unconfined sand and gravel deposits form aquifers that are generally small and restricted to the valley areas. These aquifers recharge rapidly and therefore yield large quantities of water for individual supply wells, but are rarely dependable for large industrial or city supplies. Groundwater obtained from the bedrock aquifers comes from fractures or cracks in the rock mass. The water-bearing properties of the various types of bedrock in the county are almost identical. The carbonates yield the largest water volumes of all of the bedrock types in the region.

Regional groundwater flow direction in the area of the Site is complicated due to lithological conditions and anthropo-environmental activities. The Bronx River is located to the east of the site, but its local impact on groundwater flow is not known. Groundwater flow direction will be confirmed as part of the remedial investigation described in Section 4.4.

Site-Specific Hydrogeology

According to URS Quarterly Groundwater Monitoring Reports, groundwater flow at the 40th Police Princinct flows to the south and west. During MACTEC's Limited Phase II Environmental Site Assessment, two borings were converted into temporary wells. One well was screened between 14 and 19 feet bgs and was a good groundwater producer. The other well was screened between 24 and 28 feet bgs and was a poor groundwater producer.

3.0 PREVIOUS INVESTIGATIONS

The following section summarizes the Phase I and II Environmental Site Assessments conducted at the Site.

3.1 PHASE I ENVIRONMENTAL SITE ASSESSMENTS

The Phase I Environmental Site Assessment conducted in March 2009, was limited in scope because Impact Environmental (the consultant performing the assessment) was not allowed access to the Site. On the basis of historical records, the following recognized environmental conditions at the site were found:

- A gasoline filling station with five (5) 550 gallon underground storage tanks was located in the southwest corner of the property in an area that is currently landscaped. This filling station was identified on Sanborn maps from 1935, 1944, 1947, 1951 and 1968 and therefore was likely in operation for approximately 40 years. There are no records indicating whether these tanks were removed.
- A parking garage with two underground storage tanks and an auto repair facility were located on the northwestern side of the site (139th Street). The garage was observed on Sanborn maps dated 1935, 1944, 1947, 1951, 1968 and 1978 and various auto repair facilities were noted over the same period. Like the filling station described above, there is no record of tank removal.
- According to Sanborn maps from 1944 through 1978 a mattress factory/manufacturer was present in the northwest corner of the site.
- A metals works facility was located on the southeast corner of the site, and based on a review of the Sanborn maps, was likely in operation from 1951 to 1978.

The historical operations all have potential to impact subsurface soils, groundwater and soil vapor at the site where the building is home to a sensitive elderly population. The 40 year old filling station, with five (5) 550-gallon underground gasoline storage tanks, likely represents a significant source. Leaks and spills from tanks located on the southwest section of the property may have contaminated soil under the landscaped area of the site. Also on-site for a period of about 40 years were two (2) 550-gallon underground storage tanks associated with the parking garage. If these tanks were left in place they are likely under the building itself. Research on historical mattress manufacturing suggests the possible use of solvents in the construction and degreasing of spring coils as well as chemicals used in making the mattresses flame retardant and insect proof such as antimony, phosphorus and arsenic. It was previously thought that solvents may also have been associated with the metals works and/or auto repair facility, but Sanborn maps have confirmed that the mattress/spring manufacturing actually took place across 139th Street, not on the subject property.

3.2 PHASE II ENVIRONMENTAL SITE ASSESSMENTS

MACTEC, on behalf of the U.S. Department of Housing and Urban Development, conducted a limited Phase II on-site investigation on the Site in January 2010. Three soil samples (SB-1A, SB-1B and SB-2) were collected from the southeast area of the Site near the dumpsters at the east end of the tenant parking area. Sample SB-1A was collected at 4.5 and 5.0 feet below ground surface (bgs), sample SB-1B was collected from 14.5 to 15 feet bgs and sample SB-2D was collected from 13.0 to 13.5 feet bgs. Soil sample SB-3 was collected near the northwest area of the property, near the slab extension patio from 1.5 to 2.0 feet bgs. Soil samples SB-4, SB-5 and SB-6 were collected in the western area of the property bordering Third Avenue. Soil sample SB-4 was collected from 4.5 to 5.0 feet bgs, soil sample SB-5 was collected from 0.5 to 1.0 feet and soil sample SB-6 was obtained from 0.5 to 1.0 feet bgs. Soil samples were analyzed for polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), RCRA metals and polychlorinated biphenyls (PCBs).

MACTEC attempted to advance 1-inch PVC temporary monitoring wells using GeoProbe® direct push equipment in the southeast, northwest and southwest areas of the property. Two of the 11 borings were advanced to groundwater (SB-3 and SB-4). The well at SB-3 (TWP-3) was screened from 14 to 19 feet bgs and was a good groundwater producer. SB-4, (TWP-4) screened from 24 to 28 feet bgs, did not produce much groundwater and the small amount of groundwater obtained from TWP-4 was extremely turbid. The groundwater sample from TWP-3 was analyzed for VOCs by EPA Method 8260, PAHs by EPA Method 8270, and TPHs. Due to the limited amount of groundwater collected from TWP-4, the laboratory was only able to test for diesel range organics (DRO).

<u>Analytical Results</u>

Five shallow samples (between 0.5 and 2.0 feet below ground surface (bgs)) were submitted to the laboratory for analysis of PAHs, VOCs and TPH. Analytical results indicate that the concentrations of some PAHs were in excess of New York State Department of Environmental Conservation (NYSDEC) TAGM-4046 recommended soil cleanup objectives (RSCOs). Sample SB-1A, obtained from 4.5 to 5.0 feet bgs, was analyzed for RCRA metals. The results from the analysis of this soil sample showed that both chromium and silver exceeded their respective Part 375-6.8 unrestricted use SCOs. However, neither the concentration of chromium or silver exceeded the Part 375-6.8 restricted residential SCOs. Soil samples obtained from borings SB-1A, SB-2D, SB-3, SB-4, SB-5 and SB-6 were analyzed for PCBs. PCBs were not detected in five of the six samples collected, but Aroclor 1254 was detected at the unrestricted SCO of 1 ppm in one sample.

Groundwater was encountered between 14 and 16 feet bgs in two of the borings. Of the two groundwater samples collected, only one could be analyzed and that sample contained several SVOCs. However, as a result of elevated method detection limits, the concentrations were not considered representative. MACTEC's investigation is considered incomplete and insufficient for characterizing the areas of concern on the Site.

Table 1 summarizes the soil samples with exceedances of NYSDEC SCOs from the Phase II Investigation.

4.0 REMEDIAL INVESTIGATION

The RI scope of work will involve groundwater, soil, and soil vapor sampling. The investigation data will be used to evaluate any potential remedial needs for the Site.

4.1 GEOPHYSICAL INVESTIGATION

A geophysical survey was performed on 17 August 2011 using Ground Penetrating Radar and magnetic surveys on the Site to evaluate possible presence of tanks or other subsurface structures such as electrical or water lines (Figures 4-1 through 4-3) as an aid to development of this RIWP. The geophysical subcontractor also provided subsurface clearance of all planned drilling locations.

4.2 SUB-SURFACE SOIL SAMPLING

Soil sampling data collected as part of the remedial investigation at the Site will be used in determining the remedial action. In addition to the historical data, eleven (11) soil borings will be installed throughout the Site. A map depicting the proposed soil boring locations is presented as Figure 4-1. One soil boring will be advanced near the eastern border of the Site to assess any potential off-site impacts from the 40th Precinct Police Department property. One boring will be advanced in the area of the previous metal works facility. Four borings will be advanced on the southwestern portion of the Site in the vicinity of the former gasoline station. Two borings will be installed in the northwest portion to assess any potential impacts from the mattress company. Two borings will also be installed along the northeast portion to address any impacts from the former auto repair shop and associated former USTs. Direct push technologies will be utilized to advance a macro-core sampler fitted with an acetate liner into the subsurface to collect the soil samples. Continuous cores will be collected from the land surface to the top of the bedrock surface estimated to be 21 feet bgs (5 feet into the groundwater table). Two samples per boring will be collected based on visual and photoionization detection (PID) screening and analyzed for Target Compound List/Target Analyte List (TCL/TAL) parameters. Additionally, one sample per area of concern will be collected for waste disposal characterization (TCLP VOCs, SVOCs, Herbicides/Pesticides and RCRA Metals).

4.3 SURFACE AND SHALLOW SOIL SAMPLING

Surface and shallow soil samples will be collected in vegetated areas from eight locations on the eastern portion of the Site. A map depicting the proposed surface soil sampling is presented as Figure 4-2. One location will be placed in each of the four separate vegetated areas surrounding the parking lot in the southeast corner of the Site. Four sampling locations will be evenly distributed in the gardens and grass on the northeastern portion of the Site. It is likely that in the garden and grass, surface and shallow soil will be fairly homogenous, and the proposed distribution of sampling locations will be sufficient in characterizing the surface and shallow soil in these areas. Two samples will be collected from each location using a hand auger, from the 0-2 inch interval and the 6-24 inch interval. Samples will be screened with a PID and analyzed for Target Compound List/Target Analyte List (TCL/TAL) parameters. Three samples will also be collected from the surface soils on the northern/eastern portion of the Site for waste disposal characterization (TCLP).

As part of the property rehabilitation, East 138th HDFC, Inc. plans to remove the top two feet of exposed soil on the western portion of the Site. It is estimated that 1,345 cubic yards of soil will be removed. In compliance with DER-10, 9 discrete samples will be collected and analyzed for VOCs and 3 composite samples will be collected for TCL/TAL parameter analysis from the 0-2 foot interval in this portion of the property. Two samples will be collected from surface soils on the western portion of the property for waste disposal characterization (TCLP). Analyses will be performed by a laboratory with current Environmental Laboratory Approval Program (ELAP) Certification.

4.4 GROUNDWATER INVESTIGATION

Five permanent groundwater monitoring wells (Figure 4-3) will be installed via Geoprobe to monitor areas of concern and up-gradient conditions as well as to obtain an accurate groundwater flow direction. One well will be advanced in the vicinity of each of the following: the previous metal works facility near the entrance of the building; the former gasoline station in the southwest portion of the property; the former mattress company in the northwest portion of the property; and the former auto repair shop and associated former USTs, down-gradient of the 40th Police Precinct. The wells will be installed to a maximum depth of 25 feet bgs and will be constructed using 1-inch Schedule 40 PVC with a 15 foot screen and a 10 foot riser. If a depth of 25 feet bgs is not able to be achieved, a 10 foot screen will be used. The well installation procedure SOP is provided in Appendix A.

Following well installation, the five monitoring wells will be developed until the turbidity of the recovered well water is less than 50 Nephelometric Turbidity Units (NTUs). The applicable SOPs for this work are presented in Appendix A. The HASP and sampling QAPP for this work are presented in Appendices B and C, respectively.

All proposed monitoring wells and borings will be surveyed by a NYS-licensed land surveyor for horizontal and vertical control. The vertical datum for the map will be NGVD 86 or a datum relatable to NGVD 86. A base map will be developed to accurately plot all monitoring wells and groundwater flow direction. The elevations of all monitoring well casings will be established to within +/- 0.01 feet based on the NGVD 86 datum. A notch will be placed in all interior casings to provide the point to collect future groundwater elevation measurements.

One round of depth to water measurements and one round of groundwater samples will be collected using low-flow sampling techniques from the five wells for full TCL/TAL parameters. Analyses will be performed by a laboratory with current Environmental Laboratory Approval Program (ELAP) Certification.

4.5 SOIL VAPOR SAMPLING

Four soil gas samples will be collected from shallow locations around the perimeter of the site. Four sub-slab and four indoor air samples will be collected to evaluate sub-slab and indoor air quality within the building. One ambient air sample will also be collected. Sub-slab and indoor air samples will be collected adjacent to each other and locations will be evenly spaced throughout the building and placed in areas that are unlikely to be disturbed. A map depicting the proposed air sampling locations is presented as Figure 4-4. All air sampling will be conducted in accordance with the procedures outlined in the SOP's provided in Appendix A.

The samples will be analyzed for VOCs using EPA Method TO-15. Analyses will be performed by a laboratory with current Environmental Laboratory Approval Program (ELAP) Certification.

4.6 MANAGEMENT OF INVESTIGATIVE DIRIVED WASTE

The following section describes the general protocols for handling and disposal of solid and liquid investigative derived waste (IDW) generated during the implementation of the RI. Waste generated during the investigation is expected to consist of trash (boxes, paper, etc.), soil cuttings, decontamination wash water, groundwater monitoring well purge water, and used protective clothing.

The following guidance documents and regulations may be relied upon to guide the management, staging, storage and disposal of RI-generated IDW:

- NYSDEC's TAGM #4032 on " Disposal of Drill Cuttings" {November 21, 1989};
- NYSDEC's RCRA TAGM #3028 on " Contained-In Criteria for Environmental Media" {November 30, 1992};
- 40 C. F. R. Part 262 (Standards Applicable to Generators of Hazardous Waste);
- 40 C. F. R. Part 263 (Standards Applicable to Transporters of Hazardous Waste;
- 40 C. F. R. Part 264 (Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities); and
- 40 C. F. R. Part 268 (Land Disposal Restrictions).

Accordingly, handling and disposal will be as follows:

- Cuttings from soil borings and the tailings from the unused portion of the samples collected will be placed back down the borehole. Un-used drill cuttings will be collected on plastic sheeting and stored in reconditioned 55-gallon, New York State Department of Transportation (DOT) open-top drums to be provided by ERM's drilling subcontractor.
- Cuttings from monitoring well installations will be collected on plastic sheeting and stored in reconditioned 55-gallon, New York State DOT open-top drums to be provided by the ERM's drilling subcontractor.
- Liquids generated from equipment decontamination and temporary groundwater monitoring well development/purging will be discharged to a 55-gallon, New York State DOT open top drum and field screened with a PID. If no detections are found, the liquids will be recharged to unpaved ground in a manner which does not produce surface water run-off per DER-10.
- Used protective clothing and equipment that is suspected to be contaminated with hazardous waste will be placed in plastic bags, packed in 55-gallon ring-top drums.

- All drums will be labeled according to the borehole/well number. The drilling subcontractor shall move the drums on a daily basis at the direction of ERM's representative to the staging area.
- ERM will procure waste transport and disposal subcontractor services to properly dispose of all IDW in accordance with all local, State and Federal regulations.

Non-contaminated trash, debris and protective clothing will be placed in a trash dumpster and disposed of by a local garbage hauler.

4.7 STANDARDS, CRITERIA AND GUIDANCE

The RIR will identify SCGs. The concentrations of each contaminant detected will be compared to the SCGs.

5.0 PROJECT SCHEDULE

ERM understands that the development plans will require approvals of the Remedial Action Work Plan (RAWP) by April, 2012. The attached Project Schedule (Figure 5-1) details the various project elements and expected milestone dates.

6.0 *PROJECT STAFFING PLAN*

ERM Principle in Charge

ERM's Partner-In-Charge for this assignment will be Ernie Rossano, CPG. As Partner-in-Charge, he will serve as one of the primary points of contact for the site investigation program. He will be responsible for ensuring that WSFSSH's overall site investigation and remediation objectives are met. He will provide direct senior oversight of the project and plan an active role in team selection, scheduling, budget tracking, and quality assurance. Mr. Rossano has 25 years of varied hydrogeologic experience. His experience includes the design of monitoring well networks for volatile organics, hydrocarbons, and collection of basic hydrogeologic parameters; seismic, downhole geophysical, and sample log analysis and correlation; supervision and analysis of pump tests in confined and unconfined strata; numerical modeling of groundwater flow and solute transport; and management of large scale remedial investigations and remediation.

ERM Project Manager

Gregory Shkuda, PhD, will act as the overall project manager. In this role he will manage the preparation of required documents. Mr. Shkuda has managed multiple projects for NYSDEC and will work closely with the remedial design team to ensure coordination between the RAWP and the development of the remedial costs.

ERM QA/QC Officer

Andy Coenen will be our quality assurance/quality control officer. In that role he will be responsible for the data quality and data management elements of the project. Mr. Coenen has 15 years of general analytical chemistry experience, 6 years of analytical laboratory experience, and 9 years of environmental consulting experience, including analytical data validation, sampling and analysis programs, quality assurance programs, technical support, and QA oversight for fixed laboratory and field analysis. Mr. Coenen has knowledge of numerous analytical methodologies and experience in data validation of analytical data package deliverables for adherence to USEPA CLP and non-CLP, NYSDEC ASP, and NJDEP protocols. He is proficient with GIS/key environmental management software and has operated a mobile gas chromatograph laboratory used to test soil and water samples for quick-turn volatile analysis.

ERM Field Team Leader

Karen Pickering will serve as field team leader. She will serve as one of the primary points of contact for the site investigation project. Her duties will include coordination and scheduling all site work, coordinating health and safety on site, and reporting on field activities. Ms. Pickering has three years of experience in the environmental consulting field specializing in geology. Her field experience includes groundwater, soil, and rinsate, sampling, field parameter measurement, monitoring well installation, installation of vertical profile wells, logging of soil and bedrock, subsurface and indoor air sampling, oversight of underground storage tank removals and oversight of remediation activities.

ERM Engineer of Record

John Mohlin, P.E., will be the engineer of record for this project. He will be responsible for certifying all documents as required by NYSDEC. Mr. Mohlin is a registered professional engineer with more than 17 years of environmental engineering consulting experience with emphasis on the investigation and remediation of contaminated sites. He has designed and implemented such diverse remedial technologies as soil mixing with permanganate, soil excavation, in-situ ozonation, groundwater recovery and treatment, and vapor intrusion mitigation. Mr. Mohlin has also prepared site management plans, and is continuously involved in the long-term operation and monitoring of several on-going remediation systems.

7.0 REPORTING AND CITIZEN PARTICIPATION

Following receipt of final laboratory deliverables, a Remedial Investigation Report (RIR) documenting the sampling results will be prepared in accordance with DER-10. All laboratory analytical results, with a comparison to relevant standards, criteria and guidelines (SCGs), and field measurements will be summarized and laboratory deliverables will be bound as a separate appendix to the RIR with a data usability summary report (DUSR). All data will be submitted to NYSDEC in the required Electronic Data Deliverable (EDD) format. The RIR will also include an on- and off-site qualitative exposure assessment that qualitatively assesses the potential for exposures to the public, fish and wildlife. Conclusions appropriate to the Site and recommendations as to whether any potential remediation is needed will be made. The RIR will then be certified and submitted to NYSDEC.

Appendix E contains the CPP for the Site. As discussed in Appendix E, the approved work plan and RIR will be filed with the public document repositories, one near the Site and one with the regional NYSDEC office, and required notices will be provided to parties on the Site contact list regarding Site activities.

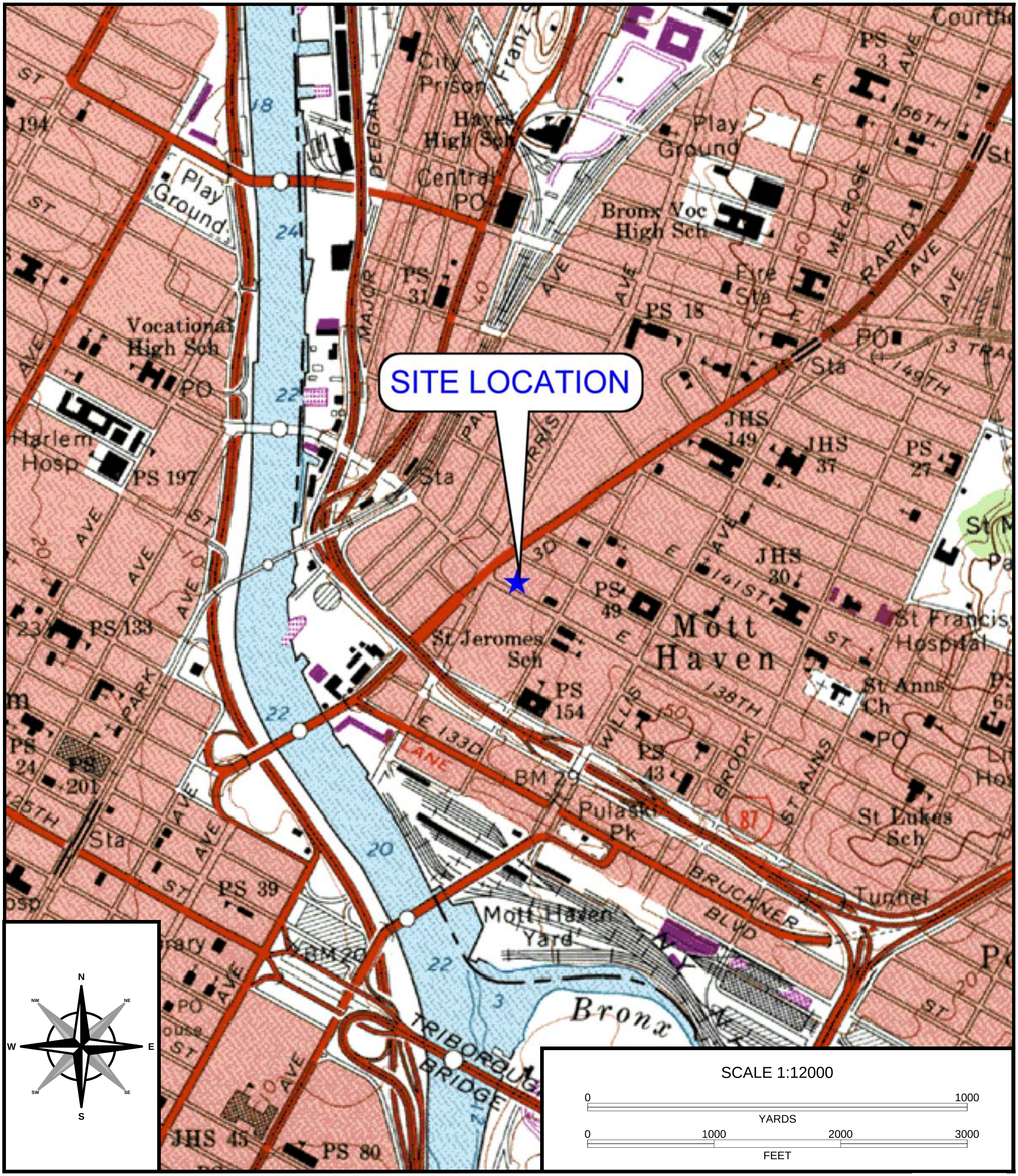
8.0 REFERENCES

Impact Environmental, 2009, “Phase I Environmental Site Assessment”, 30 March 2009.

MACTEC, 2010, “Report of Limited Phase II Environmental Site Assessment”, 13 January 2010.

URS, 2010, “40th Police Precinct RegenOx™ Injections and Soil Excavation Monitoring through 4th Quarter 2009”, 13 August 2010.

Figures



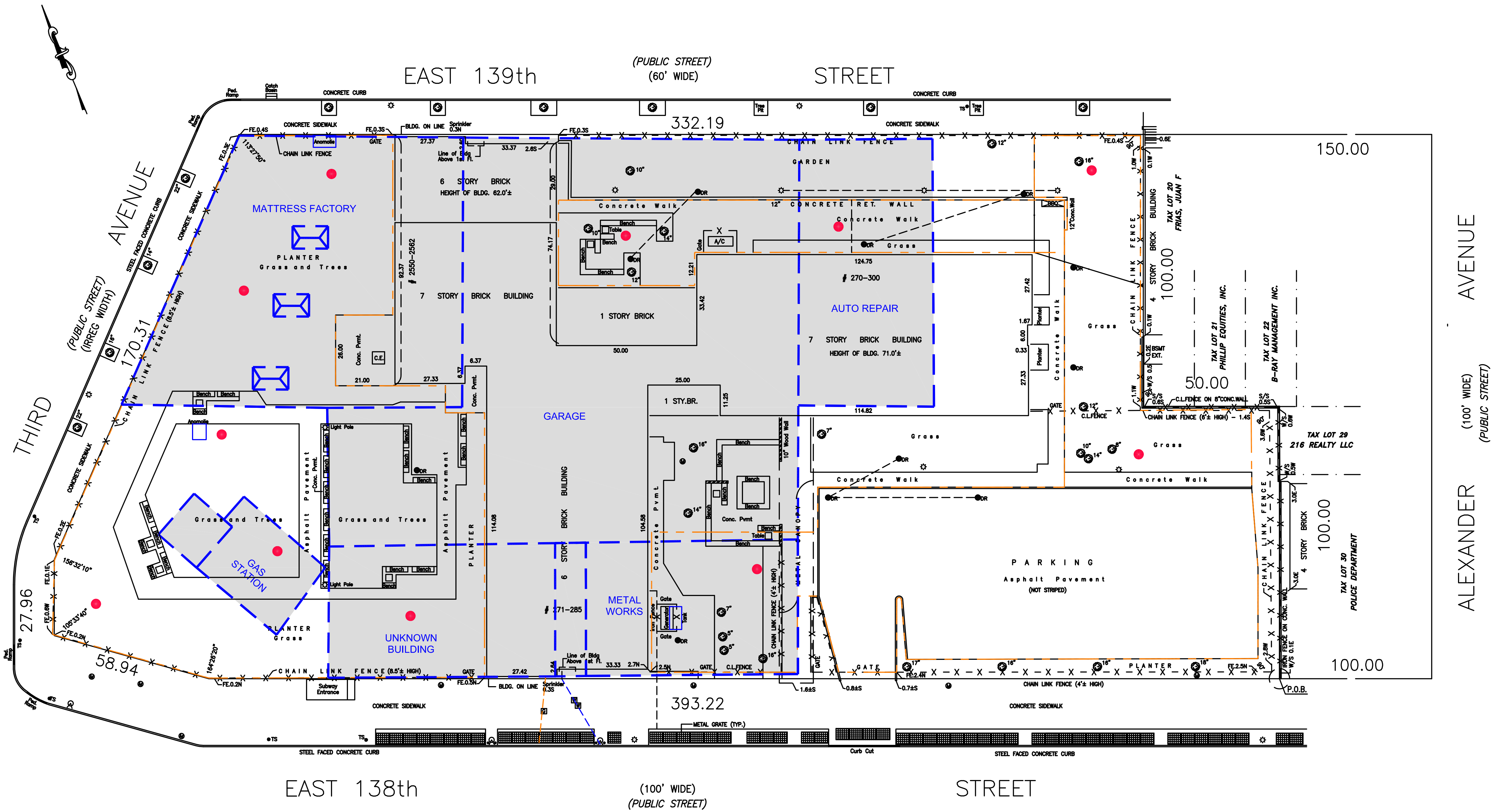
Map Name: CENTRAL PARK
Horizontal Datum: NAD83
Date Published: 1966
Copyright: Copyright (C) 2009 MyTopo

Figure 1-1 - Site Location Map
285 East 138th Street
Bronx, New York

ERM

TITLE: AERIAL SITE PLAN 285 EAST 138 STREET BRONX, NEW YORK				
PREPARED FOR: East 138th St. HDFC, Inc.				
ERM Environmental Resources Management			SCALE: GRAPHIC	FIGURE: 1-2
DRAWN: EMF	JOB NO.: 0141137	FILE NAME: 0141137-00-004	DATE: 9/1/11	

R:\projects\Borinquen Court\CAD\0141137-00-004 Aerial Site Plan.dwg (10/19/2011 - 3:51pm Melville)



SOURCE:

REF.NO.: B2314–010, TITLE NO.: BRX–239244–L

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LEGEND:
P.O.B. .... POINT OF BEGINNING
C.L.F. .... CHAIN LINK FENCE
BLDG .... BUILDING
CONC.BLK. .... CONCRETE BLOCK
CONC.RET. .... CONCRETE RETAINING WALL

BORING
GEOPHYSICS
HISTORIC PROPERTY USAGE

ELECTRIC
GAS
SEWER
WATER

LOT AREA:
79,254.5 SQ.FT. = 1.8194 ACRES

BUILDING AREA:
±21,510.9 SQ.FT.

Scale (1"=40')
20' 0 20' 40' 80'
Graphic Scale in Feet

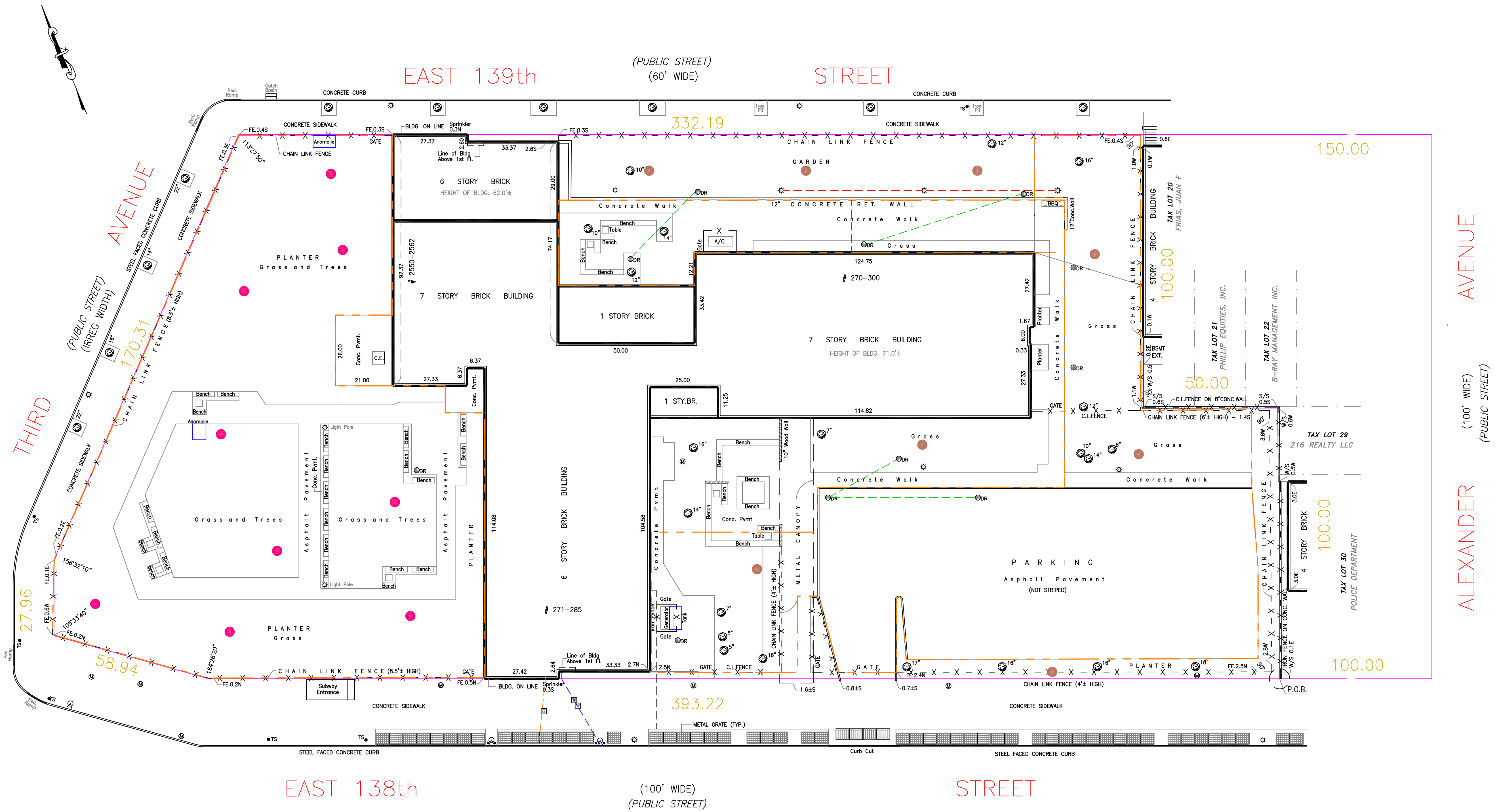
TITLE
PROPOSED
SOILING BORING
AND GEOPHYSICS LOCATIONS

PREPARED FOR
East 138th St. HDFC, Inc.

ERM Environmental Resources Management

DRAWN:	JOB NO.:	FILE NAME:	SCALE	FIGURE
EMF	0141137	0141137-00-001	GRAPHIC	4-1
			DATE: 10/17/11	

R:\projects\Borinquen Court\CAD\0141137-00-001 Proposed Soil Borings.dwg (10/17/2011 - 2:58pm Melville)



SOURCE:

REF.NO.: B2314–010, TITLE NO.: BRX–239244–L

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CONC.BLK. .... CONCRETE BLOCK
CONC.RET. .... CONCRETE RETAINING WALL

SURFACE SOIL FOR INVESTIGATIVE PURPOSES
SURFACE SOIL FOR DISPOSAL PURPOSES
GEOPHYSICS

ELECTRIC
GAS
SEWER
WATER

LOT AREA:
79,254.5 SQ.FT. = 1.8194 ACRES

BUILDING AREA:
±21,510.9 SQ.FT.

Scale (1"=40')
20' 0 20' 40' 80'
Graphic Scale in Feet

TITLE

PROPOSED SURFACE SOIL LOCATIONS AND GEOPHYSICS LOCATIONS

PREPARED FOR
East 138th St. HDFC, Inc.

ERM Environmental Resources Management

DRAWN:	JOB NO.:	FILE NAME:	SCALE	DATE	FIGURE
EMF	0141137	0141137-00-005	GRAPHIC	9/7/11	4-2

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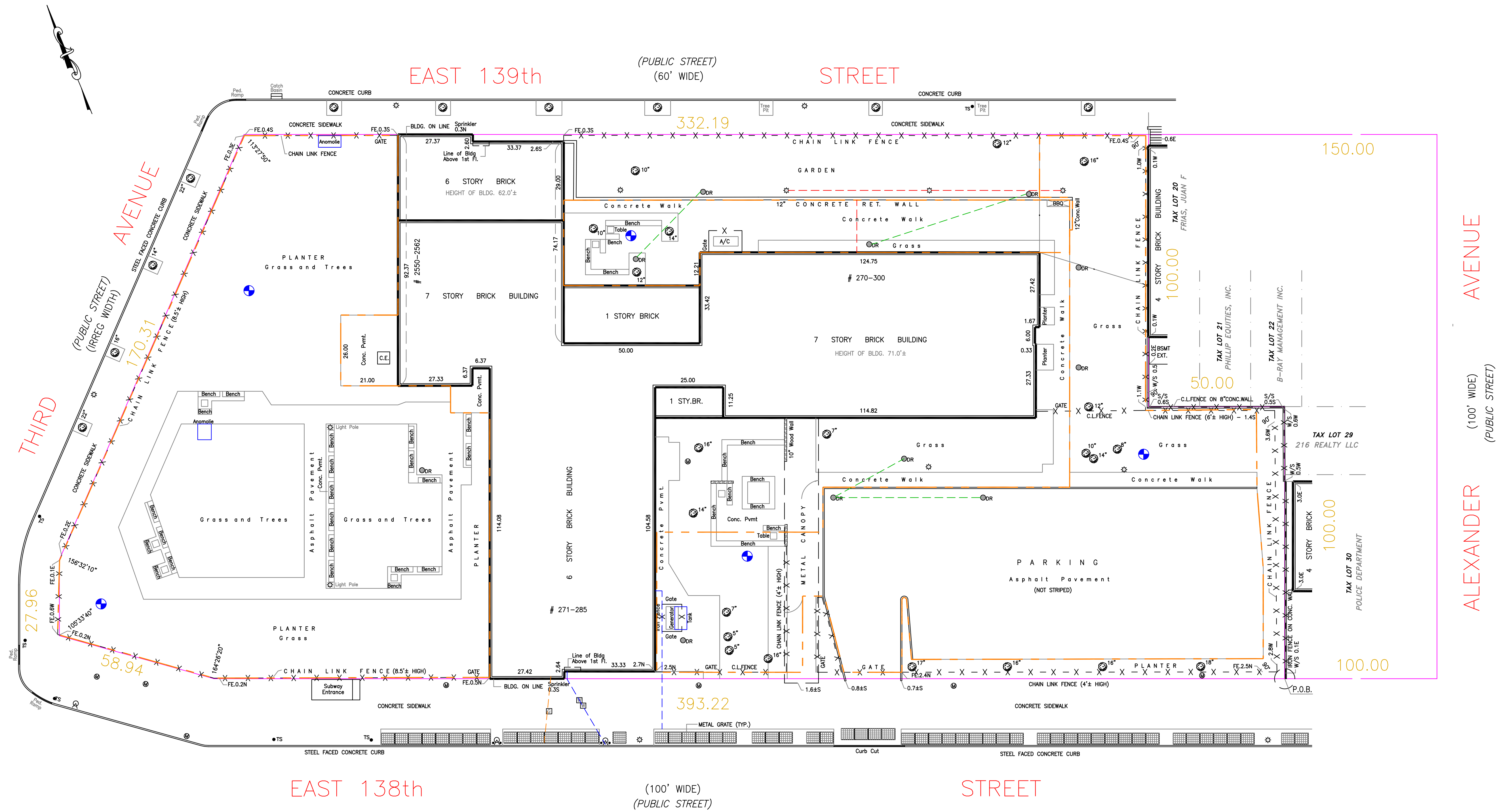

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C.L.F. .... CHAIN LINK FENCE
BLDG .... BUILDING
CONC.BLK. .... CONCRETE BLOCK
CONC.RET. .... CONCRETE RETAINING WALL

PROPOSED MONITORING WELL LOCATION
GEOPHYSICS

ELECTRIC
GAS
SEWER
WATER

LOT AREA:
79,254.5 SQ.FT. = 1.8194 ACRES

BUILDING AREA:
±21,510.9 SQ.FT.

Scale (1"=40')

20' 0 20' 40' 80'

Graphic Scale in Feet

SOURCE:

REF.NO.: B2314—010, TITLE NO.: BRX—239244—L

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TITLE

PROPOSED MONITORING WELL LOCATIONS AND GEOPHYSICS LOCATIONS

PREPARED FOR

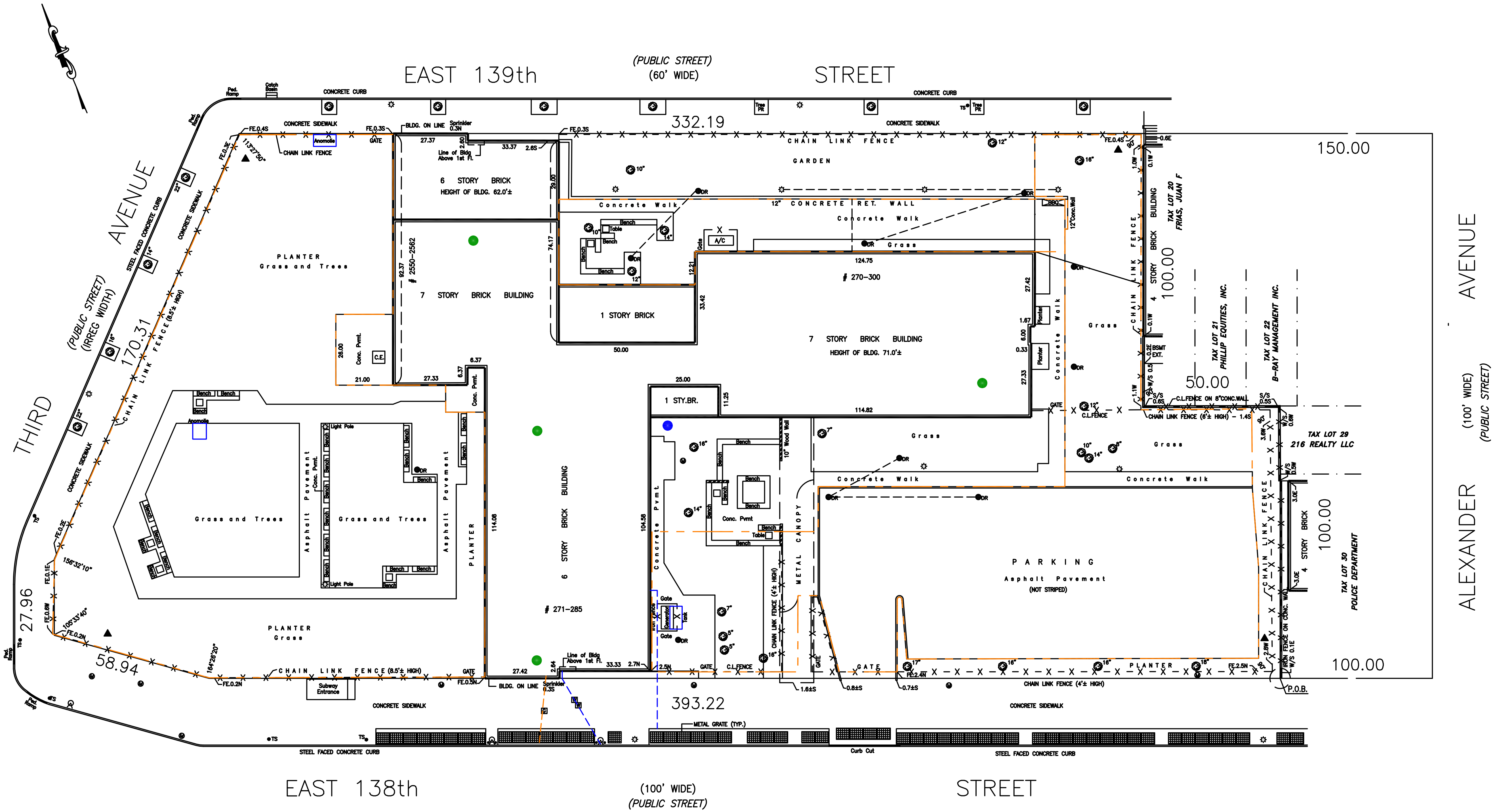
East 138th St. HDFC, Inc.

ERM Environmental Resources Management

SCALE	FIGURE
GRAPHIC	4-3
DATE	
9/1/11	

DRAWN:	JOB NO.:	FILE NAME:
EMF	0141137	0141137-00-002

R:\projects\Borinquen Court\CAD\0141137-00-002 Proposed Monitoring Well Locations.dwg (09/01/2011 - 3:28pm Melville)



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REF.NO.: B2314–010, TITLE NO.: BRX–239244–L

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● PROPOSED INDOOR AIR & SOIL VAPOR LOCATION
▲ PROPOSED SOIL GAS LOCATION
● AMBIENT AIR LOCATION
□ GEOPHYSICS

— — — ELECTRIC
— — — GAS
— — — SEWER
— — — WATER

LOT AREA:
79,254.5 SQ.FT. = 1.8194 ACRES

BUILDING AREA:
±21,510.9 SQ.FT.

Scale (1"=40')
20' 0 20' 40' 80'
Graphic Scale in Feet

TITLE
PROPOSED INDOOR AIR AND SOIL GAS LOCATIONS

PREPARED FOR
East 138th St. HDFC, Inc.

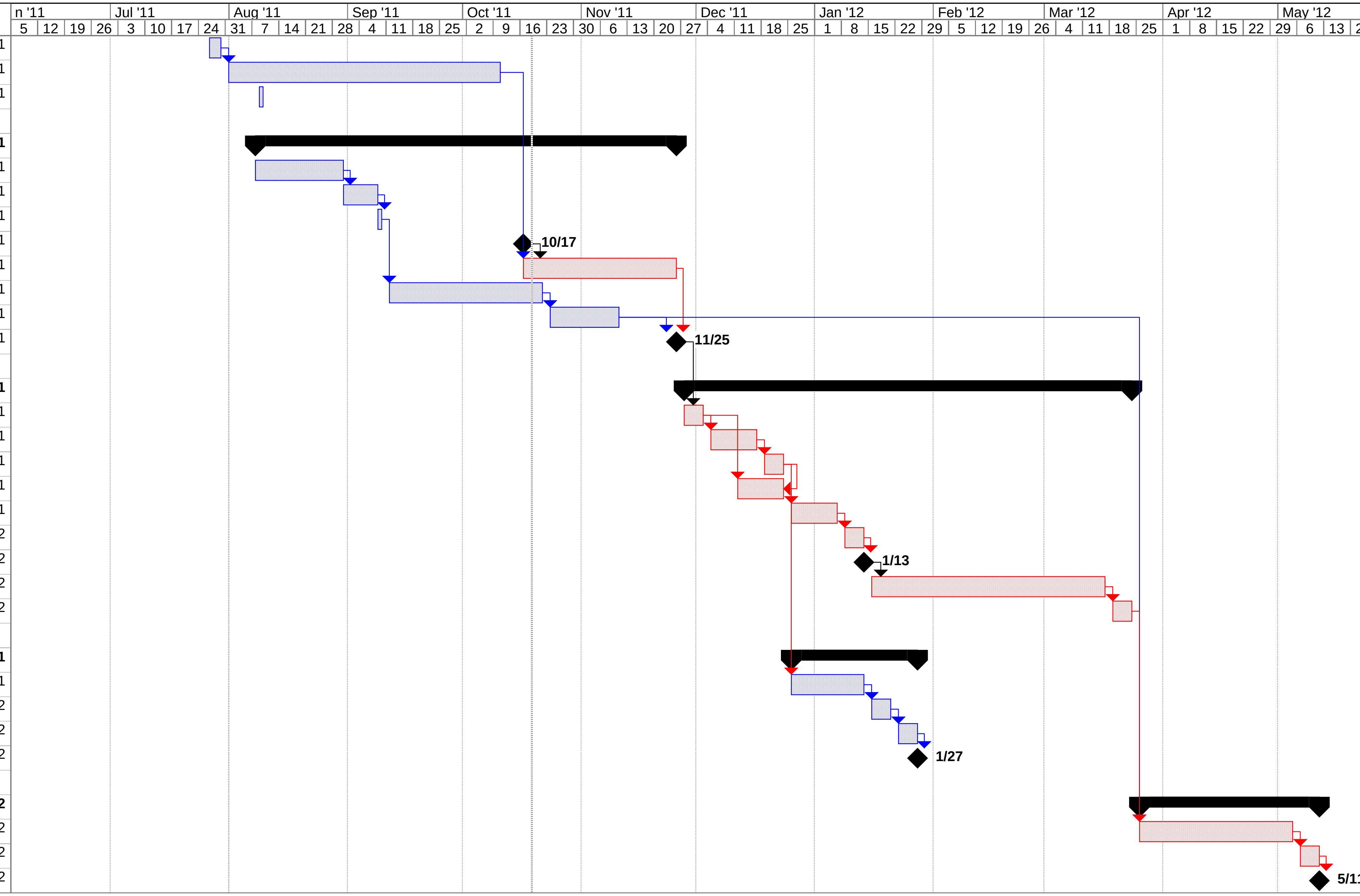
ERM Environmental Resources Management

DRAWN:	JOB NO.:	FILE NAME:	SCALE	FIGURE
EMF	0141137	0141137-00-003	GRAPHIC	4-4
			DATE: 10/14/11	

R:\projects\Borinquen Court\CAD\0141137-00-003 Proposed Indoor Air Locations.dwg (10/14/2011 - 9:52am Melville)

Figure 5.1
East 138th St. HDFC, Inc.
285 138th STREET, BRONX, NEW YORK

ID	Task Name	Duration	Start
1	Background Review	3 days	Wed 7/27/11
2	Citizen Participation Plan	51 days	Mon 8/1/11
3	NYSDEC Meeting	1 day	Tue 8/9/11
4			
5	**RI Workplan**	**80 days?**	**Mon 8/8/11**
6	Remedial Investigation Work Plan	17 days	Mon 8/8/11
7	East 138th St. HDFC, Inc. Review	7 days	Wed 8/31/11
8	Remedial Investigation Work Plan Draft	1 day?	Fri 9/9/11
9	Notice and Fact Sheet	0 days	Mon 10/17/11
10	Public Comment	30 days	Mon 10/17/11
11	NYSDEC Review	30 days	Mon 9/12/11
12	Work Plan Revisions	14 days	Mon 10/24/11
13	NYSDEC Approval	0 days	Fri 11/25/11
14			
15	**Remedial Investigation**	**85 days**	**Mon 11/28/11**
16	Remedial Investigation	5 days	Mon 11/28/11
17	Laboratory Analysis	10 days	Mon 12/5/11
18	Data Validation	5 days	Mon 12/19/11
19	RI Report/Remedial Action WP	10 days	Mon 12/12/11
20	East 138th St. HDFC, Inc. Review	10 days	Mon 12/26/11
21	RI Report/RAWP Revisions	5 days	Mon 1/9/12
22	Notice and Fact Sheet	0 days	Fri 1/13/12
23	Public Comment	45 days	Mon 1/16/12
24	Final RI Report /RAWP Revisions	5 days	Mon 3/19/12
25			
26	**Remedial Alternatives Analysis**	**25 days**	**Mon 12/26/11**
27	Alternatives Analysis/Cost Analysis	15 days	Mon 12/26/11
28	East 138th St. HDFC, Inc. Review	5 days	Mon 1/16/12
29	Alternatives/Cost Analysis Revisions	5 days	Mon 1/23/12
30	Cost Analysis Completion	0 days	Fri 1/27/12
31			
32	**NYSDEC Approval**	**35 days**	**Mon 3/26/12**
33	NYSDEC Review	30 days	Mon 3/26/12
34	Documant Finalization	5 days	Mon 5/7/12
35	Final RAWP Submittal	0 days	Fri 5/11/12



Project: Schedule 2
Date: Wed 10/19/11

Task		Milestone		Rolled Up Critical Task		Split		Group By Summary	
Critical Task		Summary		Rolled Up Milestone		External Tasks		Deadline	
Progress		Rolled Up Task		Rolled Up Progress		Project Summary			

Tables

Table 1

Phase II Soil Exceedances of NYSDEC SCOs

	NYSDEC RSCO	SB-3	SB-4	SB-4	SB-5	SB-6
Constituent	(ug/kg)	1.5′-2.0′ bgs	Unknown Depth	4.5′-5.0′ bgs	0.5′-1.0′ bgs	0.5′-1.0′ bgs
Benzo (a) Anthracene	1000	5200		-	5200	-
Chrysene	1000	5300		-	5300	-
Benzo (b) Fluoranthene	1000	5800		-	5800	-
Benzo (a) Pyrene	1000	4800		-	4800	-
Indeno (1,2,3 – cd) Pyrene	500	5200		5200	5200	5200
Dibenz (a,h) Anthracene	330	1500		-	1500	-
Aroclor 1254	1000		1000			

Project Contact List
Borinquen Court
Bronx, NY

Name	Project Role	Address	Telephone	E-mail Address
Ernie Rossano, CPG	Partner-in-Charge	40 Marcus Drive, Suite 200, Melville, NY 11747	(631) 756-8900	Ernie.Rossano@ERM.com
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Karen Pickering	Field Team Leader	40 Marcus Drive, Suite 200, Melville, NY 11747	(631) 756-8900	Karen.Pickering@ERM.com
Andy Coenen	QA/QC Control Officer	40 Marcus Drive, Suite 200, Melville, NY 11747	(631) 756-8900	Andrew.Coenen@ERM.com
John Mohlin, PE	Engineer of Record	40 Marcus Drive, Suite 200, Melville, NY 11747	(631) 756-8900	John.Mohlin@ERM.com

Appendices

Appendix A
SOPs

APPENDIX A
STANDARD OPERATING PROCEDURES (SOPs)

Section	**Standard Operating Procedure**
A.1	SOP 1: Utility Survey/Geophysical Investigation
A.2	SOP 2: Field Screening
A.3	SOP 3: Water Level Measurement Procedure
A.4	SOP 4: Groundwater Sampling (Low-Flow)
A.5	SOP 5: Groundwater pH and Temperature
A.6	SOP 6: Measurement of Groundwater Specific Conductance
A.7	SOP 7: Measurement of Groundwater Turbidity
A.8	SOP 8: Measurement of Groundwater Dissolved Oxygen
A.9	SOP 9: Geoprobe Soil and Groundwater Vertical Profiling
A.10	SOP 10: Surface Soil Sampling
A.11	SOP 11: Monitoring Well Construction
A.12	SOP 12: Monitoring Well Development
A.13	SOP 13: Sub Slab Soil Vapor (air) Sampling using Summa Canister
A.14	SOP 14: Indoor Air Sampling using Summa Canister
A.15	SOP 15: Soil Gas Sampling Using Summa Canisters

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A.0 STANDARD OPERATING PROCEDURES

A.1 SOP 1: Utility Survey/Geophysical Investigation

The exact locations of subsurface features which may be potential sources of contamination or impede drilling have not completely been identified. Electromagnetic and ground penetrating radar (GPR) geophysical methods will be used to identify any sub-surface features. In addition, the geophysical surveys will be used to confirm the locations of utility lines in areas where drilling will take place.

A.2 SOP 2: Field Screening

Field screening for organic compounds in soil samples shall be performed during soil sampling activities performed during the Site RI. Soil samples will be visually characterized for the presence of staining and screened for volatile organics using an instrument equipped with a portable photo-ionization detector (PID).

During soil boring installation, total volatile organic compound (VOC) headspace readings will be collected from every boring at two-foot intervals. As described below, the headspace readings will be performed in a consistent manner to yield comparable qualitative results. The headspace screening results will compliment the analytical data and allow for a three dimensional profile to help vertically define any encountered impacted soil.

As part of the Health and Safety monitoring program, a PID will also be utilized to continuously monitor the breathing zone of all work areas where intrusive activities are taking place. This shall serve as an immediate indication as to volatile organic hazards at the work location and shall determine if personnel health and safety protection is adequate. Screening with a hand-held PID meter shall also be performed during groundwater sampling immediately upon opening the well and during purging activities. The following standard operating procedures will apply to field screening activities:

- Calibrate the PID daily in accordance with the particular manufacturer's procedures.

- For soil samples, a separate container will be used, other than the one that is going to the analytical laboratory to screen the headspace for total VOCs. Generally, the sample aliquot retained for geologic description and archive is used for organic vapor screening and is placed in a dedicated jar or sealable baggie (e.g. Ziplock) immediately upon sample collection or retrieval.
- The headspace sample container will be filled approximately 2/3 full with soil to allow for the headspace screening.
- Following collection, aluminum foil will be placed over the sample jar mouth, tightly sealing the opening.
- Once sealed, the sample container will be allowed to stand for a standardized period of time in a location where the sample temperature change will be minimal. A minimum of 5 minutes is recommended.
- After 5 minutes, the sample container will be shaken to aid the desegregation of VOCs from the soil matrix.
- The container will then be allowed to stand for an additional standardized time interval (minimum 5 minutes) in a location where the sample temperature change will be minimal.
- To perform the headspace screening, the probe of a PID will be inserted through the foil seal while attempting to minimize the hole that will be created. The instrument will then be observed for the maximum organic vapor reading.
- The sample number and depth interval and maximum headspace organic vapor concentration will then be recorded.

A.3 SOP 3: Water Level Measurement Procedure

Groundwater elevation measurements will be obtained from all newly-installed and existing wells. The measurements will be collected following installation concurrent with the groundwater sampling event and the water levels will be obtained prior to well evacuation and sample collection. The static water level will be measured to the nearest 0.01 foot. Groundwater level data will be used to construct groundwater table contour maps.

- Clean all water-level measuring equipment using appropriate decontamination procedures.
- Remove locking well cap, note weather, time of day, and date, etc. in field notebook, or on an appropriate form.
- Remove well casing cap.
- Collect a PID reading from the well head space.

- Lower water level measuring device into well until the water surface is encountered.
- Measure distance from water surface to reference measuring point on well casing, and record in field notebook.

Note in field notebook if water level measurement is from the top of protective steel casing, top of PVC riser pipe, from ground surface, or some other position on the well head.

- Measure total depth of well and record in field notebook or on log form.
- Remove all downhole equipment, replace well casing cap and locking steel caps.
- Calculate elevation of water:

  Ew = E - D

  where

  Ew = Elevation of Water

  E = Elevation at point of measurement

  D = Depth to Water

A.4 SOP 4: Groundwater Sampling (Low-Flow)

The low-flow sampling procedure will be performed on all monitoring wells and is intended to facilitate the collection of representative groundwater samples.

Sample Equipment

- Peristaltic pumps will be used only for purging and inorganic sample collection. A stainless steel check valve placed on the bottom of the tubing will be used to sample groundwater for organic analysis. The selected pump is specifically designed for low-flow rates (i.e., use of a high volume pump that is adjusted down to a low-flow setting is not permitted).
- Tubing: Tubing used in purging and sampling each well must be dedicated to that well. Once properly located, moving the pump in the well should be avoided. Consequently, the same tubing should be used for purging and sampling. Teflon® and Teflon®-lined polyethylene tubing must be used to collect samples for organic analysis. For samples collected for inorganic analysis, Teflon® or Teflon®-lined polyethylene, PVC, Tygon, or polyethylene or silicon tubing may be used.

- Electronic water level measuring device, 0.01-foot accuracy.
- Flow measurement supplies (e.g., graduated cylinder and stop watch).
- Interface probe.
- Power or air source (generator, compressed air tank, etc.).
- In-line purge criteria parameter monitoring instruments - pH, turbidity, specific conductance, temperature, ORP, and dissolved oxygen.
- Decontamination supplies.
- Logbook and field forms.
- Sample bottles.
- Sample preservation supplies (as specified by the analytical methods).
- Sample tags or labels, chain of custody forms.
- Well construction data, location map, field data from last sampling event.
- Waste container for purge water.

Sample Procedure

1) Lower pump, safety cable, tubing, and electrical lines very slowly into the well to a depth corresponding to the center of the saturated screen section of the well. The pump intake must be kept at least two feet above the bottom of the well to prevent mobilization of any sediment. Lowering the pump quickly, or even at a moderate rate, will result in disturbing sediment in the well. This is one of the most important steps in low-flow sampling.

2) Measure the water level again with the pump in well before starting the pump. Start pumping the well at 100 to 500 milliliters per minute. Ideally, the pump rate should cause little or no water level drawdown in the well (less than 0.3 foot and the water level should stabilize).

    - Measure and record the depth to water and pumping rate every 3 to 5 minutes (or as appropriate) during pumping. If purging continues for more than 30 minutes, readings will be recorded at approximately 10-minute intervals. However, once stabilization is indicated, a minimum of 3 consecutive readings at 3 to 5 minute intervals will be recorded prior to sample collection.

    - Care should be taken not to cause pump suction to be broken or entrainment of air in the sample. Do not allow the groundwater level to go below the pump intake.

- Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to minimize drawdown and/or to ensure stabilization of indicator parameters.

3) During purging, measure and record the field indicator parameters using the in-line meter (turbidity, temperature, specific conductance, pH, Eh, and dissolved oxygen) every 3 to 5 minutes (or as appropriate). If purging continues for more than 30 minutes, readings will be recorded at approximately 10-minute intervals. However, once stabilization is indicated, a minimum of 3 consecutive readings at 3 to 5 minute intervals will be recorded prior to sample collection.

    - The well is considered stabilized and ready for sample collection once all the field indicator parameter values remain within 10 percent for 3 consecutive readings.

    - If drawdown in the well is measured at 1 foot or more, continue to low-flow purge until a minimum of the equivalent volume of 1 well casing volume is removed. Using the flow equation to calculate the volume of purge water. Then collect the groundwater sample.

4) The groundwater discharge should achieve a turbidity of 50 NTUs or less prior to sampling for metals. If this is not achievable, a filtered sample will be collected for metals in addition to an unfiltered sample.

5) Before sampling, either disconnect the in-line cell or use a by-pass assembly to collect groundwater samples before the in-line cell. All sample containers should be filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

6) Label the samples using waterproof labels, or apply clear tape over the paper labels. Place all samples in a cooler as described in the Quality Assurance Project Plan (QAPP) with bagged ice or frozen cold packs and maintain at 4°C for delivery to the laboratory.

7) Do not use ice for packing material; melting will cause bottle contact and possible breakage.

8) Measure and record well depth. Take final water quality reading using low-flow cell.

9) Secure the well.

A.5 SOP 5: *Groundwater pH and Temperature*

- Immerse the tip of the electrode in water overnight. If this is not possible due to field conditions, immerse the electrode tip in water for at least an hour before use.
- Rinse the electrode with demineralized water.
- Immerse the electrode in pH 7 buffer solution.
- Adjust the temperature compensator to the proper temperature.
- Adjust the pH meter to read 7.0.
- Remove the electrode from the buffer and rinse with demineralized water.
- Collect a groundwater sample using a bailer (or from the pump discharge line in the case of the vertical profile wells) and pour a small amount of this sample into an extra sample jar which shall not be used to store chemically analyzed samples.
- Immerse the electrode into the extra sample jar. Do not immerse the electrode into a sample that shall be chemically analyzed.
- Read and record the pH of the solution, after adjusting the temperature compensator to the sample temperature (obtained during measurement of specific conductance or from a standard scientific thermometer).
- Rinse the electrodes with demineralized water.
- Keep the electrode immersed in demineralized water when not in use.
- All results are to be recorded in the Field Notebook.

A.6 SOP 6: *Measurement of Groundwater Specific Conductance*

- Immerse the electrode in water overnight. If this is not possible due to field conditions, immerse the electrode for at least an hour before use.
- Collect a groundwater sample using a bailer (or from the pump discharge line in the case of the well purging activities) and pour a small amount of this sample into an extra sample jar which shall not be used to store chemically analyzed samples.
- Rinse the cell with one or more portions of the sample to be tested.
- Immerse the electrode in the sample and measure the temperature. Do not immerse the electrode into a sample that is to be chemically analyzed.

- Adjust the temperature setting to the sample temperature.
- Immerse the electrode in the sample and measure the conductivity. Do not immerse the electrode into a sample that is to be chemically analyzed.
- Record the results in the Field Notebook.

A.7 SOP 7: Measurement of Groundwater Turbidity

- Ensure that the sample cell (sample vials) are clean, with no dust and lint on the inside or outside surface.
- Ensure that instrument has been standardized recently and span control has not been changed.
- Range calibration of instrument is performed at the factory, but it should be checked from time to time against fresh formalin turbidity standard dilutions.
- Check the mechanical zero setting while instrument is off.
- Turn on the power and press the battery check switch and verify the battery check range. The needle should be in the battery check area. If battery was not recharged before use, switch to a charged instrument. The battery pack should be charged on a daily basis.
- Select the range that shall exceed the expected turbidity of the sample under test and press the appropriate range switch.
- Place the focusing template into the cell holder and adjust the zero control for a reading of zero NTU. Remove the focusing template.

Notes:

If the instrument shall be used in the 100 range, place the cell riser into the cell holder before inserting the test sample. When using the 1 and 10 ranges, the cell riser must not be used.

- Collect a groundwater sample using a bailer (or from the pump discharge line in the case of the vertical profile wells) and pour a small amount of this sample into an extra sample jar which shall not be used to store chemically analyzed samples.
- Fill a clean sample cell to the marked line with the sample to be measured and place it into the cell holder. Use the white dot on the sample cell to orient the cell in the same position each time. Cover the sample cell with the light shield and allow the meter to stabilize. Read the turbidity of the sample.

Notes:

The sample size for all turbidity measurements should be 18 ml. Use the line on the sample cell as a level indicator. Variation in sample volume can affect the accuracy of the determinations.

When measuring the lower range (0 - 10 and 0 - 1 NTU), air bubbles in the sample will cause false high readings - before covering the cell with the light shield, observe the sample in its cell. A five-minute wait period can eliminate air bubbles from the sample and thereafter a valid reading can be taken.

- Record the results in the Field Notebook.

A.8 SOP 8: Measurement of Groundwater Dissolved Oxygen

The dissolved oxygen (DO) meter shall be properly calibrated prior to each sampling event.

Calibration Procedure

- Prepare the DO meter with a thin Teflon membrane stretched over the sensor.
- Perform a battery check.
- Set mode switch to operate and the operation switch to zero, and zero the instrument.
- Take a temperature measurement and determine the calibration value from the manufacturer's table for the appropriate atmospheric pressure.
- Select the desired range and adjust the instrument to an appropriate calibration value (determined in the preceding step).
- Place the probe in a water sample with a known dissolved oxygen level and read mg/L-dissolved oxygen.
- Record temperature and dissolved oxygen calibration information on the equipment calibration and maintenance log for that instrument.

Operating Procedure

- Calibrate the dissolved oxygen meter.
- Perform the battery check.

- Immerse the electrode in water overnight. If this is not possible due to field conditions, immerse the electrode for at least an hour before use.
- Collect a groundwater sample using a bailer and pour a small amount of this sample into an extra sample jar which shall not be used to store chemically analyzed samples.
- Rinse the cell with one or more portions of the sample to be tested.
- Set mode switch to operate and the operation switch to the desired range.
- Immerse the probe in the water sample.
- Take a temperature and adjust the temperature compensator to the sample temperature (obtained during measurement of specific conductance or from a standard scientific thermometer).
- Switch the dissolved oxygen content measurement and allow reading to stabilize.
- Record the results in the Field Notebook.
- Repeat procedure and record a second reading. Average the results and record the average.
- Rinse the probe with distilled water and replace protective cover on probe with a small amount of distilled water to keep the probe membrane wet.

A.9 SOP 9: Geoprobe Soil Vertical Profiling

To evaluate the presence and extent of contamination at the Site, a soil boring sampling program will be implemented to allow collection of subsurface soil samples.

To collect soil samples, either a Macro Core (MC) sampler or a Large Bore (LB) drive point sampler will be used. The MC samplers are an open tube design and measure approximately 2" in diameter by 46" long. The samplers are fitted with a removable cutting shoe and clear acetate liner. Samples will be collected in four foot intervals to the determined completion depth. If probe hole "cave-in" is significant at the deeper depths, it may be necessary to use the closed piston assembly that fits into the MC cutting shoe or to switch to the LB drive point sampler. LB drive point samplers can be used to collect soil samples at points where subsurface conditions prevent the use of MC samplers or where continuous sampling is not necessary. The LB samplers use twenty-two inch by one inch acetate liners and can be driven closed to a desired sampling depth. In order to collect samples with the Large Bore (LB) drive point sampler, it is first driven to the desired sampling depth and then opened and driven two feet further.

The LB sampler remains completely closed while it is being driven to depth and is opened by releasing a stop pin from the surface. Releasing the stop pin allows a piston to retract inside of the sample tube as it is being displaced by the soil core. Each of the samplers used will be fitted with a new acetate liner prior to use. The acetate liner assists in the removal of the soil sample from the tube and helps insure sample integrity.

A.10 SOP 10: Surface and Shallow Soil Sampling

This SOP includes guidelines and procedures for use by field personnel during the collection and documentation of surface soil samples (0-24 inches bgs). Adherence to proper procedures will assure the quality and integrity of all surface and subsurface soil samples.

Prior to the start of sampling activities, the sampling locations will be marked out using stakes and flagging. Surface soil samples will be collected on the eastern side of the property from the 0-6 inch interval and the 6-24 inch interval. Surface soils collected from the western portion of the property will be sampled from the 0-24 inch interval.

Sampling Equipment

Surface soil samples will be collected using a manual technique. Samples from the 0-24 inch interval may be collected using a stainless steel hand auger that has a diameter greater than 2 inches. In the event that soils are difficult to sample using a hand auger, it may be necessary to utilize other items such as a stainless steel trowel and/or shovel. Only stainless steel tools and/or utensils will be used for sample collection.

Sample collection and compositing

Using the equipment described above, the following methodology will be employed:

1. Prior to sampling and between sampling locations, decontaminate the sample equipment according to the procedures outlined in the project work plans.

2. Don appropriate personal protection equipment as specified in the project Health and Safety Plan.

3. Clear the area to be sampled of surface debris and vegetation using equipment that will not be used for sample collection.

4. Lay out a piece of new plastic sheeting to be used a staging area for soil grab samples that will be composited.

5. Manually drive the coring device into the wetland soil to the desired depth.

6. Retrieve the device; check to see that soil recovery is adequate in the auger. If there is sufficient recovery, lay the core on the plastic sheeting described in number 5. Repeat steps 4 through 5 above to collect the remaining grab samples to be composited.

7. For composite samples, transfer approximately equal amounts of surface soil from the appropriate depth intervals of each core to a large, stainless steel mixing bowl.

8. Appropriately label and number the sample containers per the project work plans. The label will be filled out with waterproof ink.

9. Mix the surface soil using a decontaminated, stainless steel spoon until it is reasonably homogeneous. Transfer the composited soil to the appropriate laboratory-provided sample jars, filling the jars. If split-sampling is to be conducted, transfer the composited soil to the split-sampling jars in the same manner.

10. If using another manual sample collection device (other than the coring device), use the other device to scoop or collect soil and transfer to a discrete stainless steel mixing bowl on the plastic sheeting described in number 4. Repeat this step for each grab sample and then composite the grabs into one mixing bowl as described above.

11. Document the sampling event on the Sample Collection Log or an equivalent form as specified in the project work plans. Note any pertinent field observations, conditions or problems. Any encountered problems or unusual conditions should also be immediately brought to the attention of the Field Team Leader.

12. Appropriately preserve, handle, package, and ship the samples per the project work plan. The samples shall also be maintained under proper chain-of-custody procedures.

13. Fill, abandon and mark sample hole.

Sample Preservation

Samples will be packed in coolers with ice at a temperature of approximately 4°C. Holding times will not exceed those referenced in Title 40 Code of Federal Regulations (CFR) Section 136.3 Table 11, “Required Containers, Preservation Techniques and Holding Times,” or those indicated in the “Engineering and Design Chemical Data Quality Management for Hazardous Waste Remedial Activities (ER 1110-1-263).”

Sample Labeling
Each sample bottle will be affixed with a water-resistant sample label that includes the following information, filled out with indelible ink:

- Site name and location
- Sample project ID number
- Sample location and depth
- Collection date (MM/DD/YY) and time (military)
- Sample collection method (composite or grab)
- Sample preservation method
- Analysis requested
- Sampler(s) initials

If indelible ink is not available, sample labels will be covered with wide, clear, packing tape or samples will be sealed inside individual plastic bags to protect the label from water damage from melting ice.

A.11 SOP 11: Monitoring Well Construction

Materials
All monitoring wells shall be constructed of a minimum of 1-inch inside diameter to a maximum of 4-inch inside diameter, threaded flush joint, schedule 40 polyvinylchloride (PVC) casing and fifteen (15) or ten (10)feet length PVC screen having slot openings of 0.010-inches. Well screen sand packs shall be a Type #1 well sand. Type #00 fine sand shall be used to separate well screen sand pack from the overlying bentonite slurry seal. Only pure Wyoming bentonite shall be used for bentonite pellet seals and in cement/bentonite grout. Cement bentonite grout shall be prepared consisting of 5.0 pounds of high grade bentonite for each 94 pounds of Type I or Type II Portland cement mixed with 8.3 gallons of water for a target density of 13.9 pounds/gallon with an acceptable range of 13.4 to 14.5 pounds/gallon.

All well materials shall be inspected by the ERM’s representative for dents, cracks, grease, etc. and to ensure that the materials are in accordance with the specifications.

Well Assembly and Screen Placement
Once the well string is assembled in each borehole, the well shall be suspended in a manner such that the screen is set approximately two foot above the bottom of the borehole allowing for a sump at the bottom of the well. When the well screen is properly positioned, Type #1 sand pack shall be placed in the annulus by a tremie pipe to extend four (4) to five (5) feet (minimum 20% of the screen length) above the top of the screened interval to allow for settlement during development. Additionally, a 12-inch Type #00 sand pack shall be placed above the well screen sand pack to separate the bentonite seal from the well screen sand pack. During this time, the drill rods will be slowly removed. The well pipe will also be pulled up no more than ½ foot intervals to allow sand material to fill the borehole beneath the well screen. In addition, during the installation of the sand pack, the sand will be tamped down using a weighted tape measure to minimize the potential for bridging, and to ensure the proper placement and thickness of the sand.

Annular Seal
Upon completing the placement of the sand packs, a minimum 2-foot thick bentonite pellet seal will be placed in the annular space. During the installation of the pellet seal, the pellets will be tamped down using a weighted tape measure to minimize the potential for bridging, and to ensure the proper placement and thickness of the pellet seal.

Once the bentonite seal is in place, the remaining annular space shall be backfilled by pressure injection of cement/bentonite grout using a tremie pipe. The end of the tremie pipe shall be positioned approximately five (5) feet above the top of the bentonite seal prior to injection of the cement/bentonite grout to prevent disturbance of the bentonite seal. Injection shall continue until there is a return of grout from the annulus of the borehole at grade. The tremie pipe shall then be retracted from the well. Additional grout shall be added as required so the top of the grout shall settle at a maximum of two (2) feet below grade.

Well Completions at Grade

For each of the wells, a minimum of 1-inch to a maximum of 4-inch diameter PVC riser will extend from the top of the screen to approximately 4-inches below ground surface. A permanent mark will be made at the top of the well casing to provide a datum for water level measurements.

Each well will be fitted with a flush-mounted steel well vault which is a minimum of two (2) inches larger in diameter than the well casing, and secured in a surface seal to adequately protect the casing. A locking cap will be provided for each well with one (1) or two (2) inches clearance between the top of the well cap and the bottom of the locking cap of the protective casing when in the locked position. The ERM representative will provide keyed-alike padlocks for the wells.

Each well will have concrete surface seal that will secure the protective casing in place. The surface seal will extend below the frost depth (a minimum of 24 inches) to prevent potential well damage. The top of the seal will be constructed by pouring concrete into a pre-built form with a minimum of 2-foot long sides. The seal will be finished with a sloping surface to prevent surface runoff from ponding and entering the well vault.

A.12 SOP 12: Monitoring Well Development

Drilling and well installation typically result in disturbance of natural bedding and hydraulic permeability of the surrounding formation. Prior to use for collection of liquid level measurements or groundwater samples, it is imperative that sufficient hydraulic connection between the well and the surrounding soil be established. Each of the wells will be developed via peristaltic pump in an effort to meet this goal. A development goal will be achieving discharge turbidity of 50 Nephelometric Turbidity Units (NTUs) or less. Stabilization (+/- 20% in four successive measurements) of well discharge turbidity, temperature and specific conductance measurements will be used as the completion criteria for this task.

A.13 SOP 13: Sub Slab Soil Vapor (air) Sampling using Summa Canister

The sub slab soil vapor samples will be collected at four (4) locations as shown on Figure 4-4 using SUMMA® canisters equipped with timed sample acquisition regulators. The canisters and regulators will be certified clean by the laboratory prior to on-site use. A NYSDOH ELAP-certified laboratory will analyze each sample for VOCs using USEPA Method TO-15.

Selection and Preparation of Sample Collection Point

Observe the condition of the building floor slab for apparent penetrations such as concrete floor cracks, floor drains, or sump holes. Note the floor conditions on the sampling form and select a potential location or locations for a temporary or permanent subsurface probe. The location or locations should be away from foundation walls and apparent penetrations.

Review the proposed location or locations with the occupant/owner describing how the sampling port or ports will be installed. After receiving permission from the occupant or owner, mark the proposed location(s) and describe the location(s) on the sampling form.

Using the PID, screen indoor air in the area of floor penetrations such as concrete floor cracks, floor drains, or sump holes (note that the detection limits for the laboratory analyses to be performed on the samples collected are considerably lower than the detection limits of the PID). Record the indoor air PID readings on the sampling form.

Temporary Subsurface Probe Installation

1. Drill a 1-inch diameter hole about 1 to 2 inches into the concrete slab using an electric hammer drill.

2. Extend the hole through the remaining thickness of the slab using a 3/8-inch drill bit. Extend the hole no more than two inches into the sub-slab material using either the drill bit or a steel probe rod.

3. Insert a section of ¼ -inch O.D. Teflon ™ or brass tubing to the bottom of the floor slab. Seal the annular space between the 1-inch hole and ¼ -inch tubing by applying hot beeswax into the 1-inch hole.

4. Connect the ¼ -inch Teflon™ tubing (or brass tubing using a length of ¼-inch I.D. Teflon™ tubing) to a stainless steel valve using compression fittings or hose clamps. Open the in-line valve and purge the probe tubing of one to three volumes using a polyethylene 60-cubic centimeter (cc) syringe. Close the valve, remove and cap the syringe, and connect the ¼ -inch Teflon™ tubing and in-line valve to a SUMMA® canister. DO NOT DISCHARGE THE AIR/SOIL GAS SYRINGE INTO INDOOR AIR. For duplicate sample locations connect a second canister before purging by installing a ¼ -inch stainless steel "tee" fitting between the probe discharge tubing and the stainless steel valve.

Preparation Of SUMMA® Canister And Collection Of Sample

1. Place SUMMA® canister adjacent to temporary subsurface probe.

2. Record SUMMA® canister serial number on sampling summary form and COC.

3. Assign sample identification on canister ID tag, and record on sampling summary form and COC.

4. Remove brass plug from canister fitting.

5. Install pressure gauge / metering valve on canister valve fitting and tighten. If pressure gage has additional (2nd) fitting, install brass plug from canister fitting into gage fitting and tighten.

6. Open and close canister valve.

7. Record gage pressure on sample summary form and COC. Gage pressure must read >25 psi. Replace SUMMA® canister if gage pressure reads <25 psi.

8. Remove brass plug from gauge fitting and store for later use.

9. Install particulate filter onto metering valve input fitting and tighten.

10. Connect subsurface probe to end of in-line particular filter via ¼ -inch O.D. Teflon™ tubing and Swagelok® fittings.

11. Open canister valve and in-line stainless steel valve to initiate sample collection. Flow rates for both purging and collecting must not exceed 0.2 liters per minute.

12. Take digital photograph of SUMMA® canister set up and surrounding area.

13. Record date and local time of valve opening on sampling summary form and COC.

Termination of Sample Collection

1. Revisit SUMMA® canister after 80% of sample collection time has elapsed to verify sufficient amount of vacuum pressure remains for sample collection and shipment. At end of sample collection period (e.g., 24 hours after initiation of sample collection) record gauge pressure on sampling form and COC.

2. Record date and local time of valve closing on sampling summary form and COC.

3. Close canister valve.

4. Disconnect Teflon™ tubing and remove particulate filter and pressure gage/metering valve from canister.

5. Reinstall brass plug on canister fitting and tighten.

6. Remove SUMMA® canister from sample collection area.

7. Remove temporary subsurface probe and plug the slab probe hole with solid laboratory grade rubber plug. Set plug slightly below the finished floor level cover flush with the floor surface using quick drying hydraulic cement.

Preparation and Shipment of Sample To Analytical Laboratory

1. Pack SUMMA® canister in shipping container, note presence of

brass plug installed in tank fitting.

2. Complete COC and place requisite copies in shipping container.

3. Close shipping container and affix custody seal to container closure.

A.14 SOP 14: Indoor Air Sampling Using Summa Canister

In order to assess the potential for migration of VOCs vapors emanating from residual on-site sources or impacted groundwater, indoor air samples will be collected at four (4) locations as shown on Figure 4-4. The indoor air samples will be collected using Summa canisters equipped with timed sample acquisition regulators. Each sample will be analyzed by a NYSDOH ELAP-certified laboratory for TCL VOCs using USEPA Method TO-15. Specific details are presented below.

Sample locations will be chosen where samples will not be disrupted and at least 5 feet away from doors. An inventory of possible sources of VOC's will be recorded and the sources are removed if possible. A PID reading of indoor air will be taken and recorded on sample sheet.

A regulator will be attached to canister and ¼" O.D. tubing will be attached to regulator in same fashion as sub-slab samples. Intake will be placed at or around breathing height. A picture will be taken documenting the sample and surrounding area.

When all samples are set, the valve on the regulator will opened and time, date and pressure reading of canister will be recorded on sample sheet and chain of custody. Sample will be checked on periodically to check if pressure has dropped and has not reached 0"hg. Valve will be closed when 24 hours has elapsed or when pressure of canister reaches less then 5"hg, whichever occurs sooner. Ending pressure, time, and date will be recorded on sample sheet and chain of custody.

Tubing will be disconnected from regulator, and regulator will be removed from canister. Brass cap is replaced on SUMMA canister.

The following information will be recorded in the field notebook and/or data collection forms. This information should include the following for each soil vapor sample:

- Sampler's name;
- Date, time and initial PID reading;
- Date and time of Teflon tubing insertion and pilot hole sealing;

- Date, time and sustained PID reading;
- Summa canister serial number;
- Survey location number, and descriptive location of the sampling area;
- Weather conditions; and
- All calibrations performed.

A.15 SOP 15: Soil Gas Sampling Using Summa Canisters

In order to assess the potential for migration of VOCs vapors emanating from residual on-Site sources or impacted groundwater, soil gas samples will be collected at each of the four (4) locations shown on Figure 4-4. The soil gas samples will be collected using Summa canisters equipped with timed sample acquisition regulators. Each sample will be analyzed by a NYSDOH ELAP-certified laboratory for TCL VOCs using USEPA Method TO-15. Specific details are presented below.

(1) A 5/8-inch diameter pilot hole will be drilled to a minimum depth of 5 feet below ground surface at each soil vapor sampling location. The pilot hole will be drilled with an electric rotary hammer-drill powered by a portable generator. At locations where a concrete pad or asphalt covers the ground surface, an industrial-grade rotary drill equipped with a masonary bit will first be used to drill a pilot hole through the concrete pad/asphalt.

(2) After the pilot hole is completed, an initial VOC measurement will be made using a PID immediately following the removal of the bit. The initial reading will be recorded in the field logbook and/or on a soil gas sampling log form.

(3) Porous, inert backfill material (e.g., glass beads, washed #1 crushed stone, etc.) will be used to create a sampling zone of 1 to 2 feet in length.

(4) Stainless steel implants will fitted with new 1/8 inch to ¼ inch Teflon tubing to the surface.

(5) Soil vapor proves should be sealed above the sampling zone with a bentonite slurry for a minimum distance of 3 feet to prevent outdoor air infiltration and the remainder of the hole backfilled with clean material.

(6) A Helium Tracer Gas Test will be performed on each soil gas point to verify that no infiltration of atmospheric air occurs during sampling. This consists of applying a shroud that covers the top of the bentonite seal. The Teflon tubing that is attached to the soil vapor implant will be pulled out and connected to a portable

helium detector. Helium gas is then applied underneath the shroud to enrich the atmosphere in the immediate vicinity of the area where the probe intersects the ground surface. A vapor sample is then measured from the probe for the presence of high concentrations (>10%) of the tracer. One duplicate sample will also be collected for QA/QC purposes.

(7) After observing the 30-minute equilibration period, the Summa canister will then be attached to the Teflon tubing and the sampling regulator set to collect a soil vapor sample over a two hours. After the sample is collected, all Teflon tubing will be removed and disposed of in the general refuse dumpster. All penetrations of concrete pads/asphalt will be sealed with cement/black top patch.

(8) The following information will be recorded in the field notebook and/or data collection forms. This information should include the following for each soil vapor sample:

- Sampler's name;
- Date, time and initial PID reading;
- Date and time of Teflon tubing insertion and pilot hole sealing;
- Date, time and sustained PID reading;
- Helium test results;
- Summa canister serial number;
- Survey location number, and descriptive location of the sampling area;
- Weather conditions;
- Sampling depth(s);
- Soil type at sample location, if known;
- Description of the surface features (i.e., drainage, facilities), soils, any contamination noted, and trenches or any other feature that may impact the soil vapor measurement; and
- All calibrations performed.

Appendix B
HASP

Appendix B
Health and Safety Plan

ERM

Work Order #

Level 2- Short Form

PROJECT HEALTH AND SAFETY PLAN

Also Attach Specific Task Hazard Assessment Sheet(s) and Generic Risk Assessment Tables for site tasks

This form, in conjunction with ERM's Health and Safety Guidance Manual, is intended to provide health and safety guidelines for intrusive project field activities where:

The PIC and PM judge that the Short Form provides sufficient level of risk assessment and management
A more detailed HASP is not required by law or the client
The work does not require complicated interactions with subcontractors
The work is of relatively short duration such as 1-14 days
The activities described below should be conducted using good work practices and judgments consistent with employee training.

The Project Manager and PIC must ensure that all project personnel review and sign this form, and document these activities in the project file. Their signatures indicate approval of methods and precautions in this plan.

Administrative Information	Site Name and Location Borinquen Court, Bronx, NY	
	Client: East One Thirty Eighth Street Housing Development Fund Company, Inc.	
	Project Name East One Thirty Eighth Street	
	Health & Safety Plan Date 28 July 2011	Revision Number and Date 1 – 28 July 2011
	Project Field Work Start Date August 2011	Anticipated Project Field Work End Date September 2011
	Project Manager (Signature)	Principal-in-Charge (Signature)
	Project H&S Officer (If other than the PM) Karen Pickering	Site Safety Officer (*If other than the PM)* Brice Lynch

Site/Project General Information	Scope of Work REMEDIAL INVESTIGATION The RI scope of the work will involve groundwater, soil, and soil vapor sampling. The investigation data will be used to evaluate any potential remedial needs for the Site. GEOPHYSICAL INVESTIGATION A geophysical survey will be performed using Ground Penetrating Radar and magnetic surveys on the western side of the site to evaluate possible presence of tanks. The geophysical subcontractor will also provide subsurface clearance of all planned drilling locations. SOIL SAMPLING Soil sampling data collected as part of the remedial investigation at the Borinquen Court property will be used in determining the remedial action for the property. In addition to the historical data, eleven (11) soil borings will be installed throughout the property. A map depicting the proposed soil boring locations is presented as Figure 4-2. Direct push technologies will be utilized to advance a macro-core sampler fitted with an acetate liner into the subsurface to collect the soil samples. Continuous cores will be collected from the land surface to the top of the bedrock surface estimated to be 21 feet bgs (5 feet into the groundwater table). Two samples per boring will be collected based on visual and photoionization detection (PID) screening and analyzed for Target Compound List/Target Analyte List (TCL/TAL) parameters. Additionally, one sample per area of concern will be collected for waste disposal characterization (TCLP VOCs, SVOCs, Herbicides/Pesticides and RCRA Metals). SURFACE SOIL SAMPLING Surface soil samples will be collected in all vegetated areas in 40 foot centers in the northern and eastern portions of the property. A map depicted the proposed surface soil sampling is presented as Figure 4-3. Two samples will be collected from each location using a hand auger, from the 0-6 inch interval and the 6-24 inch interval. Samples will be screened with a PID and analyzed from Target Compound List/Target Analyte List (TCL/TAL) parameters. Three samples will also be collected from the surface soils on the northern/eastern portion of the site for waste disposal characterization (TCLP). As part of the site rehabilitation, East One Thirty Eighth Housing Development Fund Company plans to remove the top two feet of exposed soil on the western portion of the property. It is estimated that 1,345 cubic yards of soil will be removed from the Site. In compliance with DER-10, 9 discrete samples will be collected and analyzed for VOCs and 3 composite samples will be collected for SVOCs, Inorganics and PCBs/Pesticides from this portion of the property. Two samples will be collected from surface soils on the western portion of the property for waste disposal characterization (TCLP).
Develop a Task Hazard Analysis Sheet for each unique site task and attach to the HASP. Also Attach Generic Risk Assessment Tables	

GROUNDWATER INVESTIGATION

Five permanent groundwater monitoring wells (Figure 4-4)will be installed to monitor areas of concern and up-gradient conditions as well as obtain an accurate groundwater flow direction via Geoprobe. The wells will be installed to a depth of 25 feet bgs and will be constructed using 1-inch Schedule 40 PVC with a 15 foot screen and a 10 foot riser. The well installation procedure SOP is provided in Appendix A.

Following well installation, the four monitoring wells will be developed until the turbidity of the recovered well water is less than 50 Nephelometric Turbidity Units (NTUs). The applicable SOPs for this work are presented in Appendix B. The HASP and sampling QAPP for this work are presented in Appendices B and C, respectively.

All existing and proposed monitoring wells and borings will be surveyed by a NYS-licensed land surveyor for horizontal and vertical control. The vertical datum for the map will be NGVD 86 or a datum relatable to NGVD 86. A base map will be developed to accurately plot all monitoring wells and groundwater flow direction. The elevations of all monitoring well casings will be established to within +/- 0.01 feet based on the NGVD 86 datum. A notch will be placed in all interior casings to provide the point to collect future groundwater elevation measurements.

One round of depth to water measurements and one round of groundwater samples will be collected from the four wells for full TCL/TAL parameters.

SOIL VAPOR SAMPLING

Four soil gas samples will be collected around the perimeter of the site. Three sub-slab and three indoor air samples will be collected to evaluate sub-slab and indoor air quality on-Site. A map depicting the proposed air sampling locations is presented as Figure 4-5. All air sampling will be conducted in accordance with the procedures outlined in the SOP provided in Appendix B.

The samples will be analyzed for VOCs using EPA Method TO-15. Analyses will be performed by a laboratory with current Environmental Laboratory Approval Program (ELAP) Certification.

History of Site

PHASE I ENVIRONMENTAL SITE ASSESSMENTS

The Phase I Environmental Site Assessment conducted in March 2009 was limited in scope because Impact Environmental was not allowed access to the property. On the basis of historical records, the following recognized environmental conditions at the site were found:

A gasoline filling station with 5-550 gallon underground storage tanks was located in the southwest corner of the property in an area that is currently landscaped. This filling station was identified on Sanborn maps from 1935, 1944, 1947, 1951 and 1968 and therefore was likely in operation for approximately 40 years. There are no records indicating whether these tanks were removed.

A parking garage with two underground storage tanks and an auto repair facility were located on the northwestern side of the site. The garage was observed on Sanborn maps dated 1935, 1944, 1947, 1951, 1968 and 1978 and various auto repair facilities were noted over the same period. Like the filling station described above, there is no record of tank removal.

A mattress factory/manufacturer was present in the northwest corner of the site according to Sanborn maps from 1944 through 1978.

A metals works facility was located on the southeast corner of the site, and based on a review of the Sanborn maps, was likely in operation from 1951 to 1978.

The historical operations all have potential to impact subsurface soils, ground water and soil vapor at the site where the building is home to a sensitive population of frail and elderly. The 40 year old filling station, with five 550-gallon underground gasoline storage tanks, likely represents the most significant source. Leaks and spills from tanks located on the southwest section of the property may have contaminated soil under a portion of the building and under the landscaped area of the site. Also on-site for a period of about 40 years were two 550-gallon underground storage tanks associated with the parking garage. If these tanks were left in place they are likely under the building itself. Research on historical mattress manufacturing suggests the possible use of solvents in the construction and degreasing of spring coils as well as chemicals used in making the mattresses flame retardant and insect proof such as antimony, phosphorus and arsenic. Solvents may also have been associated with the metals works and/or auto repair facility.

PHASE II ENVIRONMENTAL SITE ASSESSMENTS

MACTEC, on behalf of the U.S. Department of Housing and Urban Development, conducted a limited Phase II on-site investigation on the property in January, 2010. Three soil samples (SB-1A, SB-1B and SB-2) from the southeast area of the property near the site dumpsters at the east end of the tenant parking area. Sample SB-1A was collected at 4.5 and 5.0 feet below ground surface (bgs), sample SB-1B was collected from 14.5 to 15 feet bgs and sample SB-2D was collected from 13.0 to 13.5 feet bgs. Soil sample SB-3 was collected near the northwest area of the property, near the slab extension patio from 1.5 to 2.0 feet bgs. Soil samples SB-4, SB-5 and SB-6 were collected in the southeast area of the property. Soil sample SB-4 was collected from 4.5 to 5.0 feet bgs, soil sample SB-5 was collected from 0.5 to 1.0 feet and soil sample SB-6 was obtained from 0.5 to 1.0 feet bgs.

Soil samples were analyzed for Poly Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), Total Petroleum Hydrocarbons (TPH) and Resource Conservation Recovery Act (RCRA) Eight Metals and Polychlorinated Biphenyls (PCBs). MACTEC attempted to advance 1-inch PVC temporary monitoring wells using GeoProbe® direct push equipment in the southeast, northwest and southwest areas of the property. Two of the 11 borings were able to be advanced to groundwater (SB-3 and SB-4). The well at SB-3 was a good water producer (TWP-4) and was screened from 14 to 19 feet bgs. SB-4 was a poor groundwater producer (TWP-4) and was screened from 24 to 28 feet bgs. The little amount of water produced from TWP-4 was extremely turbid. Groundwater samples from TWP-3 were analyzed for VOCs by EPA Method 8260, PAHs by EPA Method 8270, and TPHs. Due to the low water volume collected from TWP-4, the laboratory was only able to test for diesel range organics (DRO).

ANALYTICAL RESULTS

Five shallow samples (between 0.5 and 2.0 feet below ground surface (bgs)) were submitted to the laboratory for analysis of (PAHs), VOCs and (TPH). Analytical results indicate that the concentrations of some Semi-Volatile Organic Compounds (SVOCs) were in excess of New York State Department of Environmental Conservation (NYSDEC) recommended soil cleanup objectives (SCOs). Sample SB-1A, obtained from 4.5 to 5.0 feetbgs, was analyzed for RCRA Eight Metals. The results from the analysis of this soil sample using EPA Methods 6010B and 7471A showed that both chromium and silver both exceeded the375-6.8 unrestricted use. None of the results exceeded the 375-6.8 restricted residential SCO. Soil samples obtained from borings SB-1A, SB-2D, SB-3, SB-4, SB-5 and SB-6 were analyzed for PCBs. PCBs were not detected in five of the six samples collected. Aroclor 1254 was detected at the unrestricted threshold of 1,000 ug/kg.

Groundwater was encountered between 14 and 16 feet bgs in two of the borings. Of the two groundwater samples collected, only one could be analyzed and that sample also contained several SVOCs. However, as a result of elevated method detection limits, the concentrations were not considered representative. MACTEC's investigation is considered incomplete and insufficient for characterizing the areas of concern on the property.

	Site Description Borinquen Court is a seven-story, 145-unit, 137,800 sq. ft. low-income senior housing complex in the Mott Haven section of the South Bronx in New York City. The building is constructed of block and plank, with a slab on grade foundation and a brick façade. The building sits on a 79,400 sq. ft. piece of land on Third Avenue between East 138th street to East 139th Street in the Bronx. The building entrance fronts on East 138th Street and the building includes three residential wings that surround a centralized core. An open, paved parking lot that accommodates 33 cars is located on the southeast portion of the site and to the west is an open, landscaped area. The site occupies approximately 1.8 acres and approximately ¾ of the block. The site is legally defined as Tax Block 2314, Lot 1. A Site location map is presented as Appendix C. The properties surrounding the site are used primarily for residential purposes, with some commercial and industrial uses as well. Immediately to the west of the site is the intersection of Morris and Third Avenues and immediately to the east is the New York City Police Department's 40th Precinct. North of the site, across East 139th street, are 3 and 4 story residential buildings and one manufacturing building and south of the site is a high rise New York City Housing Authority complex, the Mayor John Purroy Mitchell Houses, surrounded by parking lots. The MTA #6 train runs adjacent to the property along East 138th Street. A subway station exists on the corner of 138th and Third Avenue and abuts the property.
	Site Hazard Assessment Summary (Summarize major bullet points from the attached Task Hazards Analysis sheet(s)) During Geoprobe activities, all borings and well locations will be hand cleared to 4 feet bgs.
	Precautions For Preventing Contractor-Equipment Related Incidents The site safety officer will review this Health and Safety Plan with all subcontractors prior to performing any work. In addition, if the site safety officer or any other ERM employee witnesses an unsafe act, he or she has the authority to stop work and/or report the incident.

Subsurface Clearance **Document the steps that must be followed and justify any exceptions.**	SSC Requirement	Yes	No	How will it be done? Why the exception?
	Contractor prequalification of SSC capability	☒		
	"Designated Person" assigned	☒		
	Site information review	☒		
	Site walkover	☒		

	Utility markout	☒	☐	
	Consider/document "Critical Zones"	☒	☐	
	Will manually clear all drilling points	☒	☐	

Chemicals of Concern	Chemical Name	PEL/TLV	Highest Reported Concentration			Site Location/Source
			Air	Water	Soil	
	Benzo (a) Anthracene	NA	NA	0.27	5.2	TWP-3/SB-3, 5
	Chrysene	0.2	NA	NA	5.3	SB-3, 5
	Benzo (b) Fluoranthene	NA	NA	NA	5.8	SB-3, 5
	Benzo (a) Pyrene	0.2	NA	NA	4.8	SB-3, 5
	Indeno (1,2,3-cd) Pyrene	NA	NA	NA	5.2	SB-3, 4, 5, 6
	Dibenz (a,h) Anthracene	NA	NA	NA	1.5	SB-3, 5
	Aroclor 1254	NA	NA	NA	1.0	SB-4

Air Monitoring Action Levels	Constituent	Action Level (ppm)	Level of Protection	Monitoring Instrument
If air monitoring is necessary to control acutely hazardous issues on site, document the short-term limit that requires response	Acute Chemical Issues			
	Oxygen			
	H2S			
	C2S			
	Dusts			
	VOCs:			
If exposures to chronic chemical exposure concerns				
	Others:			

is necessary, document the levels at which actions are required. SEE CAMP	Long-Term Issues			
	Metals			
	Dusts			
	Others:			

Level of Protection	Task Description	Level				
		A	B	C	Mod D	D
	All field tasks listed above.	☐	☐	☐	☐	☒
		☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐

Personal Protective Equipment	Equipment	Req	Rec	NA	Equipment	Req	Rec	NA
	Steel Toe Boots	☒	☐	☐	Hard Hat	☒	☐	☐
	Outer Disposable Boots	☐	☐	☒	Safety Glasses with Side Shields	☒	☐	☐
Req = Required **Rec = Recommended** **NA = Not Applicable**	Coveralls or Long Sleeve Shirt &Pants	☐	☐	☒	Indirect Vented (Splashproof) Goggles	☐	☐	☒
	Tyvek Suit	☐	☐	☒	SCBA	☐	☐	☒
	Poly-coated Tyvek / Saranex Suite	☐	☐	☒	Full-face Airline Resp.	☐	☐	☒
	Fully Encapsulated Chemical Suite	☐	☐	☒	Full Face Negative Pressure Resp.	☐	☐	☒
	Hearing Protection	☒	☐	☐	Half Face Negative Pressure Resp	☐	☐	☒
	Leather Gloves	☐	☐	☒	Powered Air Purifying Resp	☐	☐	☒
	Outer Chemical Gloves	☐	☐	☒	Other:	☐	☐	☐
	Inner Chemical Gloves	☒	☐	☐		☐	☐	☐

Some countries (U.S.) require documentation of the PPE needs assessment and certification of the selection process. If this applies, please complete below:

Name of PPE Assessor/ Certifier: _____

Date of Assessment/Certification: _____

Work Zones **If exclusion zones are necessary because of chemical OR equipment hazards, describe the plan.**	Exclusion Zone: Exclusion zones will be necessary during the drilling and sampling tasks. The exclusion zone will consist of a coned off area around the perimeter of the work zone. Only authorized personnel will be allowed within this area. If the work is being performed in a high traffic area caution tape will be utilized to cordon off the area.
	Contamination Reduction Zone: NA
	Support Zone: NA

Site Access/Control **How do we limit unauthorized entry to the site itself?**	The site health and safety officer will be present during all tasks and will be in charge of limiting work zone access to authorized personnel only.
Decontamina-tion Procedures	All drilling equipment will be steam cleaned before entering and prior to exiting the site. All sampling equipment will be decontaminated using an alconox water rinse before initial use and between each sampling interval.

<table>
<tr><td>Accident Investigation</td><td colspan="4">Incidents will be investigated using ERM Incident Investigation Form found on ERM's Health and Safety Database. Completed Incident Investigation forms will be distributed internally as required by the program and to the client as required.</td></tr>
<tr><td rowspan="14">Emergency Contacts

Complete this section if medical and emergency response support is not KNOWN to be fully available through on-site client personnel</td><td colspan="4">Name and Address of Nearest Hospital:
Lincoln Medical and Mental Health Center
234 East 149th Street, Bronx, NY 10451-5504</td></tr>
<tr><td colspan="4">Hospital Phone Number: (718) 579-5000</td></tr>
<tr><td colspan="4">Route To the Nearest Hospital: (Write or attach map)
See Attached.</td></tr>
<tr><td colspan="4">Other Contact Information</td></tr>
<tr><td>Agency</td><td>Contact</td><td>Location</td><td>Phone Number ("911" or other if they are active)</td></tr>
<tr><td>Police Dept</td><td>Bronx 40th Precinct</td><td>257 Alexander Avenue</td><td>(718) 402-2270</td></tr>
<tr><td>Fire Dept/ Ambulance</td><td>FDNY: Engine 83 Ladder 29</td><td>618 East 138th St.</td><td>(718) 430-0283</td></tr>
<tr><td>Electric Utility</td><td></td><td></td><td></td></tr>
<tr><td>Plant Contact</td><td></td><td></td><td></td></tr>
<tr><td>Client Contact</td><td>John Scott Johnson</td><td>2345 Broadway, NY, NY</td><td>(212) 721-6032</td></tr>
<tr><td>Project Manager</td><td>Greg Shkuda</td><td>ERM</td><td>(631) 756-8900</td></tr>
<tr><td>Project H&S Officer</td><td>Karen Pickering</td><td>ERM</td><td>(631) 756-8900</td></tr>
<tr><td>Site Safety Officer</td><td>Brice Lynch</td><td>ERM</td><td>(631) 756-8900</td></tr>
</table>

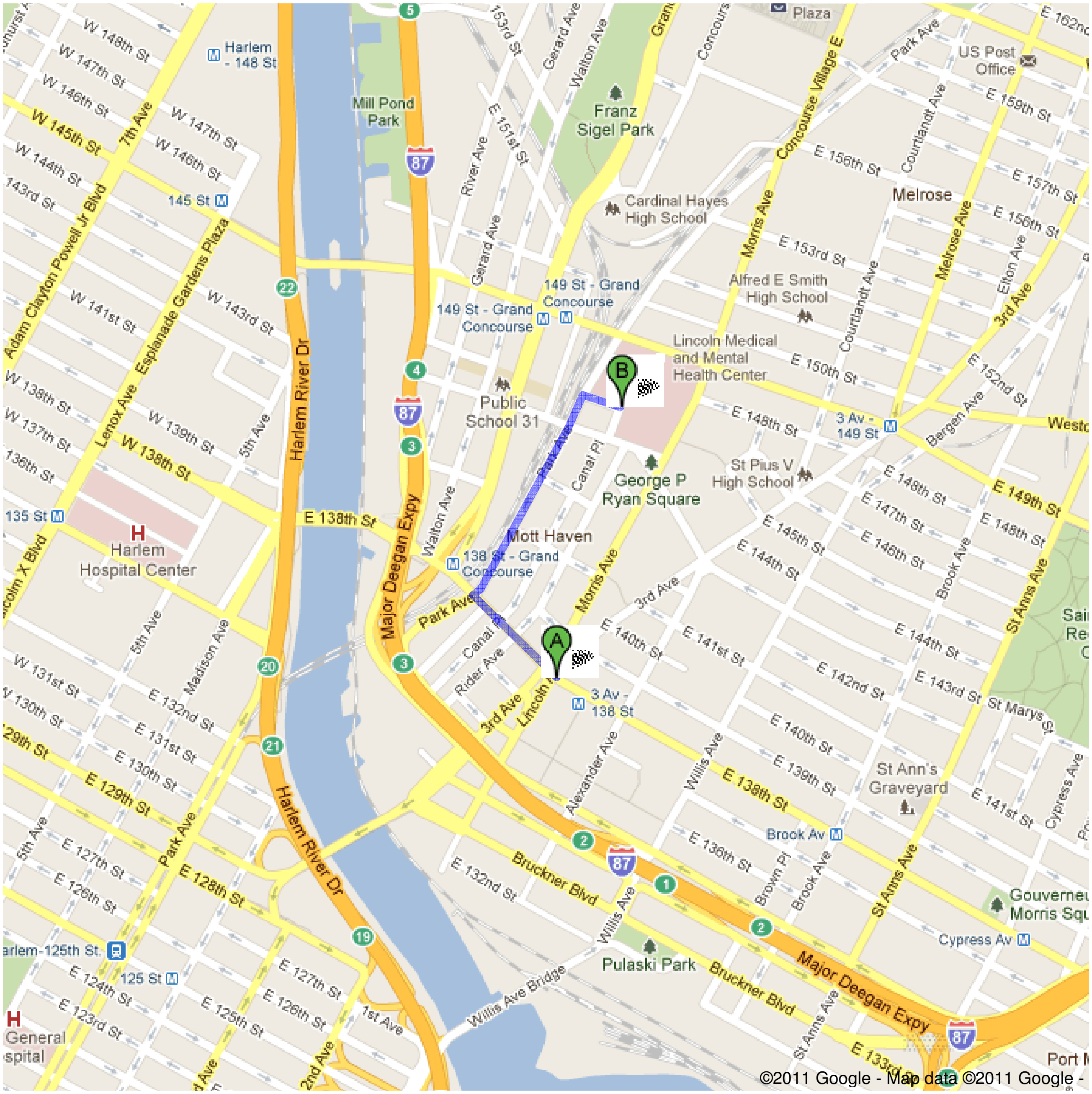
<table>
<tr><td rowspan="5">Health & Safety Plan Evaluation

Complete after the Field Work is done- place in the file and send suggested improvements to the H&S Leader</td><td colspan="9">To evaluate the effectiveness of this health and safety plan and make future plans responsive to unexpected situations, the Project Manager or Site Safety Officer should complete the following and file a copy of this entire document with the OpCo Health and Safety Leader and others who would benefit.</td></tr>
<tr><td rowspan="2">Actual Dates of the Field Tasks:</td><td colspan="4">Was the H&S Plan followed as Presented?</td><td colspan="4">Was the H&S Plan Adequate?</td></tr>
<tr><td>Yes</td><td>☐</td><td>No</td><td>☐</td><td>Yes</td><td>☐</td><td>No</td><td>☐</td></tr>
<tr><td colspan="9">Describe in detail any changes to the H&S Plan while on-site:</td></tr>
<tr><td colspan="9">Reason For Change:

What Changes Would You recommend:</td></tr>
<tr><td rowspan="3">Signatures</td><td colspan="6">Project Manager (If other than the PM)</td><td colspan="3">Date:</td></tr>
<tr><td colspan="6">Project Health and Safety Officer (If other than the PM)</td><td colspan="3">Date:</td></tr>
<tr><td colspan="6">Site Safety Officer (If other than the PM)</td><td colspan="3">Date:</td></tr>
</table>

Acknowledgement	This Health & Safety Plan has been discussed with me. I understand its content, and have been given opportunity to ask questions.		
Printed Name	Signature	Company	Date

Directions to Lincoln Medical and Mental Health Center
234 East 149th Street, Bronx, NY 10451-5504 - (
718) 579-5000
0.6 mi – about **2 mins**



A 285 E 138th St, Bronx, NY 10454

1.	Head **northwest** on **E 138th St** toward **Lincoln Ave**	go 0.2 mi total 0.2 mi
2.	Turn right onto **Park Ave** About 1 min	go 0.3 mi total 0.5 mi
3.	Turn right onto **E 146th St**	go 292 ft total 0.6 mi

B **Lincoln Medical and Mental Health Center**
234 East 149th Street, Bronx, NY 10451-5504 - (718) 579-5000

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

ERM

Task Hazard Analysis Worksheet

In assessing the potential hazards, determine if one task description/ analysis is sufficient. If not, then develop additional task assessments with their own steps.

Task Description (Sequence of Steps):

1. Drill Hole for Sub-Slab Sample
2. Insert Tubing
3. Seal Floor with Hot Wax
4. Turn on Canister
5. Periodically Check Canisters
6.

Check Applicable Task Hazard	**Check the Planned or Recommended Hazard Control (write in others)**
☐ Asphyxiation	☐ Ventilation ☐ Supplied Air ☐ Air monitoring
☐ Chemical Exposure	☐ Isolation, Lockout/Tagout ☐ PPE ☐ Respiratory Protection ☐ Decontamination/ eyewash/ shower
☒ Plant, Insect, Animal Hazards	☐ Knowledge of particular local issues ☒ Repellant sprays and coatings ☐ Netting, clothing covering ☐ Self-inspection schedule ☒ First aid kit
☒ Thermal Burns ☐ Hot Surface	☐ Splash Guard ☐ Isolation, Lockout/Tagout ☒ PPE ☐ Equipment Covers ☐ Barricades
☒ Slips and Trips	☒ Ensure clean and dry surface ☐ Barricade ☒ Walk Carefully/ Eyes on Path ☒ Use alternate route if wet or unstable situation ☒ Relocate the trip hazards
☐ Falls ☐ More than 4 feet	☐ Fall restraint, guardrails, barricades, short lanyard
☐ Electrical shock	☐ Isolation, LOTO ☐ Testing ☐ Grounding ☐ Shielding on equipment ☐ PPE ☐ Ground Fault Interruption on cords ☐ Electrical expertise on project team
☒ Airborne/Flying material	☐ Cover/Shield source ☒ PPE, Eye & Face ☐ PPE, Arms & Body ☐ Positioning
☐ Fire/ Explosion	☐ Isolation/LOTO ☐ Air testing/monitoring ☐ Control sources of ignition ☐ Implement a "Hot Work" process ☐ PPE ☐ The correct fire extinguisher is available
☒ Heat/Cold Stress	☐ Ventilation ☐ Cooling vests, etc. ☐ Task rotation, Shared tasks ☒ Work/Rest regimen ☐ Planned place for sheltering
☒ High Noise	☒ Hearing Protection ☐ Relocate Work ☐ Muffle Source
☐ Poor Visibility	☐ Illumination is adequate for task ☐ Nighttime considerations if the job *could* extend past daylight hours

☐ Lifting, pulling, pushing	☐ A plan is in place (people, devices, carts) ☐ Handling equipment is designed for the job ☐ Proper technique known/ discussed ☐ Smaller, lighter loads?
☐ Repetitive motion	☐ Proper technique known/ discussed ☐ Proper tools, rather than manual ☐ Get help, take breaks
☒ Rotating equipment/ Pinch Points	☐ Isolation, LOTO ☐ Guarding, Barricading ☒ No loose clothing ☐ Positioning
☒ Sharp objects	☐ Guarding ☒ Gloves, safety shoes or boots ☐ Substitute safe cutter for blade
☐ Falling objects	☐ Secure objects ☐ Guarding, covers ☐ Hard Hat ☐ Barricading
☐ Hazards from others working in vicinity (particularly heavy equipment)	☐ Communication ☐ Barricading ☐ Shielding
☐ Hazards to other working in vicinity	☐ Communication ☐ Barricading ☐ Shielding
☐ Environmental Spill	☐ Containment ☐ Waste Plan ☐ Waste Containers ☐ Other
☐ Chemical Storage	☐ Container labeling and MSDSs ☐ Incompatibles (acids/bases, flammables/oxidizers) considered ☐ Control physical damage to containers
☐ Drowning	☐ Personal Floatation Device ☐ Barricading ☐ Working with a partner ☐ Alerting Devices
☐ Ionizing Radiation	☐ Exposure Monitoring ☐ PPE ☐ Distance and/or shielding
☐ Nearby Road Traffic	☐ Bright colored work vests ☐ Planned avoidance of traffic areas ☐ Signs and lights to alert drivers
☒ Contact with underground utilities	☒ Local Utility "One Call" service ☒ Access to site maps/ experience ☒ Utility Line Locating Devices ☐ Utility Company Knowledge: ☐ Hand Auguring before mechanical
☐ Hazards not listed	List Hazard Controls

	YES	**NO**	**N/A**
Is a permit (Hot Work, Confined Space Entry, Process Line Breaking, and LOTO) required for this ERM work task?	☐	☒	☐
If so is the client's procedure/policy supplied?	☐	☐	☐
Do you have the proper tools and/or equipment in good condition	☒	☐	☐
Have you planned an escape route?	☒	☐	☐
Was this Hazard Analysis reviewed with the project team performing this task?	☒	☐	☐

Developed By (Individual or Team Members) Names: Karen Pickering

Date Developed: 7/27/2011

Reviewed with the Following Project Employees:

Task Hazard Analysis Worksheet

In assessing the potential hazards, determine if one task description/ analysis is sufficient. If not, then develop additional task assessments with their own steps.

Task Description (Sequence of Steps):

1. Sub-surface Utility Clearance
2.
3.
4.
5.
6.

Check Applicable Task Hazard	Check the Planned or Recommended Hazard Control (write in others)
☐ Asphyxiation	☐ Ventilation ☐ Supplied Air ☐ Air monitoring
☐ Chemical Exposure	☐ Isolation, Lockout/Tagout ☐ PPE ☐ Respiratory Protection ☐ Decontamination/ eyewash/ shower
☒ Plant, Insect, Animal Hazards	☐ Knowledge of particular local issues ☒ Repellant sprays and coatings ☐ Netting, clothing covering ☐ Self-inspection schedule ☒ First aid kit
☐ Thermal Burns ☐ Hot Surface	☐ Splash Guard ☐ Isolation, Lockout/Tagout ☐ PPE ☐ Equipment Covers ☐ Barricades
☒ Slips and Trips	☒ Ensure clean and dry surface ☐ Barricade ☒ Walk Carefully/ Eyes on Path ☒ Use alternate route if wet or unstable situation ☒ Relocate the trip hazards
☐ Falls ☐ More than 4 feet	☐ Fall restraint, guardrails, barricades, short lanyard
☐ Electrical shock	☐ Isolation, LOTO ☐ Testing ☐ Grounding ☐ Shielding on equipment ☐ PPE ☐ Ground Fault Interruption on cords ☐ Electrical expertise on project team
☐ Airborne/Flying material	☐ Cover/Shield source ☐ PPE, Eye & Face ☐ PPE, Arms & Body ☐ Positioning
☐ Fire/ Explosion	☐ Isolation/LOTO ☐ Air testing/monitoring ☐ Control sources of ignition ☐ Implement a "Hot Work" process ☐ PPE ☐ The correct fire extinguisher is available
☒ Heat/Cold Stress	☐ Ventilation ☐ Cooling vests, etc. ☐ Task rotation, Shared tasks ☒ Work/Rest regimen ☐ Planned place for sheltering
☐ High Noise	☐ Hearing Protection ☐ Relocate Work ☐ Muffle Source
☐ Poor Visibility	☐ Illumination is adequate for task ☐ Nighttime considerations if the job *could* extend past daylight hours
☐ Lifting, pulling, pushing	☐ A plan is in place (people, devices, carts) ☐ Handling equipment is designed for the job ☐ Proper technique known/ discussed ☐ Smaller, lighter loads?
☐ Repetitive motion	☐ Proper technique known/ discussed ☐ Proper tools, rather than manual ☐ Get help, take breaks
☐ Rotating equipment/ Pinch Points	☐ Isolation, LOTO ☐ Guarding, Barricading ☐ No loose clothing ☐ Positioning
☐ Sharp objects	☐ Guarding ☐ Gloves, safety shoes or boots ☐ Substitute safe cutter for blade
☐ Falling objects	☐ Secure objects ☐ Guarding, covers ☐ Hard Hat ☐ Barricading
☐ Hazards from others working in vicinity (particularly heavy equipment)	☐ Communication ☐ Barricading ☐ Shielding
☐ Hazards to other working in vicinity	☐ Communication ☐ Barricading ☐ Shielding
☐ Environmental Spill	☐ Containment ☐ Waste Plan ☐ Waste Containers ☐ Other
☐ Chemical Storage	☐ Container labeling and MSDSs ☐ Incompatibles (acids/bases, flammables/oxidizers) considered ☐ Control physical damage to containers
☐ Drowning	☐ Personal Floatation Device ☐ Barricading ☐ Working with a partner ☐ Alerting Devices
☐ Ionizing Radiation	☐ Exposure Monitoring ☐ PPE ☐ Distance and/or shielding
☐ Nearby Road Traffic	☐ Bright colored work vests ☐ Planned avoidance of traffic areas ☐ Signs and lights to alert drivers
☐ Contact with underground utilities	☒ Local Utility "One Call" service ☐ Access to site maps/ experience ☒ Utility Line Locating Devices ☐ Utility Company Knowledge: ☒ Hand Auguring before mechanical
☐ Hazards not listed	List Hazard Controls

	YES	NO	N/A
Is a permit (Hot Work, Confined Space Entry, Process Line Breaking, and LOTO) required for this ERM work task?	☐	☒	☐
If so is the client's procedure/policy supplied?	☐	☐	☐
Do you have the proper tools and/or equipment in good condition	☒	☐	☐
Have you planned an escape route?	☒	☐	☐
Was this Hazard Analysis reviewed with the project team performing this task?	☒	☐	☐

Developed By (Individual or Team Members) Names: Karen Pickering

Date Developed: 7/27/2011

Reviewed with the Following Project Employees:

Task Hazard Analysis Worksheet

ERM

In assessing the potential hazards, determine if one task description/ analysis is sufficient. If not, then develop additional task assessments with their own steps.

Task Description (Sequence of Steps):

1. Drilling Oversight
2. Soil Core Classification and Screening
3. Soil Sample Collection
4. Decon of Sampling Tools
5.
6.

Check Applicable Task Hazard	Check the Planned or Recommended Hazard Control (write in others)
☐ Asphyxiation	☐ Ventilation ☐ Supplied Air ☐ Air monitoring
☒ Chemical Exposure	☐ Isolation, Lockout/Tagout ☒ PPE ☐ Respiratory Protection ☒ Decontamination/ eyewash/ shower
☒ Plant, Insect, Animal Hazards	☐ Knowledge of particular local issues ☒ Repellant sprays and coatings ☐ Netting, clothing covering ☐ Self-inspection schedule ☒ First aid kit
☐ Thermal Burns ☐ Hot Surface	☐ Splash Guard ☐ Isolation, Lockout/Tagout ☐ PPE ☐ Equipment Covers ☐ Barricades
☒ Slips and Trips	☒ Ensure clean and dry surface ☐ Barricade ☒ Walk Carefully/ Eyes on Path ☒ Use alternate route if wet or unstable situation ☒ Relocate the trip hazards
☐ Falls ☐ More than 4 feet	☐ Fall restraint, guardrails, barricades, short lanyard
☐ Electrical shock	☐ Isolation, LOTO ☐ Testing ☐ Grounding ☐ Shielding on equipment ☐ PPE ☐ Ground Fault Interruption on cords ☐ Electrical expertise on project team
☒ Airborne/Flying material	☐ Cover/Shield source ☒ PPE, Eye & Face ☐ PPE, Arms & Body ☐ Positioning
☐ Fire/ Explosion	☐ Isolation/LOTO ☐ Air testing/monitoring ☐ Control sources of ignition ☐ Implement a "Hot Work" process ☐ PPE ☐ The correct fire extinguisher is available
☒ Heat/Cold Stress	☐ Ventilation ☐ Cooling vests, etc. ☐ Task rotation, Shared tasks ☒ Work/Rest regimen ☐ Planned place for sheltering
☒ High Noise	☒ Hearing Protection ☐ Relocate Work ☐ Muffle Source
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☐ Lifting, pulling, pushing	☐ A plan is in place (people, devices, carts) ☐ Handling equipment is designed for the job ☐ Proper technique known/ discussed ☐ Smaller, lighter loads?
☐ Repetitive motion	☐ Proper technique known/ discussed ☐ Proper tools, rather than manual ☐ Get help, take breaks
☒ Rotating equipment/ Pinch Points	☐ Isolation, LOTO ☐ Guarding, Barricading ☒ No loose clothing ☒ Positioning
☒ Sharp objects	☐ Guarding ☒ Gloves, safety shoes or boots ☐ Substitute safe cutter for blade
☒ Falling objects	☐ Secure objects ☐ Guarding, covers ☒ Hard Hat ☐ Barricading
☐ Hazards from others working in vicinity (particularly heavy equipment)	☐ Communication ☐ Barricading ☐ Shielding
☒ Hazards to other working in vicinity	☒ Communication ☒ Barricading ☐ Shielding
☐ Environmental Spill	☐ Containment ☐ Waste Plan ☐ Waste Containers ☐ Other
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☐ Drowning	☐ Personal Floatation Device ☐ Barricading ☐ Working with a partner ☐ Alerting Devices
☐ Ionizing Radiation	☐ Exposure Monitoring ☐ PPE ☐ Distance and/or shielding
☐ Nearby Road Traffic	☐ Bright colored work vests ☐ Planned avoidance of traffic areas ☐ Signs and lights to alert drivers
☒ Contact with underground utilities	☒ Local Utility "One Call" service ☐ Access to site maps/ experience ☒ Utility Line Locating Devices ☐ Utility Company Knowledge: ☒ Hand Auguring before mechanical
☒ Hazards not listed	List Hazard Controls Working over drywell. A piece of 3/4" plywood should be laid over the open hole during drilling activities to prevent falls.

	YES	NO	N/A
Is a permit (Hot Work, Confined Space Entry, Process Line Breaking, and LOTO) required for this ERM work task?	☐	☒	☐
If so is the client's procedure/policy supplied?	☐	☐	☐
Do you have the proper tools and/or equipment in good condition	☒	☐	☐
Have you planned an escape route?	☒	☐	☐
Was this Hazard Analysis reviewed with the project team performing this task?	☒	☐	☐

Developed By (Individual or Team Members) Names: Karen Pickering

Date Developed: 7/28/2011

Reviewed with the Following Project Employees:

Task Hazard Analysis Worksheet

ERM

In assessing the potential hazards, determine if one task description/ analysis is sufficient. If not, then develop additional task assessments with their own steps.

Task Description (Sequence of Steps):

1. Monitoring Well Sampling
2.
3.
4.
5.
6.

Check Applicable Task Hazard	Check the Planned or Recommended Hazard Control (write in others)
☐ Asphyxiation	☐ Ventilation ☐ Supplied Air ☐ Air monitoring
☒ Chemical Exposure	☐ Isolation, Lockout/Tagout ☒ PPE ☐ Respiratory Protection ☒ Decontamination/ eyewash/ shower
☒ Plant, Insect, Animal Hazards	☒ Knowledge of particular local issues ☒ Repellant sprays and coatings ☐ Netting, clothing covering ☐ Self-inspection schedule ☒ First aid kit
☐ Thermal Burns ☐ Hot Surface	☐ Splash Guard ☐ Isolation, Lockout/Tagout ☐ PPE ☐ Equipment Covers ☐ Barricades
☒ Slips and Trips	☒ Ensure clean and dry surface ☐ Barricade ☒ Walk Carefully/ Eyes on Path ☐ Use alternate route if wet or unstable situation ☒ Relocate the trip hazards
☐ Falls ☐ More than 4 feet	☐ Fall restraint, guardrails, barricades, short lanyard
☐ Electrical shock	☐ Isolation, LOTO ☐ Testing ☐ Grounding ☐ Shielding on equipment ☐ PPE ☐ Ground Fault Interruption on cords ☐ Electrical expertise on project team
☐ Airborne/Flying material	☐ Cover/Shield source ☐ PPE, Eye & Face ☐ PPE, Arms & Body ☐ Positioning
☐ Fire/ Explosion	☐ Isolation/LOTO ☐ Air testing/monitoring ☐ Control sources of ignition ☐ Implement a “Hot Work” process ☐ PPE ☐ The correct fire extinguisher is available
☒ Heat/Cold Stress	☐ Ventilation ☐ Cooling vests, etc. ☐ Task rotation, Shared tasks ☒ Work/Rest regimen ☒ Planned place for sheltering
☐ High Noise	☐ Hearing Protection ☐ Relocate Work ☐ Muffle Source
☐ Poor Visibility	☐ Illumination is adequate for task ☐ Nighttime considerations if the job *could* extend past daylight hours
☒ Lifting, pulling, pushing	☐ A plan is in place (people, devices, carts) ☒ Handling equipment is designed for the job ☒ Proper technique known/ discussed ☒ Smaller, lighter loads?
☒ Repetitive motion	☒ Proper technique known/ discussed ☒ Proper tools, rather than manual ☐ Get help, take breaks
☐ Rotating equipment/ Pinch Points	☐ Isolation, LOTO ☐ Guarding, Barricading ☐ No loose clothing ☐ Positioning
☒ Sharp objects	☐ Guarding ☒ Gloves, safety shoes or boots ☒ Substitute safe cutter for blade
☐ Falling objects	☐ Secure objects ☐ Guarding, covers ☐ Hard Hat ☐ Barricading
☐ Hazards from others working in vicinity (particularly heavy equipment)	☐ Communication ☐ Barricading ☐ Shielding
☐ Hazards to other working in vicinity	☐ Communication ☐ Barricading ☐ Shielding
☐ Environmental Spill	☐ Containment ☐ Waste Plan ☐ Waste Containers ☐ Other
☐ Chemical Storage	☐ Container labeling and MSDSs ☐ Incompatibles (acids/bases, flammables/oxidizers) considered ☐ Control physical damage to containers
☐ Drowning	☐ Personal Floatation Device ☐ Barricading ☐ Working with a partner ☐ Alerting Devices
☐ Ionizing Radiation	☐ Exposure Monitoring ☐ PPE ☐ Distance and/or shielding
☒ Nearby Road Traffic	☒ Bright colored work vests ☒ Planned avoidance of traffic areas ☐ Signs and lights to alert drivers
☐ Contact with underground utilities	☐ Local Utility “One Call” service ☐ Access to site maps/ experience ☐ Utility Line Locating Devices ☐ Utility Company Knowledge: ☐ Hand Auguring before mechanical
☐ Hazards not listed	List Hazard Controls

	YES	NO	N/A
Is a permit (Hot Work, Confined Space Entry, Process Line Breaking, and LOTO) required for this ERM work task?	☐	☒	☐
If so is the client's procedure/policy supplied?	☐	☐	☒
Do you have the proper tools and/or equipment in good condition	☒	☐	☐
Have you planned an escape route?	☐	☐	☒
Was this Hazard Analysis reviewed with the project team performing this task?	☐	☐	☒

Developed By (Individual or Team Members) Names: Karen Pickering

Date Developed: 7/27/2011

Reviewed with the Following Project Employees:

Appendix C
Community Air Monitoring Plan

COMMUNITY AIR MONITORING PLAN
Borenquen Court, Bronx, NY
September 2011

INTRODUCTION

The objective of the Community Air Monitoring Plan (CAMP) is to focus on potential community exposures related to migration of chemicals beyond the boundary of the Site where investigative work will be undertaken (e.g., nearby residences, public).

COMMUNITY AIR MONITORING PLAN

This CAMP has been developed in accordance with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) as well as the National Ambient Air Quality Standards (NAAQS) developed by the Environmental Protection Agency (EPA). The intent of the CAMP is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne releases of COPCs as a direct result of investigative and remedial work activities. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

Based on the NYSDOH guidance document, the CAMP includes requirements for continuous real-time air monitoring for total volatile organic compounds (VOCs), and particulates (PM-10) for select remedial activities. Real-time monitoring will be conducted at the perimeter of the work area, which may also be defined as the exclusion zone, and will include one upwind and one downwind monitoring location. Real-time monitoring will occur during activities that disrupt impacted media from the Site or adjacent sidewalk areas. The definition of activities that disrupt such impacted media is as follows:

- Ground intrusive activities include the installation of soil borings or monitoring wells and the soil/groundwater sampling.

The objective of the monitoring is to confirm that work area activities do not result in a sustained (i.e., 15 minute average) release of volatile organic compounds (VOCs) and particulates beyond the work area boundary above levels established herein. Upwind and downwind locations of the work area boundary will be determined using a wind sock. Depending on the remedial activity, perimeter monitoring will involve real-time total particulate and VOC measurements. Additional monitoring may also be conducted under any of the following circumstances:

- Change in ambient levels of hazardous constituents as indicated by the sense of smell and PID readings;
- Changes in the physical appearance of the soil or groundwater; and/or
- When new hazardous substances are encountered.

The remainder of this CAMP discusses the associated actions related to this monitoring plan as well as monitoring frequency and data reporting.

VOC Monitoring, Response Levels, Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should also be measured at the start of each workday and periodically thereafter to establish background conditions.

Ambient air monitoring will be conducted using direct-reading real-time instruments. The continuous total VOC perimeter monitoring will be performed using a portable, direct-reading photoionization detector (e.g., RAE MiniRAE 2000 PID) or a flame ionization detector (FID). The instrumentation used for perimeter monitoring will be used to calculate a running 15-minute average concentration. The PID lamp voltage of to be used for this Site is 11.7 eV.

Direct reading instrumentation will be calibrated daily per manufacturer's instructions. Cylinders of the appropriate calibration gas (e.g., isobutylene) will be required for fieldwork lasting longer than one day. The monitoring location, date, time, weather conditions, activities performed and the 15 minute interval readings in ppm shall be recorded.

The VOC response levels and actions are as follows:

- 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

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should 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 (e.g., Thermo Anderson PM-10 DataRAM). The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m3) 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/m3 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/m3 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/m3 of the upwind level and in preventing visible dust migration.

MITIGATIVE MEASURES

Potential mitigative measures to control airborne levels may include, but are not limited to, the following:

- Water spraying and/or other dust suppression techniques
- Soil gas control techniques

- Ventilation techniques to provide dilution and/or isolation of VOCs
- Personal protective equipment (worker exposures)
- Administrative controls

DOCUMENTATION AND RECORDKEEPING

All 15-minute readings will be recorded and available for personnel and management to review. Instantaneous readings, if any, used for decision purposes will also be recorded. Sampling data will be evaluated daily and a summary report will be generated weekly. The summary report shall include equipment type, serial number, calibration results, flow rates, sampling locations, sampling dates, sampling times, sampling results in the required units, and corrective actions implemented based on any threshold level exceedances.

A copy of any laboratory analytical results will be kept on-site along with any datalogged results as well as by the Project Manager at ERM.

Appendix D
QAPP

APPENDIX D
QUALITY ASSURANCE PROJECT PLAN (QAPP)

285 East 138th Street
Bronx, NY

August, 2011

Prepared for:

EAST ONE THIRTY EIGHTH HOUSING DEVELOPMENT FUND COMPANY, INC.
2345 Broadway
New York, NY 10024

Prepared by:

Environmental Resources Management
40 Marcus Drive, Suite 200
Melville, NY 11747

LIST OF TABLES

FIGURES

1.0 PURPOSE AND OBJECTIVES

1.1 Purpose

This Quality Assurance Project Plan (QAPP) was prepared for the Remedial Investigation (RI) Work Plan (WP) for the site located at 285 East 138th Street in Bronx, NY (the Site). It is intended to set forth guidelines for the generation of reliable data by measurement activities, such that data generated are scientifically valid, defensible, comparable and of known precision and accuracy.

This QAPP contains a detailed discussion of the quality assurance and quality control (QA/QC) protocols to be utilized by Environmental Resources Management (ERM) and laboratory personnel. The RI sampling program and relevant field/laboratory QA/QC requirements are summarized in Tables C-1 through C-14.

1.2 Definitions

The parameters that will be used to specify data quality objectives, and to evaluate the analytical system performance for all analytical samples are precision, accuracy, representativeness, completeness, and comparability (PARCC). Definitions of these and other key terms used in this QAPP are provided below.

- ***Accuracy*** - the degree of agreement of a measurement with an accepted reference value. Accuracy is generally reported as a percent recovery, and calculated as:

$$\frac{\text{Measured Value}}{\text{Accepted Value}} \times 100$$

- ***Analyte*** - the chemical or property for which a sample is analyzed.
- ***Comparability*** - the expression of information in units and terms consistent with reporting conventions; the collection of data by equivalent means; or the generation of data by the same analytical method. Aqueous samples will be reported as µg/l, solid samples will be reported in units of ug/kg or mg/kg, dry weight.
- ***Completeness*** - the percentage of valid data obtained relative to that which would be expected under normal conditions. Data are judged valid if they meet the stated precision and accuracy goals.

- ***Duplicate*** - two separate samples taken from the same source by the same person at essentially the same time and under the same conditions that are placed into separate containers for independent analysis. Duplicate samples are intended to assess the effectiveness of equipment decontamination, the precision of sampling efforts, the impacts of ambient environmental conditions on sensitive analyses (e.g., volatile organics analysis (VOA)), and the potential for contaminants attributable to reagents or decontamination fluids. Identifying such potential sources of error is essential to the success of the sampling program and the validity of the environmental data. Each QC sample is described below. As a minimum, each set of ten or fewer field samples will include a trip blank, a duplicate, and one sample collected in a sufficient volume to allow the laboratory to perform a matrix spike.

- ***Field Blanks*** - field blanks (sometimes referred to as "equipment blanks" or "sampler blanks") are the final analyte-free water rinse from equipment decontamination in the field and are collected at least one during a sampling episode. If analytes pertinent to the project are found in the field blank, the results from the blanks will be used to qualify the levels of analytes in the samples. This qualification is made during data validation. The field blank is analyzed for the same analytes as the sample that has been collected with that equipment.

- ***Precision*** - a measure of the agreement among individual measurements of the sample property under prescribed similar conditions. Precision is generally reported as Relative Standard Deviation (RSD) or Relative Percent Difference (RPD). Relative standard deviation is used when three or more measurements are available and is calculated as:

$$\text{RSD} = \frac{\text{Standard Deviation}}{\text{Arithmetic Mean}} \times 100$$

  Relative percent difference is used for duplicate measurements and is calculated as:

$$\text{RPD} = \frac{\text{Value 1 - Value 2}}{\text{Arithmetic Mean}} \times 100$$

- ***Quality Assurance (QA)*** - all means taken in the field and inside the laboratory to make certain that all procedures and protocols use the same calibration and standardization procedures for reporting results; also, a program which integrates the quality planning, quality assessment, and quality improvements activities within an organization.

- ***Quality Control (QC)*** - all the means taken by an analyst to ensure that the total measurement system is calibrated correctly. It is achieved by using reference standards, duplicates, replicates, and sample spikes. In addition, the routine application of procedures designed to ensure that the data produced achieve known limits of precision and accuracy.

- ***Replicate*** - two aliquots taken from the same sample container and analyzed separately. Where replicates are impossible, as with volatile organics, duplicates must be taken.
- ***Representativeness*** - degree to which data represent a characteristic of a set of samples. The representativeness of the data is a function of the procedures and caution utilized in collecting and analyzing the samples. The representativeness can be documented by the relative percent difference between separately collected, but otherwise identical sample volumes.
- ***Trip Blanks*** - trip blanks are samples that originate from analyte-free water taken from the laboratory to the sampling site and returned to the laboratory with the volatile organic samples. One trip blank should accompany each cooler containing volatile organics; it will be stored at the laboratory with the samples, and analyzed with the sample set. Trip blanks are only analyzed for VOCs.

1.3 Data Quality Objectives

1.3.1 Overall Data Quality Objectives

Data Quality Objectives (DQO) are quantitative and qualitative statements specifying the quality of the environmental data necessary to support the decision-making process to guide the RI and any subsequent corrective actions. DQO define the total uncertainty in the data that is acceptable for each specific activity during the RI. This uncertainty includes both sampling error and analytical error. Ideally, the prospect of zero uncertainty is the objective; however, the very processes by which data are collected in the field and analyzed in the laboratory contribute to the uncertainty of the data. It is the overall objective to keep the total uncertainty to a minimal level such that it will not hinder the intended use of the data.

To achieve the project DQO, specific data quality parameters such as detection limits, criteria for accuracy and precision, sample representativeness, data comparability and data completeness must be specified. The overall objectives are established such that there is a high degree of confidence in the measurements.

The parameters that will be used to specify data quality objectives and to evaluate the analytical system performance for soil and groundwater samples are PARCC: precision, accuracy, representativeness, completeness, and comparability.

1.3.2 *Field Investigation Data Quality Objectives*

To permit calculation of precision and accuracy for the samples, blind field duplicate, field blanks, trip blanks, and matrix spike/matrix spike duplicate (MS/MSD) samples will be collected, analyzed, and evaluated.

Through the submission of field QC samples, the distinction can be made between laboratory problems, sampling technique considerations, sample matrix effects, and laboratory artifacts. To assure sample representativeness, all sample collection will be performed in strict accordance with the procedures set forth in this QAPP.

Precision will be calculated as RPD if there are only two analytical points and percent relative standard deviation (% RSD) if there are more than two analytical points. Blind field duplicate and MS/MSD sample analyses will provide the means to assess precision. The submission of field and trip blanks will provide a check with respect to accuracy and will monitor chemicals that may be introduced during sampling, preservation, handling, shipping, and/or the analytical process. In the event that the blanks are contaminated and/or poor precision is obtained, the associated data will be appropriately qualified.

Representativeness will be assured through the implementation of the structured and coherent RIWP of which this QAPP is a part. This RIWP has been designed so that the appropriate numbers of samples of each matrix and of each location of interest are obtained for analysis.

Ideally, 100% completeness is the goal. However, it must be recognized that unforeseen issues may result in the generation of some data that may not be acceptable for use. Therefore, a completeness target of 90%, as determined by the total number of usable data points versus the total number of data points measured, will be the realistic goal of this program.

Comparability is defined as the extent to which data from one data set can be compared to similar data sets. Comparability between data sets is often questionable due to issues such as different analytical methods used or inter-laboratory differences. In order that the data generated as part of this project remain comparable to any previously generated data or data to be generated in the future, currently published analytical methods have been identified for the analysis of the collected samples. These methods will be performed by an analytical laboratory with a demonstrated proficiency in the analysis of similar samples by the referenced methods. In addition, samples will be collected using documented procedures to ensure consistency of effort and reproducibility if necessary.

1.3.3 Laboratory Data Quality Objectives

The analytical laboratory will demonstrate analytical precision and accuracy by the analysis of various QC samples (i.e., laboratory duplicates, spike samples, matrix spike duplicates and laboratory control samples). Tables C-5 through C-14 present the relevant precision and accuracy criteria for the analytical parameters related to this RIWP. Precision, as well as instrument stability, will also be demonstrated by comparison of calibration response factors from the initial calibration to that of the continuing calibrations. Laboratory accuracy will be evaluated by the addition of surrogate and matrix spike compounds, and will be presented as percent recovery (%R). Precision will be presented as RPD, % RSD, or percent difference (%D), whichever is appropriate for the number and type of QC samples analyzed. Laboratory blanks can also be used to demonstrate the accuracy of the analyses and possible effects from laboratory artifact contamination.

2.0 FIELD QUALITY ASSURANCE/QUALITY CONTROL

2.1 Equipment Maintenance

In addition to the laboratory analyses conducted during the course of this RI, field measurements will be collected for total volatile organics (air monitoring and soil sample screening), pH, conductivity, oxidation/reduction potential (ORP), dissolved oxygen (DO) and turbidity in groundwater. A maintenance, calibration, and operation program will be implemented to ensure that routine calibration and maintenance is performed on all field instruments. ERM's equipment manager, the Quality Assurance Officer (QAO), and the field team members will administer the program. ERM's equipment manager will perform the scheduled monthly and annual calibration and maintenance. Monthly and annual maintenance, calibration, and equipment operation will follow the procedures outlined in the manufacturer's Operation and Field Manuals accompanying the respective instruments.

2.2 Equipment Calibration

Trained field team members will be familiar with the field calibration, operation, and maintenance of the equipment. They will perform field calibrations, checks, and instrument maintenance daily. The photoionization detector (PID) will be calibrated on a periodic basis with isobutylene. A trained team member will perform daily field checks and instrument maintenance prior to use. A trained team member using standard calibration solutions will calibrate the pH, conductivity, ORP, DO, and turbidity meters. Field maintenance, calibration, and equipment operation will follow the procedures outlined in the manufacturer's Operation and Field Manuals accompanying the respective instruments. All maintenance and calibration will be documented on an instrument-specific master calibration/maintenance form.

The Field Team Leader (FTL) will be responsible for keeping a master instrument calibration/maintenance form for each measuring device. Each form will include at least the following relevant information:

- Name of device and/or instrument calibrated;
- Device/instrument serial and/or identification (I.D.) number;
- Frequency of calibration;
- Date of calibration;
- Results of calibration;
- Name of person performing the calibration;

- Identification of the calibration standards; and
- Buffer solutions (pH meter only).

2.3 *Equipment Decontamination*

To minimize the potential for cross-contamination, all drilling and sampling equipment will be properly decontaminated prior to and after each use.

2.3.1 *General Procedures*

All heavy equipment will be decontaminated in a designated clean area. Sampling equipment and probes will be decontaminated in an area covered by plastic near the sampling location. All solvents and wash water used in the decontamination process will be collected and drummed for off-site disposal. All disposable sampling equipment will be properly disposed of in dry containers.

All well casing and screen will be steam cleaned, wrapped in clean polyethylene sheeting, and stored until the time of well construction.

Extraneous contamination and cross-contamination will be controlled by wrapping the sampling equipment with aluminum foil when not in use and changing and disposing of the sampler's gloves between samples. Decontamination of sampling equipment will be kept to a minimum in the field, and wherever possible, dedicated sampling equipment will be used. Personnel directly involved in equipment decontamination will wear appropriate protective equipment.

2.3.2 *Heavy Equipment (drill rigs, etc.)*

All drilling equipment and the back of the drilling rig will be decontaminated by steam cleaning prior to performance of the first boring/well installation and between all subsequent borings/well installations. This will include all hand tools, casing, augers, drill rods and bits, tremie pipe and other related tools and equipment. The steam cleaning equipment will be capable of generating live steam with a minimum temperature of 212° F.

All water used during drilling and/or steam-cleaning operations will be from a potable source and so designated in writing. The drilling contractor is responsible for obtaining all permits from the local potable water purveyor and any other concerned authorities, and provision of any requested back-flow prevention devices. The equipment will be cleaned to the satisfaction of the ERM Hydrogeologist or FTL.

2.3.4 *Aqueous Sampling Equipment*

Factory pre-cleaned disposable bailers will be used during the RI. In the event that field decontamination of reusable sampling equipment is necessary, decontamination procedures will be as follows:

- Laboratory-grade glassware detergent and tap water scrub to remove visual contamination;
- Generous tap water rinse; and
- Distilled and deionized (ASTM Type II) water rinse;
- 10% nitric acid rinse, followed by a distilled and deionized water rinse (metals only), or
- Methanol (pesticide grade) rinse (volatiles only);
- Total air dry; and
- Distilled and deionized water rinse.

The submersible sampling pumps that are placed in the borehole will be decontaminated with an Alconox detergent rinse and by pumping approximately 5 gallons of potable water through the pump. Since dedicated new lengths of polyethylene tubing will be used for sampling each well, the tubing will not be decontaminated. Unless otherwise specified, the submersible pumps will be decontaminated prior to the sampling the first well and between each subsequent well as follows:

- Potable water rinse.
- Alconox detergent and potable water scrub.
- Potable water rinse.
- Distilled/deionized water rinse.
- Wrap in aluminum foil, shiny side facing out.

2.3.5 *Meters and Probes*

All meters and probes that are used in the field (other than those used solely for air monitoring purposes, e.g., oxygen meters, explosimeters, etc.) will be decontaminated between uses as follows:

- Phosphate-free laboratory detergent solution;
- tap water;
- methanol rinse (at the FTL's discretion);
- deionized water (triple rinse).

A methanol rinse will be used if deemed necessary by the FTL.

2.4 *Quality Assurance/Quality Control Sampling*

The field sampling quality assurance-sampling program is summarized in Table C-1. Specific guidance regarding the collection of field and laboratory QA/QC samples is presented separately below.

2.4.1 Field QA/QC Samples

Trip Blanks

The trip blank will be used to determine if any cross-contamination occurs between aqueous samples during shipment. The analytical laboratory will supply trip blanks as aliquots of distilled, deionized water that will be sealed in a sample bottle prior to initiation of each day of fieldwork. Glass vials (40 ml) with Teflon®-lined lids will be used for trip blanks. The sealed trip blank bottles will be placed in a cooler with the empty sample bottles and will be shipped to the site by the laboratory personnel. If multiple coolers are necessary to store and transport aqueous VOC samples, then each cooler must contain an individual trip blank. Trip blanks are analyzed for VOCs only.

Field Blanks

Field blanks will be collected to evaluate the cleanliness of soil and aqueous sampling equipment, sample bottles and the potential for cross-contamination of samples due to handling of equipment, sample bottles and contaminants present in the air. Field blanks will be collected at a frequency of one per decontamination event for each type of sampling equipment, and each media being sampled (e.g., a groundwater bailer for groundwater, and a hand auger for soil sampling), at a minimum of one per equipment type and/or media per day.

Field blanks will be collected prior to the occurrence of any analytical field-sampling event by pouring deionized or potable water over a particular piece of sampling equipment and into a sample container. The analytical laboratory will provide field blank water and sample jars with preservatives for the collection of all field blanks. Glass jars will be used for organic blanks. The field blanks as well as the trip blanks will accompany field personnel to the sampling location. The field blanks will be analyzed for the same analytes as the environmental samples being collected that day and will be shipped with the samples taken.

Field blanks will be taken in accordance with the procedure described below:

- Decontaminate sampler using the procedures specified in the QAPP;
- Pour distilled/deionized water over the sampling equipment and collect the rinsate water in the appropriate sample bottles;
- The sample will be immediately placed in a sample cooler and maintained at a temperature of 4°C until receipt by the laboratory; and
- Fill out sample log, labels, and COC forms, and record in field notebook.

Temperature Blanks

The temperature blank will be used to determine the temperature of the samples within the cooler upon arrival at the analytical laboratory. A laboratory-supplied temperature blank will be an aliquot of distilled, deionized water that will be sealed in a sample bottle. The sealed temperature blank bottles will be placed in a cooler with the empty sample bottles and will be shipped to the site by the laboratory personnel. If multiple coolers are necessary to store and transport samples, then each cooler must contain an individual temperature blank.

2.4.2 Laboratory QA/QC

Blind Field Duplicate Samples

Aqueous blind field duplicate samples will be collected analyzed to check laboratory reproducibility of analytical data. Blind field duplicates will be collected from the soil borings.

Blind field duplicate samples will be collected at a frequency of at least 5% (one out of every 20 samples) of the total number of samples collected to evaluate the precision and reproducibility of the analytical methods. All blind field duplicate samples will be submitted to the analytical laboratory as a normal sample, however, will have a fictitious sample identification and fictitious time of sample collection. Each blind field duplicate will be cross-referenced to document which actual sample it is a blind field duplicate of in the field notes and on the master sample log.

Matrix Spike/Matrix Spike Duplicate

Additional environmental sample volume will be collected for use as MS/MSD samples at a frequency of at least 5% (one out of every 20 samples) of the total number of samples collected per matrix to evaluate the precision and reproducibility of the analytical methods. To ensure the laboratory has sufficient volume for MS/MSD analysis, triple sample volume must be submitted for aqueous organic extractable and volatile samples once per every 20 samples in a sample delivery group (SDG).

2.5 *Field Records*

Proper management and documentation of field activities is essential to ensure that all necessary work is conducted in accordance with the RIWP and QAPP in an efficient and high quality manner. Field management procedures include following proper chain of custody procedures to track a sample from collection through analysis, noting when and how samples are split (if necessary), making regular and complete entries in the field logbook, and the consistent use and completion of field management forms. Field management forms and field logbook will be used to document all field activities, as this documentation will support that the samples were collected and handled properly, making the resultant data complete, comparable and defensible. Field logbook procedures and field management forms are identified in the following sections.

2.5.1 *Field Logbook*

The sample team or individual performing a particular sampling activity will keep a weatherproof field notebook. Field notebooks are intended to provide sufficient data and observations to enable participants to reconstruct events that occurred during projects and to refresh the memory of the field personnel if called upon to give testimony during legal proceedings. In a legal proceeding, notes, if referred to, are subject to cross-examination and are admissible as evidence. The field notebook entries should be factual, detailed, and objective. All entries are to be signed and dated. All members of the field investigation team are to use this notebook, which will be kept as a permanent record. The field notebook will be filled out at the location of sample collection immediately after sampling. It will contain sample descriptions including: sample number, sample collection time, sample location, sample description, sampling method used, daily weather conditions, field measurements, name of sampler, and other site-specific observations. The field notebook will contain any deviations from protocol and why, visitor's names, or community contacts made during sampling, geologic and other site-specific information which may be noteworthy.

2.5.2 *Field Management Forms*

In addition to maintenance of a field logbook, the use of field management forms will supplement field logbook entries for all field activities associated with this project. Field management forms provide a regular format to record the relevant information for a particular field activity. Use of these forms will ensure that the field team consistently and completely records all pertinent data relative to a particular field activity on a regular basis. All forms, sample labels, custody seals and other sample documents will be filled out completely.

A list of forms and the associated activities for which each form could be potentially be completed is presented below.

Form	***Activity***
Groundwater Sampling Record	All permanent well sampling
Soil Boring Logs	All borings
Air Sampling Checklist	All air samples
Monitoring Well Construction Logs	All permanent well installations
Well Development Data Sheet	All well development efforts
Chain of Custody (COC) Form	All field sampling efforts
Laboratory Sample Bottle Request	All field sampling efforts
Sampling Equipment Checklist	All field sampling efforts
Daily Instrument Calibration Log	Every day a field instrument is used
Well Inspection Log	All permanent well sampling

Copies of each of these forms are provided at the end of this attachment.

2.6 Sample Preparation And Custody

2.6.1 Sample Identification

To provide for proper identification in the field, and proper tracking in the laboratory, all samples must be labeled in a clear and consistent fashion using the procedures and protocols described below and within the following subsections.

- Sample labels will be waterproof and have a pre-assigned, unique number that is indelible.
- Field personnel must maintain a field notebook. This notebook must be water resistant with sequentially numbered pages. Field activities will be sequentially recorded in the notebook.
- The notebook, along with the COC form, must contain sufficient information to allow reconstruction of the sample collection and handling procedure at a later time.
- Each sample will have a corresponding notebook entry which includes:
    - Sample ID number;

- Well or other sample location and number;
- Date and time;
- Analysis for which sample was collected;
- Additional comments as necessary; and
- Samplers' name.

- Each sample must have a corresponding entry on a COC manifest.
- The manifest entry for sampling at any one well is to be completed before sampling is initiated at any other well by the same sampling team.
- In cases where the samples leave the immediate control of the sampling team (i.e., shipment via common carrier) the shipping container must be sealed.

Each sample collected will be designated by an alphanumeric code that will identify the type of sampling location and a specific sample designation (identifier). Location types will be identified by a two-letter code. Groundwater samples collected from the monitoring wells will begin with "MW". Sub-slab air samples will begin with "SS", indoor air samples from the basement will begin with "B", samples from other floors although not anticipated would begin with "FF" for first floor, etc, and ambient air samples will begin with "AA". Soil samples collected from the soil borings will begin with "SB". The depth will also be added to soil samples if applicable. The specific sampling designation (identifier) will be identified using a two-digit number. Samples collected for waste characterization will begin with "WC". For example, the first sample collected from the first soil boring at 5 feet will be identified as SB-01 (5).

In the case of QC samples such as field blanks, trip blanks and blind field duplicate samples, six digits will follow FB, TB and DUP respectively to represent the date (e.g., FB040112 would represent a field blank collected on 01 April 2012). For matrix spike/matrix spike duplicate samples, MS/MSD will be added following the applicable sample identification.

2.6.2 Sample Containers

- The analytical laboratory will provide all sample containers.
  - If glass bottles are used, extra glass bottles will be obtained from the laboratory to allow for accidental breakage that may occur.
  - If sample preservation is specified, the necessary preservatives will be placed in the sample bottles by the laboratory.
- The sample bottles will be handled carefully so that any preservatives are not inadvertently spilled.

A more detailed description of the sample containers to be utilized for this RI can be found in Tables C-2 through C-4.

2.6.3 Sample Preservation

Sample Preservation

Soil samples collected during the RI will be preserved by cooling to 4°C and maintained at this temperature until time of analysis. Groundwater samples for VOC analysis during the RI will be preserved by acidification to a pH of <2 using hydrochloric acid (HCl), cooled to 4°C, and maintained at this temperature until time of analysis. A more detailed description of the sample preservation to be utilized for this RI can be found in Tables C-2 through C-4.

- Immediately following collection of the samples, they will be placed in a cooler with "freezer-pacs" to maintain sample integrity. All volatile sample bottles to be filled to capacity with no headspace for volatilization. If necessary to meet a maximum recommended holding time, the samples are to be shipped by overnight courier to the laboratory.
- The shipping container used will be designed to prevent breakage, spills, and contamination of the samples. Tight packing material is to be provided around each sample container and any void around the "freezer-pacs". The container is to be securely sealed, clearly labeled, and accompanied by a COC record. Separate shipping containers should be used for "clean" samples and samples suspected of being heavily contaminated. During winter months, care should be taken to prevent samples from freezing. Sample bottles will not be placed directly on "freezer-pacs".

Sample Holding Time

- All samples will be shipped the same day they are obtained to the analytical laboratory.
- The samples must be stored at or near 4°C and analyzed within specified holding times.
- The analytical laboratory will be a NYSDOH ELAP-certified laboratory, and conform to meeting specifications for documentation, data reduction, and reporting. The laboratory will follow all method specifications pertaining to sample holding times contained in the NYSDEC ASP (revised 2005) and/or as prescribed by the specific analytical method.

A more detailed description of the sample holding times to be utilized for this RI can be found in Tables C-2 through C-4. These holding times are consistent with NYSDEC ASP Exhibit I although technical holding times vary. The holding times for the air samples will be consistent with the method requirements and not the EPA Region 2 validation criteria.

Sample Custody

Chain of Custody - *T*he primary objective of the sample custody procedures is to create an accurate written record that can be used to trace the possession and handling of all samples from the moment of their collection, through analysis, until their final disposition. All field-sampling personnel will adhere to proper sample custody procedures because samples collected during an investigation could be used as evidence in litigation. Therefore, possession of the samples must be traceable from the time each sample is collected until it is analyzed at the laboratory.

Custody Transfer to Field Personnel - The on-site hydrogeologist or the field personnel will maintain custody of samples collected during this investigation. All field personnel are responsible for documenting each sample transfer and maintaining custody of all samples until they are shipped to the laboratory. COC records will be completed at the time of sample collection and will accompany the samples inside the cooler for shipment to the selected laboratory.

Each individual who has the samples in their possession will sign the COC record. Preparation of the COC record is as follows:

- For every sample, the person collecting the sample will initiate the COC record in the field. Every sample will be assigned a unique identification number that is entered on the COC Record.
- The record will be completed in the field to indicate project, sampling team, etc.
- If the person collecting the sample does not transport the samples to the laboratory or deliver the sample containers for shipment, the first block for Relinquished By __________, Received By __________ will be completed in the field.
- The person transporting the samples to the laboratory or delivering them for shipment will sign the record form as Relinquished By ____________.
- If commercial carrier ships the samples to the laboratory, the original COC record will be sealed in a watertight container and placed in the shipping container, which will be sealed prior to being given to the carrier. The carbonless copy of the COC record will be maintained in the field file.

- If the samples are directly transported to the laboratory, the COC will be kept in possession of the person delivering the samples.
- For samples shipped by commercial carrier, the waybill will serve as an extension of the COC record between the final field custodian and the laboratory.
- Upon receipt in the laboratory, the Sample Custodian or designated representative, will open the shipping containers, compare the contents with the COC record, and sign and date the record. Any discrepancies will be noted on the COC record.
- If discrepancies occur, the samples in question will be segregated from normal sample storage and the field personnel immediately notified.
- COC records will be maintained with the records for a specific project, becoming part of the data package.

Custody Transfer to Laboratory - All samples collected during the RI will be submitted to a NYSDOH ELAP-certified laboratory meeting specifications for documentation, sample login, internal chain of custody procedures, sample/analysis tracking, data reduction, and reporting. The laboratory will follow all specifications pertaining to laboratory sample custody procedures contained in the NYSDEC ASP (revised 2005).

In general, the following procedures will be followed upon sample receipt. The laboratory will not accept samples collected by project personnel for analysis without a correctly prepared COC record.

The first steps in the laboratory receipt of samples are completing the COC records and project sample login form. The laboratory Sample Custodian, or designee, will note that the shipment is accepted and notify the Laboratory Manager or the designated representative of the incoming samples.

Upon sample receipt, the laboratory Sample Custodian, or designee, will:

- Examine all samples and determine if proper temperature has been maintained during shipment. If samples have been damaged during shipment, the remaining samples will be carefully examined to determine whether they were affected. Any samples affected will also be considered damaged. It will be noted on the COC record that specific samples were damaged and that the samples were removed from the sampling program. Field personnel will be notified as soon as possible that samples were damaged and that they must be resampled, or the testing program changed, and provide an explanation of the cause of damage.
- Compare samples received against those listed on the COC record.

- Verify that sample holding times have not been exceeded.
- Sign and date the COC record and attach the waybill to the COC record.
- Denote the samples in the laboratory sample log-in book which contains the following information:
  - Project identification number
  - Sample numbers
  - Type of samples
  - Date received in laboratory
  - Record of the verified time of sample receipt (VTSR)
  - Date put into storage after analysis is completed
  - Date of disposal.

The last two items will be added to the log when the action is taken.

- Notify the Laboratory Manager of sample arrival.
- Place the completed COC records in the project file.

The VTSR is the time of sample receipt at the laboratory. The date and time the samples are logged in by the Sample Custodian or designee, will agree with the date and time recorded by the person relinquishing the samples.

A typical COC can be found as Figure C-1.

2.6.4 *Sampling Packaging and Shipping*

Sample bottles and samples will either be delivered/picked up at the site daily by the analytical laboratory, or delivered/shipped via overnight courier. Once the samples have been collected, proper procedures for packaging and shipping will be followed as described below.

<u>Packaging</u>

Prior to shipment, samples must be packaged in accordance with current United States Department of Transportation (USDOT) regulations. All necessary government and commercial carrier shipping papers must be filled out. The procedure below should be followed regardless of transport method:

- Samples will be transported in metal ice chests or sturdy plastic coolers (cardboard or Styrofoam containers are unacceptable).
- Remove previously used labels, tape, and postage from cooler.

- Ship filled sample bottles in same cooler in which empty bottles were received.
- Affix a return address label to the cooler.
- Check that all sample bottles are tightly capped.
- Check that all bottle labels are complete.
- Be sure COC forms are complete.
- Wrap sample bottles in bubble pack and place in cooler.
- Pack bottles with extra bubble pack, vermiculite, or Styrofoam "peanuts". Be sure to pack the trip blank, if one is being submitted with the samples.
- Keep samples refrigerated in cooler with bagged ice or frozen cold packs. Do not use ice for packing material; melting will cause bottle contact and possible breakage.
- Separate and retain the sampler's copy of COC and keep with field notes.
- Tape paperwork (COC, manifest, return address) in zipper bag to inside cooler lid.
- Close cooler and apply signed and dated custody seal in such a way that the seal must be broken to open cooler.
- Securely close cooler lid with packing or duct tape. Be sure to tape latches and drain plugs in closed position.

Shipping

Samples should arrive at the laboratory as soon as possible following sample collection to ensure that holding times are not exceeded. All samples must be hand delivered on the same day as sampling or sent via overnight courier. When using a commercial carrier, follow the steps below.

- Securely package samples and complete paperwork.
- Weigh coolers for air transport.
- Complete air bill for commercial carrier (air bills can be partially completed in office prior to sampling to avoid omissions in field). If necessary, insure packages.
- Keep customer copy of air bill with field notes and COC form.
- When coolers have been released to transporter, call receiving laboratory and give information regarding samplers' names, method of arrival.

- Call the lab on day following shipment to be sure all samples arrived intact. If bottles are broken, locations can be determined from COC and resampled.

2.7 *Analytical Laboratory*

The data collected during the course of the RI activities will be used to determine the presence and concentration of certain analytes in soil, and groundwater.

All groundwater samples collected from the permanent monitoring wells as well as the soil samples collected during the RI will be submitted to Spectrum Analytical Laboratories located at 175 Metro Center Boulevard, Warwick, Rhode Island 02886. Spectrum Warwick is a NYSDOH ELAP-certified laboratory (Lab I.D. # 11522) meeting specifications for documentation, data reduction, and reporting. Air samples will be sent to Spectrum Analytical Laboratories located at 830 Silver Street, Agawam, Massachusetts 01001. Spectrum Agawam is a NSDOH ELAP-certified laboratory (Lab I.D. # 11840) meeting specifications for documentation, data reduction, and reporting.

2.8 *Analytical Test Parameters*

The RI will require the analysis of approximately 5 groundwater samples and 50 soil samples (not including quality assurance/quality control [QA/QC] samples), for full Target Compound List/Target Analyte List (TCL/TAL).

Nine soil samples will also be collected for waste characterization. Those samples are to be analyzed for Toxicity Characteristic Leaching Procedure (TCLP) prepared in accordance with SW-846 Method 1311 and analyzed for VOCs by USEPA SW-846 Method 8260B, SVOCs by USEPA SW-846 Method 8270C, Pesticides by SW-846 Method 8081, Herbicides by SW-846 Method 8151 and Metals by USEPA SW-846 Methods 6010B/7470A.

These analyses will be performed in accordance with United States Environmental Protection Agency (USEPA) *"Test Methods for the Evaluation of Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions"*.

Thirteen air samples will be collected and analyzed for volatile compounds following "*Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition 1997, EPA/625/R-96/010B*", Compendium Method TO-15, "*Determination Of Volatile Organic*

Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)".

2.9 Instrument Calibration

The frequency of laboratory instrument calibration and associated procedures for the specific analytical methods to be followed by the selected laboratory are specified in the individual USEPA analytical method procedures. The selected laboratory's calibration schedule will adhere to all analytical method specifications.

2.10 Data Management and Reporting Plan

2.10.1 Data Use and Management Objectives

Data Use Objectives

The typical data use objectives for this RI are:

- Ascertaining if there is a threat to public health or the environment.
- Locating and identifying potential sources of impacts to soil or groundwater.
- Delineation of horizontal and vertical constituent concentrations, identifying clean areas, estimating the extent and/or volume of impacted soil and groundwater.
- Determining treatment and disposal options.
- Characterizing soil for on-site or off-site treatment.
- Formulating remediation strategies, and estimating remediation costs.

Data Management Objectives

The primary objective of proper data management is to ensure and document that all necessary work is conducted in accordance with the RIWP and QAPP in an efficient and high quality manner thereby maximizing the confidence in the data in terms of PARCC. Data management procedures not only include field and laboratory documentation, but also include how the information is handled after the conclusion of field investigation and laboratory analyses area completed. Data handling procedures include project file management, reporting, usability analysis (review and validation) and use of consistent formats for the final presentation of the data.

Project File Specifications

The ERM Project Manager in ERM's Melville, New York, office location will keep all project information in a central Project File maintained. The Project File will be assigned a unique project number that will be clearly displayed on all project file folders (including electronic files). Electronic files will be maintained in a similarly organized Project File located on the ERM Central Network system that is backed up on a weekly basis. Both hard copy and electronic Project Files will contain, at a minimum copies or originals of the following key project information:

- All correspondence including letters, transmittals, telephone logs, memoranda, and emails;
- Meeting notes;
- Technical information such as analytical data; field survey results, field notes, field logbooks and field management forms;
- Project calculations;
- Subcontractor agreements/contracts, and insurance certificates;
- Project-specific health and safety information/records;
- Access agreements;
- Project document output review/approval documentation; and
- Reports: Monthly Progress, Interim Technical, and Draft/Final Technical.

2.10.2 Reporting

Field Data

Field data will be recorded and reported by field personnel using appropriate field data documentation materials such as the field logbook, field management forms, and COC forms.

Good field management procedures include following proper chain of custody procedures to track a sample from collection through analysis, noting when and how samples are split (if necessary), making regular and complete entries in the field logbook, and the consistent use and completion of field management forms. Proper completion of these forms and the field logbook are necessary to support the consequent actions that may result from the sample analysis. This documentation will support that the samples were collected and handled properly making the resultant data complete, comparable, and defensible.

Laboratory Data

The analytical results of all samples collected, as part of the RI will be reported following NYSDEC ASP 2005 specifications. All laboratory analytical data will be reported as NYSDEC Category B deliverables. The Category B data deliverables include all backup QA/QC documentation necessary to facilitate a complete validation of the data.

In addition, NYSDEC "Sample Identification and Analytical Requirement Summary" and "Sample Preparation and Analysis Summary" forms will be completed and included with each data package. The sample tracking forms are specified and supplied by the 2005 NYSDEC ASP.

The laboratory will also transmit the analytical data in an electronic format to minimize the chances of transposition errors in summarizing the data. The data will be transmitted in an electronic data deliverable (EDD) in GISKEY (most recent version) format and a PDF copy of each ASP deliverable.

2.10.3 Data Validation

All field and laboratory data will be reviewed, validated and qualified as necessary to assess data usability by direct comparison to the specified data quality objectives and/or procedures set forth in this QAPP. The data associated with the groundwater samples, the soil samples, and the waste characterization samples will not be validated or qualified unless a major issue is observed after the initial review of the results. The ERM QAO will determine this. Information that can be obtained includes comparison of results obtained from samples taken at the same location, and the identification of missing data points. Examination of the data at the end of the process allows for the assessment of data quality with respect to PARCC.

Field Data Validation Protocol

Field data generated in accordance with the project-specific RIWP will primarily consist of field temperature, pH, ORP, specific conductance data, data associated with soil boring advancement, monitoring well installation and development, and soil classification. This data will be validated by review of the project documentation to check that all forms specified in the Work Plan and this QAPP have been completely and correctly filled out and that documentation exists for the specified instrument calibrations. This documentation will be considered sufficient to provide that proper procedures have been followed during the field investigation.

Laboratory Data Validation Protocol

Data validation is the assessment of data quality with respect to method specifications and technical performance of the analytical laboratory.

Analytical data packages will be examined to ensure that all specified lab components are included, all QA/QC specifications were performed or met, and the data use restrictions are well defined.

Summary documentation regarding QA/QC results will be completed by the laboratory using NYSDEC ASP forms and will be submitted with the raw analytical data packages (NYSDEC ASP Category B deliverables). Data validation will be performed to assess and document analytical data quality in accordance with the project data quality objectives. The data review will evaluate data for its quality and usability. This process will qualify results so that the end user of the analytical results can make decisions with consideration of the potential accuracy and precision of the data. For example, the results are acceptable as presented, considered estimated and qualified with a "J", or rejected and not useable and therefore qualified with an "R".

The validation of the organic analytical data will be performed according to the protocols and QC requirements of the analytical methods, the NYSDEC ASP, the National Functional Guidelines for Organic Data Review (October 1999), the USEPA Region II Data Review Standard Operating Procedure (SOP) HW-24, Revision 1, June 1999: Validating Volatile Organic Compounds by SW-846 Method 8260B, the USEPA Region II Data Review SOP Number HW-22, Revision 3, October 2006: Validating Semivolatile Organic Compounds by SW-846 Method 8270C, the USEPA Region II Data Review SOP Number HW-44, Revision 1, October 2006: Validating Pesticide Organic Compounds by SW-846 Method 8081, the USEPA Region II Data Review SOP Number HW-45, Revision 1, October 2006: Validating PCB Compounds by SW-846 Method 8082A, the USEPA Region II Data Review SOP Number HW-18, Revision 0, August 1994: Validating Canisters of Volatile Organics in Ambient Air, and the reviewer's professional judgment.

The validation of the inorganic analytical data will be performed according to the protocols and QC requirements of the analytical methods, the NYSDEC ASP, the USEPA CLP National Functional Guidelines for Inorganic Data Review (October 2004), the USEPA Region II Data Review SOP Number HW-02, Revision 13, September 2006: Evaluation of Metals Data for the CLP Program, and the reviewer's professional judgment.

The order in which the aforementioned guidance documents and/or criteria are listed does not imply a hierarchy of reliance on a particular document for validation. ERM will utilize all guidance documents and/or criteria relying on the most comprehensive reference sources to perform the most complete validation possible.

The data validation process will provide an informed assessment of the laboratory's performance based upon contractual requirements and applicable analytical criteria. The report generated as a result of the data validation process will provide a base upon which the usefulness of the data can be evaluated by the end user of the analytical results.

During the validation process, it will be determined whether sufficient back-up data and QA/QC results are available so the reviewer may conclusively determine the quality of data support laboratory submittals for sample results. Each data package will be checked for completeness and technical adequacy of the data. Upon completion of the review, the reviewers will develop a QA/QC data validation report for each SDG.

For the organic parameter analyses, the following items or criteria will be reviewed:

- Case narrative and deliverable compliance
- Holding times both technical and procedural and sample preservation (including pH and temperature)
- Surrogate Compound recoveries, summary and data
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) results, recoveries, summary and data
- Blank Spike Sample (BSS) recoveries
- Method blank summary and data
- Gas Chromatography (GC)/Mass Spectroscopy (MS) tuning and performance
- Initial and continuing calibration summaries and data
- Internal standard areas, retention times, summary and data
- Blind Field Duplicate sample results
- Field Blank results
- Trip Blank results
- Organic analysis data sheets (Form I)
- GC/MS chromatograms, mass spectra and quantitation reports
- Quantitation and detection limits
- Qualitative and quantitative compound identification

After the Summary Reports are prepared for each SDG, the validator will prepare a Data Usability Report (DUSR). The DUSR will be prepared according to the guidelines established by Division of Environmental Remediation Quality Assurance Group and will review the following:

- Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

- Have all holding times been met?
- Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?
- Have all of the data been generated using established and agreed upon analytical protocols?
- Does an evaluation of the raw data confirm the results provided in the data summary sheets and qualify control verification forms?
- Have the correct data qualifiers been used?

Once the data package has been reviewed and the above questions asked and answered the DUSR proceeds to describe the samples and the analytical parameters. Data deficiencies, analytical protocol deviations, and quality control problems are identified and their effect-on the data is discussed. The DUSR shall also include recommendations on resampling/reanalysis. All data qualifications must be documented following the NYSDEC ASP 2005 Rev. Guidelines.

2.10.4 Data Presentation Formats

Project data will be presented in consistent formats for all letters, Progress Reports, Interim Technical Reports, and Draft/Final Technical Reports. All data will be submitted to the NYSDEC in EQuIS Electronic Data Deliverable (EDD) format consistent with the requirements outlined by the NYSDEC. General specifications are described below.

Data Records

The data record will generally include one or more of the following:

- Unique sample or field measurement code;
- Sampling or field measurement location and sample or measurement type;
- Sampling or field measurement raw data;
- Laboratory analysis ID number;
- Property or component measured; and
- Result of analysis (e.g., concentration).

Tabular Displays

The following data will generally be presented in tabular displays:

- Unsorted (raw) data;
- Results for each medium or for each constituent monitored;
- Data reduction for statistical analysis;
- Sorting of data by potential stratification factors (e.g., location, soil layer/depth, topography, etc.); and
- Summary data.

Graphical Displays

The following data will be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.):

- Sample locations and sampling grid;
- Boundaries of sampling area;
- Areas where additional data are necessary;
- Constituent concentrations at each sample location;
- Geographical extent of impacts;
- Constituent concentration levels, averages, minima and maxima;
- Changes in concentration in relation to distance from the source, time, depth or other parameters;
- Features affecting intramedia transport; and
- Potential receptors.

2.11 Performance Audits

2.11.1 Field Audits

During field activities, the ERM QAO may accompany sampling personnel into the field to verify that the sampling program is being properly implemented and to detect and define problems so that corrective action can be taken. All findings will be documented and provided to the ERM Project Manager and FTL.

2.11.2 Laboratory Audits

The NYSDOH ELAP certified laboratory that has satisfactorily completed performance audits and performance evaluation samples will be used for all sample analysis. The results of the most recent performance audits and performance evaluations will be made available upon request. ERM may perform a laboratory audit if warranted.

2.11.3 Corrective Actions

The laboratory utilized for this project will meet the specifications for corrective action protocols typical for performing contract laboratory services. Laboratory corrective action may include instrumentation maintenance, methods modification, cross contamination/carry over issues, sample tracking practices, laboratory information management (LIMs), etc.

Prior to mobilization for the field investigation, a meeting may be scheduled among representatives of ERM and the laboratory to discuss general corrective action approach and establish procedures to ensure good and timely communications among all parties during the investigation. New procedures will be put into effect as appropriate.

TABLES

TABLE C-1
SAMPLE TOTAL SUMMARY

Media[1]	*AOC*	*Analytical Parameters*	*Number of Samples*	*Blind Field Duplicates* [1]	*MS/MSD Pairs* [2]	*Field Blanks* [3]	*Trip Blanks* [4]
Sub-Surface Soil	Corner Gas Station	TCL [5]/TAL [6]	8	2 [8]	2 [8]	2 [8]	0
		TCLP [7]	1	0	0	0	0
	Mattress Facility	TCL [5]/TAL [6]	4	0 [8]	0 [8]	0 [8]	0 [8]
		TCLP [7]	1	0	0	0	0
	Garage/Auto Repair Facility	TCL [5]/TAL [6]	6	0 [8]	0 [8]	0 [8]	0 [8]
		TCLP [7]	1	0	0	0	0
	Metal Works Facility	TCL [5]/TAL [6]	4	0 [8]	0 [8]	0 [8]	0 [8]
		TCLP [7]	1	0	0	0	0
Surface Soil	Eastern Portion	TCL [5]/TAL [6]	16	1 [9]	1 [9]	1 [9]	0
		TCLP [7]	3	0	0	0	0
	Western Portion	TCL VOCs	9	1 [9]	1 [9]	1 [9]	0
		TCL SVOCs, Pesticides and PCBs and TAL [6]	3 [10]	1 [9]	1 [9]	1 [9]	0
		TCLP [7]	2	0	0	0	0
Air	Indoor Air	TO-15	3	0	0	0	0
	Sub-Slab Soil Vapor	TO-15	3	0	0	0	0
	Ambient Air	TO-15	1	0	0	0	0
	Soil Gas	TO-15	4	0	0	0	0
Groundwater	Groundwater	TCL [5]/TAL [6]	5	1	1	1	1

Notes:

1. Duplicates are generally collected at a minimum frequency of five percent (1 per 20 field samples). More frequent collection may be warranted based on field conditions/observations and/or at the discretion of the Field Team Leader.

TABLE C-1 (continued)
SAMPLE TOTAL SUMMARY

2. MS/MSD Pairs (two samples) will be collected at a minimum frequency of five percent (1 per 20 field samples). More frequent collection may be warranted based on field conditions/observations and/or at the discretion of the Field Team Leader.
3. Field Blanks will be collected at a minimum frequency of one per day where applicable. More frequent collection may be warranted based on field conditions/observations and/or at the discretion of the Field Team Leader.
4. Trip Blanks will be collected at the rate of one per aqueous sample shipment when VOCs are collected where applicable.
5. TCL – Target Compound List to include Volatiles, SVOCs, Pesticides, and PCBs.
6. TAL – Target Analyte List Inorganics to include 22 metals, mercury, and cyanide.
7. TCLP - Toxicity Characteristic Leaching Procedure to include VOCs, SVOCs, Pesticides, Herbicides, and RCRA Metals
8. Sub-surface soil QC samples will be collected from two of the AOCs.
9. Surface soil QC will be collected from each portion of the site.
10. Each SVOCs, Pesticides, Herbicides, and RCRA Metals sample will be composited from 3 discrete soil sample locations.

TABLE C-2
DETAILED SUMMARY OF SOIL SAMPLING PROGRAM
SAMPLE TOTALS, ANALYTICAL METHODS, PRESERVATIVES, HOLDING TIMES, AND CONTAINERS

Analytical Parameters	*Analytical Method Reference*	*Sample Preservation*	*Holding Time* [1]	*Container* [2]
TCL VOCs	SW-846 8260 + 10 TICs	Cool 4°C	10 days	1 – 4 oz. glass jar
TCL SVOCs	SW-846 8270 + 20 TICs	Cool 4°C	5 days/ 40 days	2 – 8 oz. glass jar [3]
TCL Pesticides	SW-846 8081	Cool 4°C	5 days/ 40 days	2 – 8 oz. glass jar [3]
TCL PCBs	SW-846 8082	Cool 4°C	5 days/ 40 days	2 – 8 oz. glass jar [3]
TAL Inorganics	SW-846 6010, 7471, & 9012	Cool, 4°C	All metals (except mercury) 180 days, Mercury 28 days, Cyanide 14 days	2 – 8 oz. glass jar[3]
Toxicity Characteristic Leaching Procedure (TCLP)	Sample preparation: USEPA SW-846 Method 1311 Sample analysis: 8260, 8270, 8081, 8151, 6010, & 7470	Cool, 4°C	VOCs 10 days/NA/14 days, SVOCs, Pesticides, and Herbicides 5 days/14 days/40 days, Metals (except Mercury) 14 days/NA/180 days, Mercury 5 days/NA/28 days	2 – 8 oz. glass jar [3]

Notes:
1. Holding times are from Validated Time of Sample Receipt (VTSR). Technical holding times vary. VOC and TAL Inorganic holding times are days after VTSR until analysis; SVOC, Pesticide, and PCB holding times are days after VTSR until extraction / days from extraction to analysis; Inorganics holding times are days after VTSR until analysis. TCLP holding times are days after VTSR until leaching / days from leaching until extraction (if required)/days from extraction until analysis.
2. As specified by Spectrum Analytical Inc., Warwick RI.
3. Parameters can be collected into the same sample containers.

TABLE C-3
DETAILED SUMMARY OF AQUEOUS SAMPLING PROGRAM
SAMPLE TOTALS, ANALYTICAL METHODS, PRESERVATIVES, HOLDING TIMES, AND CONTAINERS

Analytical Parameters	*Analytical Method Reference*	*Sample Preservation*	*Holding Time* [1]	*Container* [2]
TCL VOCs	SW-846 8260 + 10 TICs	Cool 4°C, pH<2 (HCl)	10 days	2 – 40 mL glass Teflon-lined cap vials
TCL SVOCs	SW-846 8270 + 20 TICs	Cool, 4°C	5 days/40 days	2 - 1000 mL (1 Liter) amber bottle
TCL Pesticides/PCBs	SW-846 8081/8082	Cool, 4°C	5 days/40 days	2 - 1000 mL (1 Liter) amber bottle
TAL Inorganics	SW-846 6010, 7471, & 9012	Cool 4°C, metals: pH<2 (HNO3) cyanide: pH>12 (NaOH)	All metals (except mercury) 180 days, Mercury 28 days, Cyanide 14 days	1 - 250 mL plastic bottle for metals; 1 - 250 ml plastic bottle for cyanide
Toxicity Characteristic Leaching Procedure (TCLP)	Sample preparation: USEPA SW-846 Method 1311 Sample analysis: 8260, 8270, 8081, 8151, 6010, & 7470	Cool, 4°C	VOCs 10 days/NA/14 days, SVOCs, Pesticides, and Herbicides 5 days/14 days/40 days, Metals (*except Mercury*) 14 days/NA/180 days, Mercury 5 days/NA/28 days	2 – 40 mL glass Teflon-lined cap vials (HCl preserved); 2 - 1000 mL (1 Liter) amber bottle; 1 - 500 mL plastic bottle

Notes:

1. Holding times are from Validated Time of Sample Receipt (VTSR). Technical holding times vary. VOC and TAL Inorganic holding times are days after VTSR until analysis; SVOC, Pesticide, and PCB holding times are days after VTSR until extraction / days from extraction to analysis; Inorganics holding times are days after VTSR until analysis. TCLP holding times are days after VTSR until leaching / days from leaching until extraction (if required)/days from extraction until analysis.
2. As specified by Spectrum Analytical Inc., Warwick RI.

TABLE C-4
DETAILED SUMMARY OF AIR SAMPLING PROGRAM
SAMPLE TOTALS, ANALYTICAL METHODS, PRESERVATIVES, HOLDING TIMES, AND CONTAINERS

Analytical Parameters	*Analytical Method Reference*	*Sample Preservation*	*Holding Time* [1]	*Container*
VOCs in Air	TO-15	none	30 days	1 – 6 liter Summa Canister

Notes:
1. VOCs in Air holding times are days after the date of sample collection until analysis.

TABLE C-5
VOLATILE TARGET COMPOUND LIST (TCL) AND REPORTING LIMITS

Target Compound List	*CAS Number* [1]	*Soil Reporting Limits (ug/kg)* [2]	*Aqueous Reporting Limits (ug/l)* [2]
Dichlorodifluoromethane	75-71-8	5	5
Chloromethane	74-87-3	5	5
Vinyl chloride	75-01-4	5	5
Bromomethane	74-83-9	5	5
Chloroethane	75-00-3	5	5
Trichlorofluoromethane	75-69-4	5	5
1,1-Dichloroethene	75-35-4	5	5
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5	5
Acetone	67-64-1	5	5
Carbon disulfide	75-15-0	5	5
Methyl acetate	79-20-9	5	5
Methylene chloride	75-09-2	2	2
trans-1,2-Dichloroethene	156-60-5	5	5
Methyl tert-butyl ether	1634-04-4	5	5
1,1-Dichloroethane	75-34-3	5	5
cis-1,2-Dichloroethene	156-59-2	5	5
2-Butanone	78-93-3	5	5
Bromochloromethane	74-97-5	5	5
Chloroform	67-66-3	5	5
1,1,1-Trichloroethane	71-55-6	5	5
Cyclohexane	110-82-7	5	5
Carbon tetrachloride	56-23-5	5	5
Benzene	71-43-2	5	5
1,2-Dichloroethane	107-06-2	5	5
1,4-Dioxane	123-91-1	100	100
Trichloroethene	79-01-6	5	5
Methylcyclohexane	108-87-2	5	5
1,2-Dichloropropane	78-87-5	5	5
Bromodichloromethane	75-27-4	5	5
cis-1,3-Dichloropropene	10061-01-5	5	5
4-Methyl-2-pentanone	108-10-1	5	5
Toluene	108-88-3	5	5
trans-1,3-Dichloropropene	10061-02-6	5	5
1,1,2-Trichloroethane	79-00-5	5	5
Tetrachloroethene	127-18-4	5	5
2-Hexanone	591-78-6	5	5
Dibromochloromethane	124-48-1	5	5
1,2-Dibromoethane	106-93-4	5	5

TABLE C-5 (continued)
VOLATILE TARGET COMPOUND LIST (TCL) AND REPORTING LIMITS

Target Compound List	*CAS Number* [1]	*Soil Reporting Limits (ug/kg)* [2]	*Aqueous Reporting Limits (ug/l)* [2]
Chlorobenzene	108-90-7	5	5
Ethylbenzene	100-41-4	5	5
o-Xylene	95-47-6	5	5
m,p-Xylene	179601-23-1	5	5
Styrene	100-42-5	5	5
Bromoform	75-25-2	5	5
Isopropylbenzene	98-82-8	5	5
1,1,2,2-Tetrachloroethane	79-34-5	5	5
1,3-Dichlorobenzene	541-73-1	5	5
1,4-Dichlorobenzene	106-46-7	5	5
1,2-Dichlorobenzene	95-50-1	5	5
1,2-Dibromo-3-chloropropane	96-12-8	5	5
1,2,4-Trichlorobenzene	120-82-1	5	5
1,2,3-Trichlorobenzene	87-61-6	5	5

Notes:

1. Chemical Abstracts Service (CAS) Registry Number.
2. As specified by Spectrum Analytical Inc., Warwick RI.

TABLE C-6
SEMIVOLATILE TARGET COMPOUND LIST (TCL) AND REPORTING LIMITS

Target Compound List	*CAS Number* [1]	*Soil Reporting Limits (ug/kg)* [2]	*Aqueous Reporting Limits (ug/l)* [2]
Benzaldehyde	100-52-7	330	10
Phenol	108-95-2	330	10
Bis(2-chloroethyl) ether	111-44-4	330	10
2-Chlorophenol	95-57-8	330	10
2-Methylphenol	95-48-7	330	10
2,2'-Oxybis(1-choloropropane)	108-60-1	330	10
Acetophenone	98-86-2	330	10
4-Methylphenol	106-44-5	330	10
N-Nitroso-di-n propylamine	621-64-7	330	10
Hexachloroethane	67-72-1	330	10
Nitrobenzene	98-95-3	330	10
Isophorone	78-59-1	330	10
2-Nitrophenol	88-75-5	330	10
2,4-Dimethylphenol	105-67-9	330	10
Bis(2-chloroethoxy) methane	111-91-1	330	10
2,4-Dichlorophenol	120-83-2	330	10
Naphthalene	91-20-3	330	10
4-Chloroaniline	106-47-8	330	10
Hexachlorobutadiene	87-68-3	330	10
Caprolactam	105-60-2	330	10
4-Chloro-3-methylphenol	59-50-7	330	10
2-Methylnaphthalene	91-57-6	330	10
Hexachlorocyclopentadiene	77-47-4	330	10
2,4,6-Trichlorophenol	88-06-2	330	10
2,4,5-Trichlorophenol	95-95-4	330	10
1,1'-Biphenyl	92-52-4	330	10
2-Chloronaphthalene	91-58-7	330	10
2-Nitroaniline	88-74-4	670	20
Dimethylphthalate	131-11-3	330	10
2,6-Dinitrotoluene	606-20-2	330	10
Acenaphthylene	208-96-8	330	10
3-Nitroaniline	99-09-2	670	20
Acenaphthene	83-32-9	330	10
2,4-Dinitrophenol	51-28-5	670	20
4-Nitrophenol	100-02-7	670	20
Dibenzofuran	132-64-9	330	10
2,4-Dinitrotoluene	121-14-2	330	10
Diethylphthalate	84-66-2	330	10

TABLE C-6 (continued)
SEMIVOLATILE TARGET COMPOUND LIST (TCL) AND
REPORTING LIMITS

Target Compound List	*CAS Number* [1]	*Soil Reporting Limits (ug/kg)* [2]	*Aqueous Reporting Limits (ug/l)* [2]
Fluorene	86-73-7	330	10
4-Chlorophenyl-phenyl ether	7005-72-3	330	10
4-Nitroaniline	100-01-6	670	20
4,6-Dinitro-2-methylphenol	534-52-1	670	20
N-Nitrosodiphenylamine	86-30-6	330	10
1,2,4,5-Tetrachlorobenzene	95-94-3	330	10
4-Bromophenyl-phenylether	101-55-3	330	10
Hexachlorobenzene	118-74-1	330	10
Atrazine	1912-24-9	330	10
Pentachlorophenol	87-86-5	670	20
Phenanthrene	85-01-8	330	10
Anthracene	120-12-7	330	10
Carbazole	86-74-8	330	10
Di-n-butylphthalate	84-74-2	330	10
Fluoranthene	206-44-0	330	10
Pyrene	129-00-0	330	10
Butylbenzylphthalate	85-68-7	330	10
3,3'-dicholorobenzidine	91-94-1	330	10
Benzo(a)anthracene	56-55-3	330	10
Chrysene	218-01-9	330	10
Bis(2-ethylhexyl) phthalate	117-81-7	330	10
Di-n-octylphthalate	117-84-0	330	10
Benzo(b) fluoranthene	205-99-2	330	10
Benzo(k) fluoranthene	207-08-9	330	10
Benzo(a) pyrene	50-32-8	330	10
Indeno(1,2,3,-cd) pyrene	193-39-5	330	10
Dibenzo(a,h) anthracene	53-70-3	330	10
Benzo(g,h,i) perylene	191-24-2	330	10
2,3,4,6-Tetrachlorophenol	58-90-2	330	10

Notes:

1. Chemical Abstracts Service (CAS) Registry Number.
2. As specified by Spectrum Analytical Inc., Warwick RI.

TABLE C-7
PESTICE AND PCB TARGET COMPOUND LIST (TCL) AND REPORTING LIMITS

Target Compound List	*CAS Number* [1]	*Soil Reporting Limits (ug/kg)* [2]	*Aqueous Reporting Limits (ug/l)* [2]
alpha-BHC	319-84-6	1.7	0.05
beta-BHC	319-85-7	1.7	0.05
delta-BHC	319-86-8	1.7	0.05
gamma-BHC (Lindane)	58-89-9	1.7	0.05
Heptachlor	76-44-8	1.7	0.05
Aldrin	309-00-2	1.7	0.05
Heptachlor epoxide	1024-57-3	1.7	0.05
Endosulfan I	959-98-8	1.7	0.05
Dieldrin	60-57-1	3.3	0.1
4,4'-DDE	72-55-9	3.3	0.1
Endrin	72-20-8	3.3	0.1
Endosulfan II	33213-65-9	3.3	0.1
4,4'-DDD	72-54-8	3.3	0.1
Endosulfan sulfate	1031-07-8	3.3	0.1
4,4'-DDT	50-29-3	3.3	0.1
Methoxychlor	72-43-5	17	0.5
Endrin ketone	53494-70-5	3.3	0.1
Endrin aldehyde	7421-93-4	3.3	0.1
alpha-Chlordane	5103-71-9	1.7	0.05
gamma-Chlordane	5103-74-2	1.7	0.05
Toxaphene	8001-35-2	170	5
Aroclor-1016	12674-11-2	33	1
Aroclor-1221	11104-28-2	33	1
Aroclor-1232	11141-16-5	33	1
Aroclor-1242	53469-21-9	33	1
Aroclor-1248	12672-29-6	33	1
Aroclor-12154	11097-69-1	33	1
Aroclor-1260	11096-82-5	33	1
Aroclor-1262	37324-23-5	33	1
Aroclor-1268	11100-14-4	33	1

Notes:

1. Chemical Abstracts Service (CAS) Registry Number.
2. As specified by Spectrum Analytical Inc., Warwick RI.

TABLE C-8
INORGANIC TARGET ANALYTE LIST (TAL) AND REPORTING LIMITS

Target Analyte List	*CAS Number* [1]	*Soil Reporting Limits (mg/kg)* [2]	*Aqueous Reporting Limits (ug/l)* [2]
Aluminum	7429-90-5	10	200
Antimony	7440-36-0	1	20
Arsenic	7440-38-2	1	20
Barium	7440-39-3	10	200
Beryllium	7440-41-7	0.25	5
Cadmium	7440-43-9	0.25	5
Calcium	7440-70-2	40	800
Chromium	7440-47-3	1	20
Cobalt	7440-48-4	2.5	50
Copper	7440-50-8	1.5	30
Iron	7439-89-6	10	200
Lead	7439-92-1	0.5	10
Magnesium	7439-95-4	25	5000
Manganese	7439-96-5	2.5	50
Mercury	7439-97-6	0.1	0.2
Nickel	7440-02-0	2.5	50
Potassium	7440-09-7	50	5000
Selenium	7782-49-2	1.5	35
Silver	7440-22-4	1.5	30
Sodium	7440-23-5	50	5000
Thallium	7440-28-0	1	25
Vanadium	7440-62-2	2.5	50
Zinc	7440-66-6	2.5	60
Cyanide	57-12-5	5	50

Notes:
1. Chemical Abstracts Service (CAS) Registry Number.
2. As specified by Spectrum Analytical Inc., Warwick RI.

TABLE C-9
VOLATILES IN AIR COMPOUND LIST AND REPORTING LIMITS

Compound List	*CAS Number* [1]	*Reporting Limits (ppbv)* [2]	*Reporting Limits (ug/m³)* [2]
Acetone	67-64-1	0.5	1.19
1,3-Butadiene	106-99-0	0.5	1.10
Benzene	71-43-2	0.5	1.60
Bromodichloromethane	75-27-4	0.5	3.35
Bromoform	75-25-2	0.5	5.17
Bromomethane	74-83-9	0.5	1.94
Benzyl Chloride	100-44-7	0.5	2.58
Carbon disulfide	75-15-0	0.5	1.56
Chlorobenzene	108-90-7	0.5	2.30
Chloroethane	75-00-3	0.5	1.32
Chloroform	67-66-3	0.5	2.43
Chloromethane	74-87-3	0.5	1.03
Carbon tetrachloride	56-23-5	0.5	3.15
Cyclohexane	110-82-7	0.5	1.72
1,1-Dichloroethane	75-34-3	0.5	2.02
1,1-Dichloroethylene	75-35-4	0.5	1.98
1,2-Dibromoethane	106-93-4	0.5	3.84
1,2-Dichloroethane	107-06-2	0.5	2.02
1,2-Dichloropropane	78-87-5	0.5	2.31
1,4-Dioxane	123-91-1	0.5	1.80
Dibromochloromethane	124-48-1	0.5	4.26
trans-1,2-Dichloroethylene	156-60-5	0.5	1.98
cis-1,2-Dichloroethylene	156-59-2	0.5	1.98
cis-1,3-Dichloropropene	10061-01-5	0.5	3.27
m-Dichlorobenzene	541-73-1	0.5	3.01
o-Dichlorobenzene	95-50-1	0.5	3.01
p-Dichlorobenzene	106-46-7	0.5	3.01
trans-1,3-Dichloropropene	10061-02-6	0.5	2.27
Ethanol	64-17-5	0.5	0.94
Ethylbenzene	100-41-4	0.5	2.17
4-Ethyltoluene	622-96-8	0.5	2.46
Heptane	142-82-5	0.5	2.05
Hexachlorobutadiene	87-68-3	0.5	5.33
Hexane	110-54-3	0.5	1.76
2-Hexanone	591-78-6	0.5	2.05
Isopropylbenzene	98-82-8	0.5	2.46
Isopropyl Alcohol	67-63-0	0.5	1.23
Methylene chloride	75-09-2	0.5	1.74
Methyl ethyl ketone	78-93-3	0.5	1.47

TABLE C-9 (continued)
VOLATILES IN AIR COMPOUND LIST AND REPORTING LIMITS

Compound List	***CAS Number*** [1]	***Reporting Limits (ppbv)*** [2]	***Reporting Limits (ug/m^3)*** [2]
Methyl Isobutyl Ketone	108-10-1	0.5	2.05
Methyl Tert Butyl Ether	1634-04-4	0.5	1.80
Styrene	100-42-5	0.5	2.13
1,1,1-Trichloroethane	71-55-6	0.5	2.73
1,1,2,2-Tetrachloroethane	79-34-5	0.5	3.43
1,1,2-Trichloroethane	79-00-5	0.5	2.73
1,2,4-Trichlorobenzene	120-82-1	0.5	3.71
1,2,4-Trimethylbenzene	95-63-6	0.5	2.46
1,3,5-Trimethylbenzene	108-67-8	0.5	2.46
Tetrachloroethylene	127-18-4	0.5	3.39
Tetrahydrofuran	109-99-9	0.5	1.47
Toluene	108-88-3	0.5	1.88
Trichloroethylene	79-01-6	0.5	2.69
Vinyl chloride	75-01-4	0.5	1.28
m+p-Xylene	179601-23-1	0.5	4.34
o-Xylene	95-47-6	0.5	2.17

Notes:

1. Chemical Abstracts Service (CAS) Registry Number.
2. As specified by Spectrum Analytical Inc., Agawam, MA.

TABLE C-10
TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) VOLATILES

Compound List	*CAS Number*	*Reporting Limits (mg/l)* [2]
benzene	71-43-2	0.005
2-butanone	78-93-3	0.005
carbon tetrachloride	56-23-5	0.005
chlorobenzene	108-90-7	0.005
chloroform	67-66-3	0.005
1,4-dichlorobenzene	106-46-7	0.005
1,2-dichloroethane	107-06-2	0.005
1,1-dichloroethene	75-35-4	0.005
tetrachloroethene	127-18-4	0.005
trichloroethene	79-01-6	0.005
vinyl chloride	75-01-4	0.005

TCLP SEMIVOLATILES

Compound List	*CAS Number* [1]	*Reporting Limits (mg/l)* [2]
2-methylphenol	95-48-7	0.01
3&4-methylphenol [3]	65794-96-9	0.01
pentachlorophenol	87-86-5	0.02
2,4,5-trichlorophenol	95-95-4	0.02
2,4,6-trichlorophenol	88-06-2	0.01
1,4-dichlorobenzene	106-46-7	0.02
2,4-dinitrotoluene	121-14-2	0.01
hexachlorobenzene	118-74-1	0.01
hexachlorobutadiene	87-68-3	0.01
hexachloroethane	67-72-1	0.01
nitrobenzene	98-95-3	0.01
pyridine	110-86-1	0.02

TCLP PESTICIDES

Compound List	*CAS Number* [1]	*Reporting Limits (mg/l)* [2]
Chlordane	57-74-9	0.025
Endrin	72-20-8	0.0001
Heptachlor	76-44-8	0.0005
gamma-BHC (Lindane)	58-89-9	0.0005
Methoxychlor	72-43-5	0.0005
Toxaphene	8001-35-2	0.005

TABLE C-10 (continued)
TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP)
VOLATILES

TCLP HERBICIDES

Target Analyte List	*CAS Number* [1]	*Reporting Limits (mg/l*[2]*)*
2,4,5-TP (Silvex)	93-76-5	0.001
2,4-D	94-75-7	0.01

TCLP METALS

Target Analyte List	*CAS Number* [1]	*Reporting Limits (mg/l)* [2]
Arsenic	7440-38-2	0.02
Barium	7440-39-3	0.2
Cadmium	7440-43-9	0.005
Chromium	7440-47-3	0.02
Lead	7439-92-1	0.01
Mercury	7439-97-6	0.0002
Selenium	7782-49-2	0.035
Silver	7440-22-4	0.03

Notes:
1. Chemical Abstracts Service (CAS) Registry Number.
2. As specified by Spectrum Analytical Inc., Warwick RI.
3. Compounds co-elute.

TABLE C-11
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY
VOLATILE ANALYSES

Matrix	*QC Compounds*	*Surrogate Accuracy (% R)1*	*Blind Field Duplicate Precision (RPD)*	*Method Blanks*	*MS/MSD Accuracy (% R)*[1]	*MS/MSD Precision (RPD)*[1]	*BS/BSD Accuracy (% R)*[1]	*BS/BSD Precision (RPD)*[1]
Aqueous	all compounds		< 100	≤10 x RL for acetone, methylene chloride, and 2-butanone ≤ RL for all other compounds.				
	Dichlorodifluoromethane				30-155	40	70 – 130	20
	Chloromethane				40-125	40	70 – 130	20
	Vinyl chloride				50-145	40	70 – 130	20
	Bromomethane				30-145	40	70 – 130	20
	Chloroethane				60-135	40	70 – 130	20
	Trichlorofluoromethane				60-145	40	70 – 130	20
	1,1-Dichloroethene				70-130	40	70 – 130	20
	1,1,2-Trichloro-1,2,2-trifluoroethane				70-130	40	70 – 130	20
	Acetone				40-140	40	70 – 130	20
	Carbon disulfide				35-160	40	70 – 130	20
	Methyl acetate				70-130	40	70 – 130	20
	Methylene chloride				55-140	40	70 – 130	20
	trans-1,2-Dichloroethene				60-140	40	70 – 130	20
	Methyl tert-butyl ether				65-125	40	70 – 130	20
	1,1-Dichloroethane				70-135	40	70 – 130	20
	cis-1,2-Dichloroethene				70-125	40	70 – 130	20
	2-Butanone				30-150	40	70 – 130	20
	Bromochloromethane				65-130	40	70 – 130	20
	Chloroform				65-135	40	70 – 130	20
	1,1,1-Trichloroethane				65-130	40	70 – 130	20
	Cyclohexane				70-130	40	70 – 130	20
	Carbon tetrachloride				65-140	40	70 – 130	20
	Benzene				80-120	40	70 – 130	20
	1,2-Dichloroethane				70-130	40	70 – 130	20

TABLE C-11 (continued)
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY
VOLATILE ANALYSES

Matrix	*QC Compounds*	*Surrogate Accuracy (% R)1*	*Blind Field Duplicate Precision (RPD)*	*Method Blanks*	*MS/MSD Accuracy (% R)[1]*	*MS/MSD Precision (RPD)[1]*	*BS/BSD Accuracy (% R)[1]*	*BS/BSD Precision (RPD)[1]*
Aqueous (continued)	Trichloroethene				70-125	40	70 – 130	20
	Methylcyclohexane				70-130	40	70 – 130	20
	1,2-Dichloropropane				75-125	40	70 – 130	20
	Bromodichloromethane				75-120	40	70 – 130	20
	cis-1,3-Dichloropropene				70-130	40	70 – 130	20
	4-Methyl-2-pentanone				60-135	40	70 – 130	20
	Toluene				75-120	40	70 – 130	20
	trans-1,3-Dichloropropene				55-140	40	70 – 130	20
	1,1,2-Trichloroethane				75-125	40	70 – 130	20
	Tetrachloroethene				45-150	40	70 – 130	20
	2-Hexanone				55-130	40	70 – 130	20
	Dibromochloromethane				60-135	40	70 – 130	20
	1,2-Dibromoethane				80-120	40	70 – 130	20
	Chlorobenzene				80-120	40	70 – 130	20
	Ethylbenzene				75-125	40	70 – 130	20
	o-Xylene				80-120	40	70 – 130	20
	m,p-Xylene				75-130	40	70 – 130	20
	Styrene				65-135	40	70 – 130	20
	Bromoform				70-130	40	70 – 130	20
	Isopropylbenzene				75-125	40	70 – 130	20
	1,1,2,2-Tetrachloroethane				65-130	40	70 – 130	20
	1,3-Dichlorobenzene				75-125	40	70 – 130	20
	1,4-Dichlorobenzene				75-125	40	70 – 130	20
	1,2-Dichlorobenzene				70-120	40	70 – 130	20
	1,2-Dibromo-3-chloropropane				50-130	40	70 – 130	20
	1,2,4-Trichlorobenzene				65-135	40	70 – 130	20
	1,2,3-Trichlorobenzene				55-140	40	70 – 130	20
	Toluene-d8	85-120						
	Bromofluorobenzene	75-120						
Aqueous	1,2-Dichloroethane-d4	70-120						

TABLE C-11 (continued)
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY
VOLATILE ANALYSES

Matrix	*QC Compounds*	*Surrogate Accuracy (% R)1*	*Blind Field Duplicate Precision (RPD)*	*Method Blanks*	*MS/MSD Accuracy (% R)[1]*	*MS/MSD Precision (RPD)[1]*	*BS/BSD Accuracy (% R)[1]*	*BS/BSD Precision (RPD)[1]*
(continued)								
Soil	all compounds		< 100	≤10 x RL for acetone,				
	Dichlorodifluoromethane			methylene chloride,	35-135	40	70 – 130	20
	Chloromethane			and 2-butanone	50-130	40	70 – 130	20
	Vinyl chloride				60-125	40	70 – 130	20
	Bromomethane			≤ RL for all other	30-160	40	70 – 130	20
	Chloroethane			compounds.	40-155	40	70 – 130	20
	Trichlorofluoromethane				25-185	40	70 – 130	20
	1,1-Dichloroethene				65-135	40	70 – 130	20
	1,1,2-Trichloro-1,2,2-trifluoroethane				70-130	40	70 – 130	20
	Acetone				20-160	40	70 – 130	20
	Carbon disulfide				45-160	40	70 – 130	20
	Methyl acetate				70-130	40	70 – 130	20
	Methylene chloride				55-140	40	70 – 130	20
	trans-1,2-Dichloroethene				65-135	40	70 – 130	20
	Methyl tert-butyl ether				75-126	40	70 – 130	20
	1,1-Dichloroethane				75-125	40	70 – 130	20
	cis-1,2-Dichloroethene				65-125	40	70 – 130	20
	2-Butanone				30-160	40	70 – 130	20
	Bromochloromethane				70-125	40	70 – 130	20
	Chloroform				70-125	40	70 – 130	20
	1,1,1-Trichloroethane				70-135	40	70 – 130	20
	Cyclohexane				70-130	40	70 – 130	20
	Carbon tetrachloride				65-135	40	70 – 130	20
	Benzene				75-125	40	70 – 130	20
	1,2-Dichloroethane				70-135	40	70 – 130	20
	1,4-Dioxane				70-130	40	70 – 130	20
	Trichloroethene				75-125	40	70 – 130	20
Soil (continued)	Methylcyclohexane				70-130	40	70 – 130	20
	1,2-Dichloropropane				70-120	40	70 – 130	20

TABLE C-11 (continued)
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY
VOLATILE ANALYSES

Matrix	*QC Compounds*	*Surrogate Accuracy (% R)1*	*Blind Field Duplicate Precision (RPD)*	*Method Blanks*	*MS/MSD Accuracy (% R)[1]*	*MS/MSD Precision (RPD)[1]*	*BS/BSD Accuracy (% R)[1]*	*BS/BSD Precision (RPD)[1]*
	Bromodichloromethane				70-130	40	70 – 130	20
	cis-1,3-Dichloropropene				70-125	40	70 – 130	20
	4-Methyl-2-pentanone				45-145	40	70 – 130	20
	Toluene				70-125	40	70 – 130	20
	trans-1,3-Dichloropropene				65-125	40	70 – 130	20
	1,1,2-Trichloroethane				60-125	40	70 – 130	20
	Tetrachloroethene				65-140	40	70 – 130	20
	2-Hexanone				45-145	40	70 – 130	20
	Dibromochloromethane				65-130	40	70 – 130	20
	1,2-Dibromoethane				70-125	40	70 – 130	20
	Chlorobenzene				75-125	40	70 – 130	20
	Ethylbenzene				75-125	40	70 – 130	20
	o-Xylene				75-125	40	70 – 130	20
	m,p-Xylene				80-125	40	70 – 130	20
	Styrene				75-125	40	70 – 130	20
	Bromoform				55-135	40	70 – 130	20
	Isopropylbenzene				75-130	40	70 – 130	20
	1,1,2,2-Tetrachloroethane				55-130	40	70 – 130	20
	1,3-Dichlorobenzene				70-125	40	70 – 130	20
	1,4-Dichlorobenzene				70-125	40	70 – 130	20
	1,2-Dichlorobenzene				75-120	40	70 – 130	20
	1,2-Dibromo-3-chloropropane				40-135	40	70 – 130	20
	1,2,4-Trichlorobenzene				65-130	40	70 – 130	20
	1,2,3-Trichlorobenzene				60-135	40	70 – 130	20
	toluene-d8	85-115						
	bromofluorobenzene	77-111						
	1,2-dichloroethane-d4	65-128						

Notes:

1. As specified by Spectrum Analytical Inc., Warwick RI.

TABLE C-11 (continued)
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY
VOLATILE ANALYSES

QC = Quality Control; % R = Percent Recovery; RPD = Relative Percent Difference; MS = Matrix Spike; MSD = Matrix Spike Duplicate; RL = Reporting Limit

TABLE C-12
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY SEMIVOLATILE ANALYSES

Matrix	QC Compounds	Surrogate Accuracy (% R)[1]	Blind Field Duplicate Precision (RPD)	Method Blanks	MS/MSD Accuracy (% R)[1]	MS/MSD Precision (RPD)[1]	BS/BSD Accuracy (% R)[1]	BS/BSD Precision (RPD)[1]
Aqueous	all compounds		< 100	≤ 10 x RL for any phthalate ester. ≤ RL for all other compounds.				
	Benzaldehyde				10-118	40	70 – 130	20
	Phenol				40-100	40	70 – 130	20
	Bis(2-chloroethyl) ether				40-105	40	70 – 130	20
	2-Chlorophenol				45-105	40	70 – 130	20
	2-Methylphenol				40-105	40	70 – 130	20
	2,2'-Oxybis(1-choloropropane)				20-115	40	70 – 130	20
	Acetophenone				50-150	40	70 – 130	20
	4-Methylphenol				40-105	40	70 – 130	20
	N-Nitroso-di-n propylamine				40-115	40	70 – 130	20
	Hexachloroethane				35-110	40	70 – 130	20
	Nitrobenzene				40-115	40	70 – 130	20
	Isophorone				45-110	40	70 – 130	20
	2-Nitrophenol				40-110	40	70 – 130	20
	2,4-Dimethylphenol				30-105	40	70 – 130	20
	Bis(2-chloroethoxy) methane				45-110	40	70 – 130	20
	2,4-Dichlorophenol				45-110	40	70 – 130	20
	Naphthalene				40-105	40	70 – 130	20
	4-Chloroaniline				10-100	40	70 – 130	20
	Hexachlorobutadiene				40-115	40	70 – 130	20
	Caprolactam				40-115	40	70 – 130	20
	4-Chloro-3-methylphenol				45-115	40	70 – 130	20
	2-Methylnaphthalene				45-105	40	70 – 130	20
	Hexachlorocyclopentadiene				8-148	40	70 – 130	20
	2,4,6-Trichlorophenol				45-110	40	70 – 130	20

TABLE C-12 (continued)
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY
SEMIVOLATILE ANALYSES

Matrix	QC Compounds	Surrogate Accuracy (% R)[1]	Blind Field Duplicate Precision (RPD)	Method Blanks	MS/MSD Accuracy (% R)[1]	MS/MSD Precision (RPD)[1]	BS/BSD Accuracy (% R)[1]	BS/BSD Precision (RPD)[1]
Aqueous (continued)	2,4,5-Trichlorophenol				50-110	40	70 – 130	20
	1,1'-Biphenyl				50-121	40	70 – 130	20
	2-Chloronaphthalene				45-105	40	70 – 130	20
	2-Nitroaniline				45-120	40	70 – 130	20
	Dimethylphthalate				50-110	40	70 – 130	20
	2,6-Dinitrotoluene				50-110	40	70 – 130	20
	Acenaphthylene				45-105	40	70 – 130	20
	3-Nitroaniline				25-110	40	70 – 130	20
	Acenaphthene				45-110	40	70 – 130	20
	2,4-Dinitrophenol				15-130	40	70 – 130	20
	4-Nitrophenol				15-140	40	70 – 130	20
	Dibenzofuran				50-105	40	70 – 130	20
	2,4-Dinitrotoluene				50-115	40	70 – 130	20
	Diethylphthalate				50-115	40	70 – 130	20
	Fluorene				50-110	40	70 – 130	20
	4-Chlorophenyl-phenyl ether				45-110	40	70 – 130	20
	4-Nitroaniline				35-115	40	70 – 130	20
	4,6-Dinitro-2-methylphenol				30-135	40	70 – 130	20
	N-Nitrosodiphenylamine				50-115	40	70 – 130	20
	1,2,4,5-Tetrachlorobenzene				50-126	40	70 – 130	20
	4-Bromophenyl-phenylether				45-115	40	70 – 130	20
	Hexachlorobenzene				45-120	40	70 – 130	20
	Atrazine				50-150	40	70 – 130	20
	Pentachlorophenol				25-120	40	70 – 130	20
	Phenanthrene				50-110	40	70 – 130	20
	Anthracene				55-105	40	70 – 130	20
	Carbazole				45-115	40	70 – 130	20
	Di-n-butylphthalate				55-110	40	70 – 130	20
	Fluoranthene				55-115	40	70 – 130	20
	Pyrene				45-125	40	70 – 130	20
	Butylbenzylphthalate				50-125	40	70 – 130	20

TABLE C-12 (continued)
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY
SEMIVOLATILE ANALYSES

Matrix	*QC Compounds*	*Surrogate Accuracy (% R)[1]*	*Blind Field Duplicate Precision (RPD)*	*Method Blanks*	*MS/MSD Accuracy (% R)[1]*	*MS/MSD Precision (RPD)[1]*	*BS/BSD Accuracy (% R)[1]*	*BS/BSD Precision (RPD)[1]*
Aqueous (continued)	3,3'-dicholorobenzidine				10-130	40	70 – 130	20
	Benzo(a)anthracene				50-110	40	70 – 130	20
	Chrysene				55-110	40	70 – 130	20
	Bis(2-ethylhexyl) phthalate				45-125	40	70 – 130	20
	Di-n-octylphthalate				40-130	40	70 – 130	20
	Benzo(b) fluoranthene				45-115	40	70 – 130	20
	Benzo(k) fluoranthene				45-125	40	70 – 130	20
	Benzo(a) pyrene				50-110	40	70 – 130	20
	Indeno(1,2,3,-cd) pyrene				40-120	40	70 – 130	20
	Dibenzo(a,h) anthracene				40-125	40	70 – 130	20
	Benzo(g,h,i) perylene				40-125	40	70 – 130	20
	2,3,4,6-Tetrachlorophenol				41-139	40	70 – 130	20
	nitrobenzene-d5	35-100						
	2-fluorobiphenyl	45-105						
	terphenyl-d14	30-125						
	phenol-d5	40-100						
	2-fluorophenol	35-105						
	2,4,6-tribromophenol	35-125						
Soil	all compounds		< 100	≤ 10 x RL for				
	Benzaldehyde			any phthalate	50-150	40	70 – 130	20
	Phenol			ester.	0-115	40	70 – 130	20
	Bis(2-chloroethyl) ether				35-110	40	70 – 130	20
	2-Chlorophenol			≤ RL for all	35-105	40	70 – 130	20
	2-Methylphenol			other compounds.	40-110	40	70 – 130	20
	2,2'-Oxybis(1-choloropropane)				30-123	40	70 – 130	20
	Acetophenone				50-150	40	70 – 130	20
	4-Methylphenol				30-110	40	70 – 130	20
	N-Nitroso-di-n propylamine				35-130	40	70 – 130	20
	Hexachloroethane				30-95	40	70 – 130	20
	Nitrobenzene				45-110	40	70 – 130	20

TABLE C-12 (continued)
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY
SEMIVOLATILE ANALYSES

Matrix	*QC Compounds*	*Surrogate Accuracy (% R)[1]*	*Blind Field Duplicate Precision (RPD)*	*Method Blanks*	*MS/MSD Accuracy (% R)[1]*	*MS/MSD Precision (RPD)[1]*	*BS/BSD Accuracy (% R)[1]*	*BS/BSD Precision (RPD)[1]*
	Isophorone				50-110	40	70 – 130	20
	2-Nitrophenol				40-115	40	70 – 130	20
	2,4-Dimethylphenol				30-110	40	70 – 130	20
	Bis(2-chloroethoxy) methane				45-105	40	70 – 130	20
	2,4-Dichlorophenol				50-105	40	70 – 130	20
	Naphthalene				40-100	40	70 – 130	20
	4-Chloroaniline				15-110	40	70 – 130	20
	Hexachlorobutadiene				25-105	40	70 – 130	20
	Caprolactam				50-150	40	70 – 130	20
	4-Chloro-3-methylphenol				45-110	40	70 – 130	20
	2-Methylnaphthalene				45-105	40	70 – 130	20
	Hexachlorocyclopentadiene				27-147	40	70 – 130	20
	2,4,6-Trichlorophenol				50-115	40	70 – 130	20
	2,4,5-Trichlorophenol				50-110	40	70 – 130	20
	1,1'-Biphenyl				55-108	40	70 – 130	20
	2-Chloronaphthalene				50-105	40	70 – 130	20
	2-Nitroaniline				50-115	40	70 – 130	20
	Dimethylphthalate				25-125	40	70 – 130	20
	2,6-Dinitrotoluene				50-115	40	70 – 130	20
	Acenaphthylene				50-105	40	70 – 130	20
	3-Nitroaniline				20-125	40	70 – 130	20
	Acenaphthene				45-110	40	70 – 130	20
	2,4-Dinitrophenol				15-140	40	70 – 130	20
	4-Nitrophenol				0-125	40	70 – 130	20
	Dibenzofuran				55-105	40	70 – 130	20
	2,4-Dinitrotoluene				50-120	40	70 – 130	20
	Diethylphthalate				40-120	40	70 – 130	20
	Fluorene				50-110	40	70 – 130	20
	4-Chlorophenyl-phenyl ether				50-110	40	70 – 130	20
	4-Nitroaniline				35-120	40	70 – 130	20
	4,6-Dinitro-2-methylphenol				40-130	40	70 – 130	20

TABLE C-12 (continued)
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY
SEMIVOLATILE ANALYSES

Matrix	*QC Compounds*	*Surrogate Accuracy (% R)*[1]	*Blind Field Duplicate Precision (RPD)*	*Method Blanks*	*MS/MSD Accuracy (% R)*[1]	*MS/MSD Precision (RPD)*[1]	*BS/BSD Accuracy (% R)*[1]	*BS/BSD Precision (RPD)*[1]
Soil (continued)	N-Nitrosodiphenylamine				50-110	40	70 – 130	20
	1,2,4,5-Tetrachlorobenzene				50-150	40	70 – 130	20
	4-Bromophenyl-phenylether				50-115	40	70 – 130	20
	Hexachlorobenzene				50-110	40	70 – 130	20
	Atrazine				52-175	40	70 – 130	20
	Pentachlorophenol				40-115	40	70 – 130	20
	Phenanthrene				40-115	40	70 – 130	20
	Anthracene				55-110	40	70 – 130	20
	Carbazole				50-115	40	70 – 130	20
	Di-n-butylphthalate				55-115	40	70 – 130	20
	Fluoranthene				53-115	40	70 – 130	20
	Pyrene				50-130	40	70 – 130	20
	Butylbenzylphthalate				45-115	40	70 – 130	20
	3,3'-dicholorobenzidine				20-110	40	70 – 130	20
	Benzo(a)anthracene				55-110	40	70 – 130	20
	Chrysene				55-110	40	70 – 130	20
	Bis(2-ethylhexyl) phthalate				40-125	40	70 – 130	20
	Di-n-octylphthalate				35-135	40	70 – 130	20
	Benzo(b) fluoranthene				45-120	40	70 – 130	20
	Benzo(k) fluoranthene				45-125	40	70 – 130	20
	Benzo(a) pyrene				55-110	40	70 – 130	20
	Indeno(1,2,3,-cd) pyrene				45-125	40	70 – 130	20
	Dibenzo(a,h) anthracene				40-125	40	70 – 130	20
	Benzo(g,h,i) perylene				40-125	40	70 – 130	20
	2,3,4,6-Tetrachlorophenol				50-150	40	70 – 130	20
	nitrobenzene-d5	40-110						
	2-fluorobiphenyl	50-110						
	terphenyl-d14	50-135						
	phenol-d5	10-115						
	2-fluorophenol	20-110						
	2,4,6-tribromophenol	40-125						

TABLE C-12 (continued)
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY
SEMIVOLATILE ANALYSES

Notes:
1. As specified by Spectrum Analytical Inc., Warwick RI.

QC = Quality Control; % R = Percent Recovery; RPD = Relative Percent Difference; MS = Matrix Spike; MSD = Matrix Spike Duplicate;
RL = Reporting Limit

TABLE C-13
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY PESTICIDE /POLYCHLORINATED BIPHENYL (PCBs)

Matrix	*QC Compounds*	*Surrogate Accuracy (% R)* [1]	*Blind Field Duplicate Precision (RPD)*	*Method Blanks*	*MS/MSD Accuracy (% R)*[1]	*MS/MSD Precision (RPD)*[1]	*BS/BSD Accuracy (% R)*[1]	*BS/BSD Precision (RPD)*[1]
Aqueous	all compounds		< 100	≤ RL				
	alpha-BHC				60-130	30	70 – 130	20
	beta-BHC				65-125	30	70 – 130	20
	delta-BHC				45-135	30	70 – 130	20
	gamma-BHC (Lindane)				25-135	30	70 – 130	20
	Heptachlor				40-130	30	70 – 130	20
	Aldrin				25-140	30	70 – 130	20
	Heptachlor epoxide				60-130	30	70 – 130	20
	Endosulfan I				50-110	30	70 – 130	20
	Dieldrin				60-130	30	70 – 130	20
	4,4'-DDE				35-140	30	70 – 130	20
	Endrin				55-135	30	70 – 130	20
	Endosulfan II				30-130	30	70 – 130	20
	4,4'-DDD				25-150	30	70 – 130	20
	Endosulfan sulfate				55-135	30	70 – 130	20
	4,4'-DDT				45-140	30	70 – 130	20
	Methoxychlor				55-150	30	70 – 130	20
	Endrin ketone				65-135	30	70 – 130	20
	Endrin aldehyde				55-135	30	70 – 130	20
	alpha-Chlordane				65-125	30	70 – 130	20
	gamma-Chlordane				60-125	30	70 – 130	20
	Aroclor-1016				25-145	30	70 – 130	20
	Aroclor-1260				30-145	30	70 – 130	20
	Decachlorobiphenyl (8081/8082)	30-135/40-135						
	Tetrachloro-m-xylene (8081/8082)	25-140/34-137						

TABLE C-13 (continued)
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY PESTICIDE /POLYCHLORINATED BIPHENYLS (PCBs)

Matrix	*QC Compounds*	*Surrogate Accuracy (% R)* [1]	*Blind Field Duplicate Precision (RPD)*	*Method Blanks*	*MS/MSD Accuracy (% R)*[1]	*MS/MSD Precision (RPD)*[1]	*BS/BSD Accuracy (% R)*[1]	*BS/BSD Precision (RPD)*[1]
Soil	all compounds		< 100	≤ RL				
	alpha-BHC				60-125	30	70 – 130	20
	beta-BHC				60-125	30	70 – 130	20
	delta-BHC				55-130	30	70 – 130	20
	gamma-BHC (Lindane)				60-125	30	70 – 130	20
	Heptachlor				50-140	30	70 – 130	20
	Aldrin				45-140	30	70 – 130	20
	Heptachlor epoxide				65-130	30	70 – 130	20
	Endosulfan I				15-135	30	70 – 130	20
	Dieldrin				65-125	30	70 – 130	20
	4,4'-DDE				70-125	30	70 – 130	20
	Endrin				60-135	30	70 – 130	20
	Endosulfan II				35-140	30	70 – 130	20
	4,4'-DDD				30-135	30	70 – 130	20
	Endosulfan sulfate				60-135	30	70 – 130	20
	4,4'-DDT				45-140	30	70 – 130	20
	Methoxychlor				55-145	30	70 – 130	20
	Endrin ketone				65-135	30	70 – 130	20
	Endrin aldehyde				35-145	30	70 – 130	20
	alpha-Chlordane				65-120	30	70 – 130	20
	gamma-Chlordane				65-125	30	70 – 130	20
	Aroclor-1016				40-140	30	70 – 130	20
	Aroclor-1260				60-130	30	70 – 130	20
	Decachlorobiphenyl (8081/8082)	55-130/60-125						
	Tetrachloro-m-xylene (8081/8082)	14-113/13-120						

Notes:

1. As specified by Spectrum Analytical Inc., Warwick RI.

QC = Quality Control; % R = Percent Recovery; RPD = Relative Percent Difference; MS = Matrix Spike; MSD = Matrix Spike Duplicate; RL = Reporting Limit

TABLE C-14
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs)
FOR PRECISION AND ACCURACY
INORGANIC CONSTITUENT ANALYSES

QC Analytes	Blind Field Duplicate Precision (RPD)	Method Blanks	Calibration ICV & CCV	MS Accuracy (% R)	Laboratory Duplicate Precision (RPD)	Serial Dilution Precision (% D)	Lab Check Sample Accuracy (% R)
all analytes	For water	< ±		80-120 [1]	< 20 [2]	< 10 [3]	80-120%
aluminum	< 100 for	CRDL	90-110	for all			for all
antimony	all	for all	90-110	analytes			analytes
arsenic	Analytes	Analytes	90-110	except			
barium			90-110	cyanide			
beryllium			90-110	75-125%			
cadmium			90-110				
calcium			90-110				
chromium			90-110				For soil :
cobalt	For soil :		90-110				Manufacturer's
copper	< 100 for		90-110				Control Limits
iron	all		90-110				
lead	Analytes		90-110				
magnesium			90-110				
manganese			90-110				
mercury			80-120				
nickel			90-110				
potassium			90-110				
selenium			90-110				
silver			90-110				
sodium			90-110				
thallium			90-110				
vanadium			90-110				
zinc			90-110				
cyanide			85-115				

Notes:

1. Spike recovery limits do not apply when the sample concentration exceeds the spike added concentration by a factor of 4 or more.
2. Limit is ± 20% if values are ≥ 10x CRDL; limit is ± CRDL if values are <10x CRDL; no limit if both values are < instrument detection limit (IDL). For soils limits are ± 310% RPD and ± 2x CRDL.
3. Limit applies only when the analyte concentration in the original sample (I) is > 100 x IDL; if I < 100x IDL then no limit.

QC = Quality Control; RPD = Relative Percent Difference; CRDL = Contract Required Detection Limits;
ICV = Initial Calibration Verification Check; CCV = Continuing Calibration Verification Check;
MS = Matrix Spike Sample; % R = Percent Recovery

FIGURES

FIGURE C-1
EXAMPLE CHAIN-OF-CUSTODY

MITKEM LABORATORIES

A DIVISION OF SPECTRUM ANALYTICAL, INC. Featuring HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page ______ of ______

Special Handling:

- ☐ Standard TAT - 7 to 10 business days
- ☐ Rush TAT - Date Needed: __________
- · All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- · Samples disposed of after 60 days unless otherwise instructed.

Report To: ______________	Invoice To: ______________	Project No.: ______________
______________	______________	Site Name: ______________
______________	______________	Location: ______________ State: ______
Project Mgr.: ______________	P.O. No.: __________ RQN: __________	Sampler(s): ______________

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH_3OH 8= $NaHSO_4$ 9=__________ 10=__________

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1=__________ X2=__________ X3=__________

G=Grab C=Composite

Containers: | **Analyses:** | **QA Reporting Notes:** (check if needed)

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Preservative	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic										QA Reporting Notes

QA Reporting Notes:

- ☐ Provide MA DEP MCP CAM Report
- ☐ Provide CT DEP RCP Report

QA/QC Reporting Level

☐ Standard ☐ No QC
☐ Other__________

State specific reporting standards: __________

	Relinquished by:	Received by:	Date:	Time:
☐ Fax results when available to (____) __________				
☐ E-mail to __________				
EDD Format __________				
Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C ______				

FIGURE C-2
EXAMPLE CUSTODY SEAL

ERM® **CHAIN OF CUSTODY SEAL**

Appendix E
Citizen Participation Plan

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
For
Borinquen Court

BCP Site #C203056
285 East 138th Street
Bronx, New York 10454

November 2011

Contents

*** * * * ***

Note: *The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the remedial process.*

Applicant: **East One Thirty Eighth Housing Development Fund Company, Inc. and Borinquen Court Associates, L.P.**
Site Name: **Borinquen Court ("Site")**
Site Number: **C203056**
Site Address: **285 East 138th Street**
Site County: **Bronx, NY 10454**

1. What is New York's Brownfield Cleanup Program?:

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants that conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at: http://www.dec.ny.gov/chemical/8450.html.

2. Citizen Participation Activities:

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected by and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment;

- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process;

- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process;

- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community; and

- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the Site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the Site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC website. If this occurs, NYSDEC will inform the public in fact sheets distributed about the Site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the Site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.
The site contact list includes, at a minimum:

- Chief executive officer and planning board chairperson of each county, city, town and village in which the Site is located;
- Residents, owners, and occupants of the Site and properties adjacent to the Site;
- The public water supplier which services the area in which the Site is located;
- Any person who has requested to be placed on the site contact list;
- The administrator of any school or day care facility located on or near the Site for purposes of posting and/or dissemination of information at the facility; and
- Location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site. The fact sheet will also be available in Spanish and is a certified direct translation.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the Site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the Site, as described in Section 5.

If the Site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the Site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the Site.

For more information about TAGs, go online at http://www.dec.ny.gov/regulations/2590.html.

Note: The table continues on the next page:

Citizen Participation Requirements (Activities)	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repositories	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement:	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report

Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about proposed RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that summarizes the Final Engineering Report • Distribute fact sheet to site contact list announcing issuance of Certificate of Completion (COC)	At the time NYSDEC approves Final Engineering Report. These two fact sheets are combined if possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern:

There are no major issues of public concern as they relate to the Site. Major issues of public concern may be identified during the Site's investigation process if they arise.

The Applicant has completed a Scoping Sheet for the Major Issues of Public Concern, which will help them better understand the community surrounding the Site. Because of the high percentage of Potential Environmental Justice Areas in New York City, the Scoping Sheet is a particularly valuable tool in this region.

The area surrounding the Site is predominantly Hispanic-American. Fact sheets will be translated into Spanish. The Scoping Sheet will provide the Applicant with opportunity to further understand the demographics surrounding the BCP site. In addition, the Applicant will need to understand how truck traffic patterns involving the site remediation, will affect the community. Furthermore, there is a large elderly population in the surrounding area.

4. Site Information:

<u>Site Description</u>

Borinquen Court is a seven-story, 145-unit, 137,800 sq. ft. low-income senior housing complex in the Mott Haven section of the South Bronx in New York City. The building is constructed of block and plank, with a slab on grade foundation and a brick façade. The building sits on a 79,400 sq. ft. piece of land on Third Avenue between East 138th street to East 139th Street in the Bronx. The building entrance fronts on East 138th Street and the building includes three residential wings that surround a centralized core. An open, paved parking lot that accommodates 33 cars is located on the southeast portion of the Site and to the west is an open, landscaped area. The site occupies approximately 1.8 acres and approximately ¾ of the block. The Site is legally defined as Tax Block 2314, Lot 1. A site location map is presented as Appendix C. The properties surrounding the Site are used primarily for residential purposes, with some commercial and industrial uses as well. Immediately to the west of the Site is the intersection of Morris and Third Avenues and immediately to the east is the New York City Police Department's 40th Precinct. North of the Site, across East 139th Street, are 3 and 4 story residential buildings and one manufacturing building and south of the Site is a high rise New York City Housing Authority complex, the Mayor John Purroy Mitchell Houses, surrounded by parking lots. The MTA #6 train runs adjacent to the property along East 138th Street. A subway station exists on the corner of 138th and Third Avenue and abuts the property.

Site History

According to a March 2009 Impact Environmental Phase I Environmental Site Assessment Report, Block 2314 Lot 1 was utilized as a gasoline filling station from about 1935 through 1968, an automobile repair facility from about 1935 to 1978, a mattress factory/manufacturer from 1944 to 1978 and a metal works facility from about 1951 to 1978. The original sponsor of the project, the South Bronx Housing Corporation, constructed the building and obtained a Certificate of Occupancy on July 9, 1981. In February of 2011, U.S. Department of Housing and Urban Development (HUD) transferred ownership of the building to East One Thirty Eighth Housing Development Fund Company, Inc. (hereafter referred to as East 138th HDFC, Inc.).

Environmental History

The Phase I Environmental Site Assessment conducted in March, 2009, was limited in scope because Impact Environmental was not allowed access to the property. On the basis of historical records, the following recognized environmental conditions at the Site were found:

- A gasoline filling station with 5-550 gallon underground storage tanks (USTs) was located in the southwest corner of the property in an area that is currently landscaped. This filling station was identified on Sanborn maps from 1935, 1944, 1947, 1951 and 1968 and, therefore, was likely in operation for approximately 40 years. There are no records indicating whether these tanks were removed.

- A parking garage with two USTs and an auto repair facility were located on the northwestern side of the Site. The garage was observed on Sanborn maps dated 1935, 1944, 1947, 1951, 1968 and 1978 and various auto repair facilities were noted over the same period. Like the filling station described above, there is no record of tank removal.

- A mattress factory/manufacturer was present in the northwest corner of the Site according to Sanborn maps from 1944 through 1978.

- A metals works facility was located on the southeast corner of the Site, and based on a review of the Sanborn maps, was likely in operation from 1951 to 1978.

The historical operations all have potential to impact subsurface soils, groundwater and soil vapor at the Site where the building is home to a sensitive population of frail and elderly. The 40 year old filling station, with five 550-gallon underground gasoline storage tanks, likely represents the most significant source. Leaks and spills from tanks located on the southwest section of the property may have contaminated soil under a portion of the building and under the landscaped area of the Site. Also on-site for a period of about 40 years were two 550-gallon underground storage tanks associated with the parking garage. If these tanks were left in place they are likely under the building itself. Research on historical mattress manufacturing suggests the possible use of solvents in the construction and degreasing of spring coils as well as chemicals used in making the mattresses flame retardant and insect proof such as antimony, phosphorus and arsenic. Solvents may also have been associated with the metals works and/or auto repair facility.

MACTEC, on behalf of the U.S. Department of Housing and Urban Development, conducted a limited Phase II on-site investigation on the property in January, 2010. Five shallow samples (between 0.5 and 2.0 feet below ground surface (bgs)) were submitted to the laboratory for analysis of Polycyclic Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs) and Total Petroleum Hydrocarbons (TPH). Analytical results indicate that the concentrations of some Semi-Volatile Organic Compounds (SVOCs) were in excess of New York State Department of Environmental Conservation (NYSDEC) recommended soil cleanup objectives (RSCOs). Groundwater was encountered between 14 and 16 feet bgs in two of the borings. Two groundwater samples were also collected, only one of which could be analyzed and that sample also contained several SVOCs. However, as a result of elevated method detection limits, the concentrations were not considered representative. MACTEC's investigation is considered incomplete and insufficient for characterizing the areas of concern on the property. The table below summarizes the soil samples with exceedances of NYSDEC RSCOs. Borings SB-3, SB-4, SB-5 and SB-6 were all collected from the portion of the property bordering Third Avenue.

Phase II Soil Analytical Results
Borinquen Court
BCP Site – C203056

Constituent	SCO (ug/kg)	SB-3 1.5′-2.0′ bgs	SB-4 4.5′-5.0′ bgs	SB-5 0.5′-1.0′ bgs	SB-6 0.5′-1.0′ bgs
Benzo (a) Anthracene	1000	5200	-	5200	-
Chrysene	1000	5300	-	5300	-
Benzo (b) Fluoranthene	1000	5800	-	5800	-
Benzo (a) Pyrene	1000	4800	-	4800	-
Indeno (1,2,3 – cd) Pyrene	500	5200	5200	5200	5200
Dibenz (a,h) Anthracene	330	1500	-	1500	-

5. Investigation Process:

Application

The Applicant has applied for and been accepted into New York's BCP as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the Site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination on-site, and must conduct a qualitative exposure assessment, a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the Site and to contamination that has migrated from the Site.

The Applicant proposes that the Site will be used for restricted residential purposes.

To achieve this goal, the Applicant will conduct investigation activities at the Site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the Site.

Investigation

The Applicant will conduct an investigation of the Site officially called a "remedial investigation" (RI). This investigation will be performed with NYSDEC oversight. The

Applicant must develop a remedial investigation workplan, which is subject to public comment.

The site investigation has several goals:

1) Define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) Identify the source(s) of the contamination;
3) Assess the impact of the contamination on public health and the environment; and
4) Provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

When the investigation is complete, the Applicant will prepare and submit a report that summarizes the results. This report also will recommend whether cleanup action is needed to address site-related contamination. The investigation report is subject to review and approval by NYSDEC.

NYSDEC will use the information in the investigation report to determine if the Site poses a significant threat to public health or the environment. If the Site is a significant threat, it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the Site does not pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Remedy Selection

When the investigation of the Site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the Site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a Certificate of Completion (COC) (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a Remedial Work Plan. The Remedial Work Plan describes the Applicant's proposed remedy for addressing contamination related to the Site.

When the Applicant submits a proposed Remedial Work Plan for approval, NYSDEC would announce the availability of the proposed plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy.

The Applicant may then design and perform the cleanup action to address the Site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a Final Engineering Report (FER) that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the Site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the Site, it will approve the FER. NYSDEC then will issue a COC to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the Site after it receives a COC.

Site Management

Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management may be conducted by the Applicant under NYSDEC oversight, if contamination will remain in place. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the Site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An institutional control is a non-physical restriction on use of the Site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the Site suitable for some, but not all uses.

An engineering control is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that is pumping and treating groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A

Project Contacts and Locations of Reports and Information

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):
Mandy Yau
Project Manager
NYSDEC Region 2
Division of Environmental Remediation
One Hunters Point Plaza
47-40 21st Street
Long Island City, NY 11101
Tel: (718) 482-4897

New York State Department of Health (NYSDOH):
Bridget Callaghan
Project Manager
NYSDOH
Flanigan Square
547 River Street

Troy, NY 12180-2216
Email: bkco1@health.state.ny.us

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

Mott Haven Library
321 East 140th Street
Bronx, NY 10454
Tel: (718) 665-4878
Call for hours

NYSDEC Region 2
One Hunters Point Plaza
47-40 21st Street
Long Island City, NY 11101
Attn: Mandy Yau
Phone: (518) 402-9706
Hours: Monday through Friday: 9:00 AM to 5:00 PM
(Call for appointment)

Appendix B

Site Contact List

Government Contacts:

Senator State of New York
US Senate:
Hon. Charles Schumer
757 Third Avenue, Ste 17-02
New York, NY 10007

Hon. Kirsten Gillibrand
780 Third Avenue, Ste 2601
New York, NY 10007

U.S. Congress:
The Honorable Jose E. Serrano,
Congressman, 16th District of New York
1231 Lafayette Ave, 4th Floor
Bronx, NY, 10474

State Senate of New York:
The Honorable Jose M. Serrano,
Senate District 28
157 East 104th Street (Ground Level),
New York, New York 10029

State of New York
State Assembly:
The Honorable Carmen E. Arroyo,
Assembly District 84
384 East 149th Street, Suite 301
Bronx, NY 10455

City of New York:
The Honorable Michael R. Bloomberg,
Mayor City of New York
City Hall
New York, NY 10007

Hon. John Liu
NYC Comptroller
1 Centre Street
New York, NY 10007
Press@comptroller.nyc.gov

Hon. Bill de Blasio
Public Advocate
1 Centre Street, 15th Flr
New York, NY 10007
wnorvell@pubadvocate.nyc.gov

Amanda M. Burden, FAICP, Chair of the City Planning Commission and Dir. of the Department of City Planning
c/o Department of City Planning
22 Reade Street
New York, NY 10007-1216

Dan Walsh, PhD,
Director NYC Environmental Remediation
Environmental Remediation
253 Broadway, 14th Floor
New York, NY 10007

New York City Housing Authority
340 Alexander Avenue #1C
Bronx, NY 104540
Tel: 646-330-6770

Dr. Robert Kulikowski
Director NYC Office of Environmental Coordination
253 Broadway 14th Flr
New York, NY 10007

John Wuthenow
Office of Environmental Planning & Assessment NYCDEP
96-05 Horace Harding Expressway
Flushing, NY 11373

State of New York:
Michelle Moore, Environmental Analyst
NYSDEC Div of Environmental Permits
One Hunter's Point Plaza
47-40 21st Street
Long Island City, New York 11101-5407
Tel: (718) 482-4900
Email: ej@gw.dec.state.ny.us

Jane O'Connell, Chief of Superfund
NYSDEC
47-40 21st Street
Long Island City, NY 11101
jhoconne@gw.dec.state.ny.us
Tel: (718)-481-4900

US Government:
US Dept of Housing & Urban Development
5 Point Plaza
Atlanta, GA 30303

Borough of the Bronx, Bronx County:
The Honorable Ruben Diaz, Jr.
Bronx Borough President
851 Grand Concourse, Ste. 301
Bronx, New York 10451
Attn: Wilhelm Ronda, Director Policy & Planning

Luis M. Diaz
Bronx County Clerk's Office
851 Grand Concourse, Room 118
Bronx, NY 10454

James Rausse, AICP
Director of Budget & Housing
Office of the Bronx Borough President
851 Grand Concourse, 3rd Flr
Bronx, NY 10454

Wilhem Rhonda
Director Pollicy & Planning
Office of the Bronx Borough President
851 Grand Concourse, Ste 301
Bronx, NY 10454

Department of City Planning,
Bronx Borough Office
One Fordham Plaza, 5th Floor,
Bronx, NY 10438-5891
Attn: Carol Samol, Director

Jeanine Thomas-Cross
Mott Haven Library
321 East 140th Street
Bronx, NY 10454

City Councilperson:
The Honorable Maria del Carmen Arroyo
New York City, District 17
384 E. 149th St., Suite 300
Bronx, NY 10455

Bronx Community Board 1:
Mr. Cedric Lofton, District Manager
George Rodriquez, Chairperson
Community Board 1,
3024 Third Avenue
Bronx, NY 10455

Civic/Community/Religious Groups

Lenny Caro
Bronx Chamber of Commerce
1200 Waters Place, Ste 106
Bronx, NY 10461
Tel: (718)-828-3900
Tel: (718)-409-3748

Shira Gidding
South Bronx Overall Economic Development
555 Bergen Avenue
Bronx, NY 10455
Tel: (718) 292-3113

Phillip Morrow
South Bronx Overall Economic Development Corp
555 Bergen Avenue
Bronx, NY 11454
Tel: (718)-292-3113

Borinquen Court Housing Dev Fund Corp.
271 East 138th Street
Bronx, NY 10454

Fr. Gustavo Nieto
St. Jerome's Church
230 Alexander Avenue
Bronx, NY 10454
gustavoniete@ive.org

Centor Christiano Emanuel
2612 Third Avenue
Bronx, NY 10454

Third Spanish Baptist Church
322 Alexander Avenue
Bronx, NY 10454

Erica Packard
Bronx Land Trust
232 East 11th Street
Bronx, NY 10454
Erica_packard@yahoo.com
Tel: 212-228-5482

Green Workers Cooperatives
461 Timpson Place
Bronx, NY 10454
info@greenworder.coop
Tel: (718)-617-7807
Tel: (718)-742-1116

Luis Rojas
For a Better Bronx
199 Lincoln Avenue, Ste 214
Bronx, NY 10454
rojasiguamo@aol.com
Tel: (718)-292-4344

Mitchell Community Center
210 Alexander Avenue
Bronx, NY 10454
Tel: (718)-993-9355

Mott Haven Community Center
375 East 143rd Street
Bronx, NY 10454

Andre Pabon
Abraham House
340 Willis Avenue
Bronx, NY 10454
apabon@abrahamhouse.org
Tel: (718)-292-9321

ASPIRA of NY
Attn: Executive Director
520 Eighth Avenue, 22nd Flr.
New York, NY 10018

United Methodist Church
Att: Pastor
401 East 141st Street
Bronx, NY 10454

Little Mt Calvary Baptist Church
Attn: Pastor
420 East 138th Street
Bronx, NY 10454
Tel: (718)-292-4516

St. Peter's Evangelical Lutheran Church
430 East 140th Street
Bronx, NY 10454
Tel: (718)-402-5510

Freedom Community Center
455 East 140th Street
Bronx, NY 10454
Tel: (718)-402-2236

Residents, owners, occupants of the site and properties immediately adjacent owner:

East One Thirty Eighth Housing Development Fund Company, Inc.
2345 Broadway
New York, NY 10024
Attention: Joann Vargas

Peter Standish
East Side House Settlement
337 Alexander Avenue
Bronx, NY 10454
inguiries@eastsidehouse.org
Tel: (718)-665-5250

243 East 138th Street LLC
c/o Yorkville Van & Storage Co., Inc
1587 Third Avenue
New York, NY 10028

138th Street Realty LLC
579 Grand Concourse
Bronx, NY 10451

Adfia Realty LLC
573 Grand Concourse
Bronx, NY 10451

East 138th Street Bronx Realty Corp
535 East 14th Street
New York, NY 10009

NYCHA
Mott Haven Houses
373 East 141st Street
Bronx, NY 10454
Tel: (718)-665-1020

Mayor John Purroy Mitchell Houses
NYCHA
225 Alexander Avenue
Bronx, NY 10454

NYCHA
Patterson Houses
301 East 143rd Street
Bronx, NY 10451

261 Realty, LLC
261 Alexander Avenue
Bronx, NY 10454

Carney Holdings, LLC
263 Alexander Avenue
Bronx, NY 10454

NYC Police Department
40th Police Precinct
257 Alexander Avenue
Bronx, NY 10454

John P. Carney
265 Alexander Avenue
Bronx, NY 10454

Edwin Figueroa
267 Alexander Avenue
Bronx, NY 10454

George John Saegaert
269 Alexander Avenue
Bronx, NY 10454

Angel Lopez
271 Alexander Avenue
Bronx, NY 10454

James McAfee
273 Alexander Avenue
Bronx, NY 10454

B-Ray Management, Inc.
306-308 East 139th Street
Bronx, NY 10454

Phillip Equities, Inc.
304 East 139th Street
Bronx, NY 10454

Juan Frias
302 East 139th Street
Bronx, NY 10454

Gilberto Chavez
1850 Loring Place South
Bronx, NY 10453

Site Residents/Occupants:

Borinquen Court Tenants Association
285 East 138th Street
Bronx, NY 10454
Attention: Manuel Colon

Local News Media

Bronx News
134 Dreiser Loop
Bronx, NY 10475
http://www.bxnews.net

News 12 Bronx
930 Soundview Avenue
Bronx, NY 10473

New York 1 News
75 Ninth Avenue
New York, NY 1001
Ny1news@ny1.com

New York Daily News
450 West 33rd Street
New York, NY 10011

New York Post
1211 Avenue of the Americas
New York, NY 10036

El Diario La Prensa
1 Metro Tech Center , 18th Flr
Brooklyn, NY 11201

Bronx Times Reporter
900 East 132nd Street
Bronx, NY 10454

Mott Haven Herald
3400 Reservoir Oval
Bronx NY 10467

Hunts Point Express
3400 Reservoir Oval
Bronx NY 10467

Bronx News Network
3400 Reservoir Oval
Bronx NY 10467

Inner City Press
P.O. Box 580188
Bronx, NY 10458

Public Water Supplier:

Hon. Carter Strickland
New York City Department of
Environmental Protection (DEP)
Bureau of Water Supply
59-17 Junction Blvd.
Flushing, NY 11373

DEP manages the water supply and distribution and a copy of the 2009 New York City Water Supply and Quality Report is available by calling 311 or at: http://home.nyc.gov/html/drinking_water/wsstate.shtml

Administrator of any school or day care facility located on or near the site:

South Bronx Charter School
International Cultures and Arts
383 East 139th Street
Bronx, NY 10454

Freedom Community Center
455 East 140th Street

Bronx, NY 10454
Tel: (718) 402-2236

Bronx Charter School for Children
388 Willis Avenue
Bronx, NY 10454
Tel: (718) 402-3300

Darlene Morris
St. Jerome School
222 Alexander Avenue
Bronx, NY 10454
Tel: (718) 292-4920

William Hewlett Jr.
Middle School 203
339 Morris Avenue

Anna Hall
Bronx Academy of Letters
339 Morris Avenue
Bronx, NY 10451

East Side House Settlement Day Care Facilities
210 Alexander Avenue
Bronx, NY 10454

East Side House Settlement Day Care Facilities
414 Morris Avenue
Bronx, NY 10454

Winifred Wheeler Nursery School
Attn: Director
200 Alexander Avenue
Bronx, NY 10454

Bronx Elementary School 49
Attn: Principal
383 East 139th Street
Bronx, NY 10454

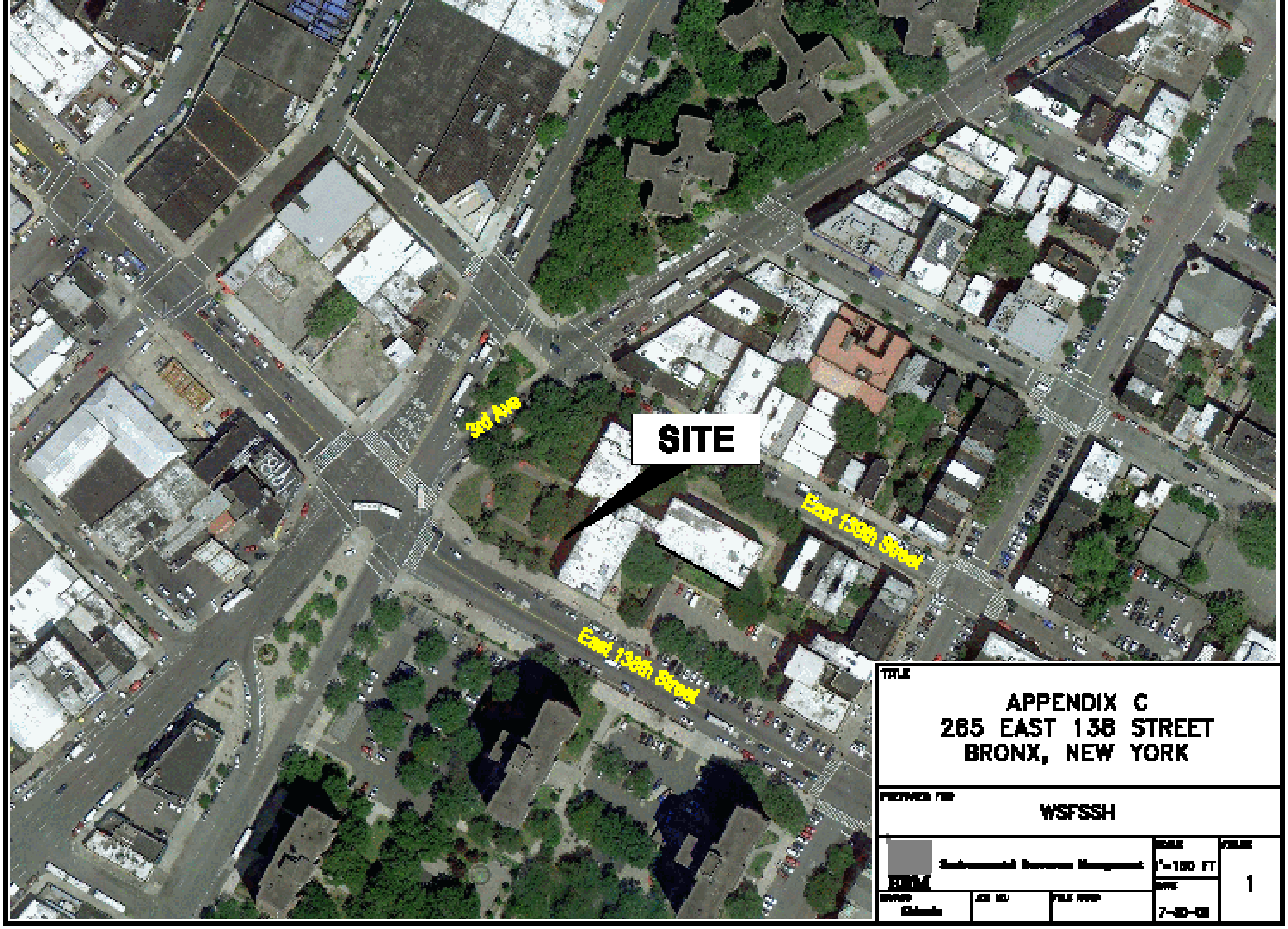
Marsha Elliot
P.S. 154 Jonathan Hyatt
333 East 135th Street
Bronx, NY 10454
Tel: (718)-292-4742

Sherry Font-Williams
P.S. 179
468 East 140th Street
Bronx, NY 10454
Tel: (718)-292-2237

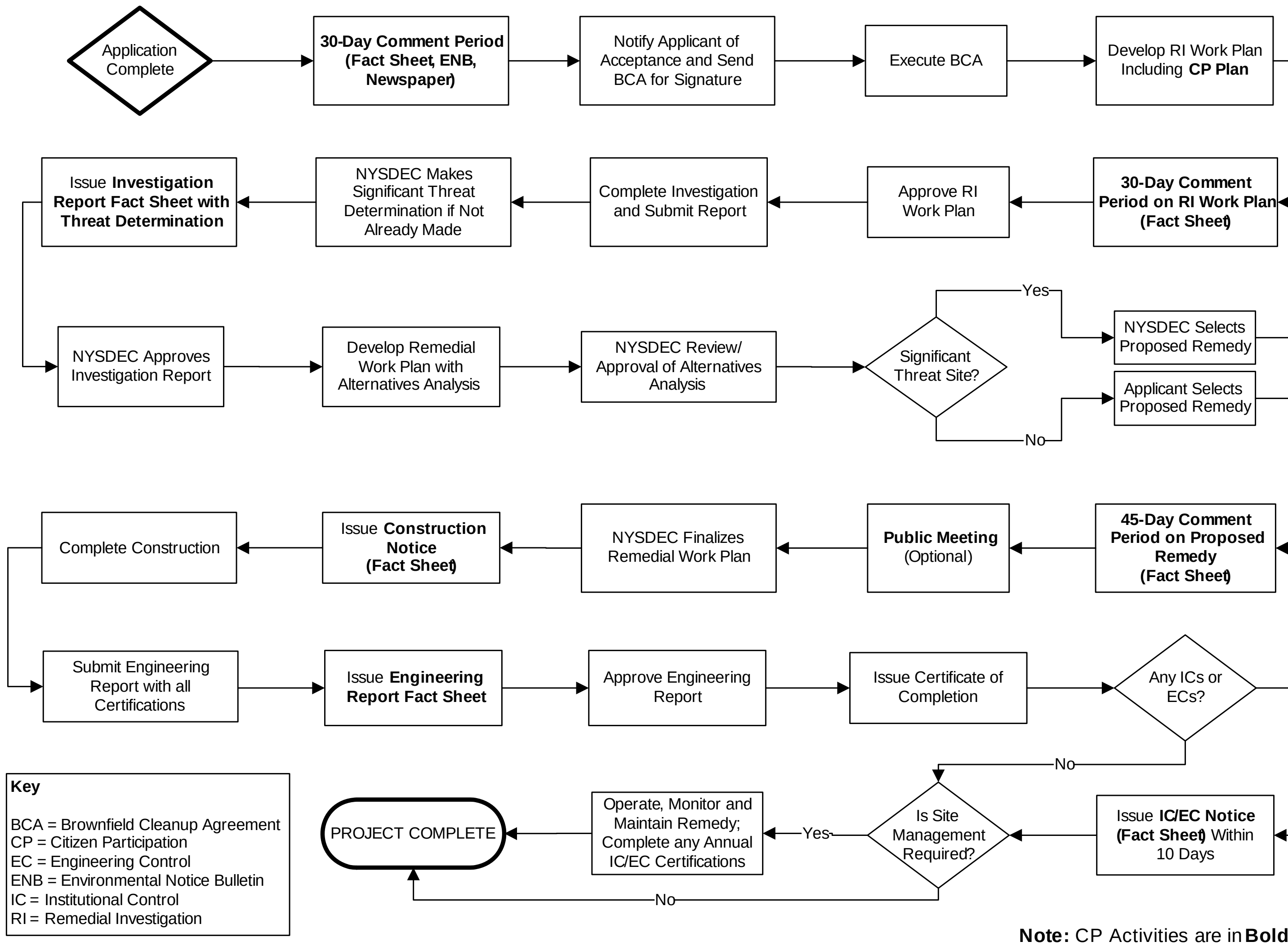
Rosa Nieves-Greene
Public School 168
Rosa Nieves-Greene
Public School 168
339 Morris Avenue
Bronx, NY 10451

Appendix C

Site Location Map


3rd Ave
SITE
East 139th Street
East 138th Street
APPENDIX C
265 EAST 138 STREET
BRONX, NEW YORK
WSFSSH
1

Appendix D– Brownfield Cleanup Program Process



Appendix F
Project Team Profiles

Ernest Rossano, C.P.G.

Mr. Rossano has 20 years of varied hydrogeologic experience, including 3 years as a Project Manager for the United States Geological Survey, Water Resources Division on Long Island. His experience includes the design of monitoring well networks for volatile organics, hydrocarbons, and collection of basic hydrogeologic parameters; seismic, downhole geophysical, and sample log analysis and correlation; supervision and analysis of pump tests in confined and unconfined strata; numerical modeling of ground water flow and solute transport; and management of large scale remedial investigations and remediation.

Registrations & Professional Affiliations

- Certified Professional Geologist
- National Ground Water Association
- American Institute of Professional Geologists
- Association of Ground Water Scientists & Engineers

Fields of Competence

- Management of ground water pollution investigations
- Analysis of surface and ground water flow systems
- Surface and subsurface water quality monitoring
- In-situ permeability testing
- Infiltration testing
- Stratigraphic analysis, correlation and interpretation
- Multi-media sampling
- Tank removal and associated soils assessment
- Aquifer test analysis
- Ground water modeling
- Fate & Transport modeling
- Applied geophysics
- Municipal water supply
- Soil Vapor Extraction
- Air Sparging
- Bioventing/Biosparging
- Design & Installation of Horizontal Wells
- Construction Management
- Data Management using GIS Systems

Education

- M.S. Hydrogeology, State University of New York at Stony Brook, 1992
- B.S. Geology, Southampton College, New York, 1984

Key Projects

Comparison of major land use with the overall water quality of Long Island, New York.

Management and supervision of monitoring well network using over 1,000 wells. Correlation of data for use in USGS-published annual reports.

Stream gauging and surface water sampling on Long Island for the USGS National Stream Quality Accounting Network (NASQAN) and National Water Quality Assessment (NAWQA) programs.

Supervision of field activities including aquifer testing, test borings, well installation, recovery well construction, soil vapor and ground water sampling, and data evaluation.

Design and installation of a static hydrocarbon recovery system using 29 wells to recover over 450,000 gallons of product.

Supervision of tank removal and subsequent soils evaluation for contamination.

Design and installation of a municipal supply well yielding over 1,000 gallons per minute. Supervised all aspects of well construction and acceptance testing.

Three dimensional ground water flow model of New Jersey Coastal Plain deposits, to determine recovery well locations and rates, and feasibility of recharging treated effluent.

Pilot testing of soil vapor extraction and air sparging at several sites with varied hydrogeologic settings.

Pilot testing of bioventing and biosparging in glacial outwash deposits in New York.

Project Manager for the design, construction and operation of a 4000 scfm air sparge and 6200 scfm soil vapor extraction system consisting of 181 vertical and three horizontal sparge wells and 33 vertical and 1 horizontal soil vapor extraction wells. Provided direct construction management supervision for installation of 4 horizontal wells averaging 1100 feet in length. As project manager was responsible for construction management of above ground treatment system components.

Regional scale three-dimensional flow and solute transport model of hydrocarbons in glacial terrain in New York used to negotiate favorable cleanup criteria for the client.

Flow and transport model of a chlorinated solvent plume on Long Island, New York. Constructed a model involving the movement of groundwater and chlorinated solvents in highly permeable glacial sediments. This model utilized the MT3D code and site-specific decay rates to demonstrate fate and transport.

Flow and transport model of a chlorinated solvent plume in East Rutherford, New Jersey. Constructed a model involving the movement of ground water and chlorinated solvents in overburden sediments and wetland areas. This model utilized the RT3D code and site-specific decay rates to develop a Classification Exception Area and demonstrate monitored natural attenuation.

Managed a site decommissioning and remedial investigation for a large defense industry client. Investigation results indicated significant chromium contamination in soil and ground water and led to inclusion in the New York State Voluntary Cleanup Program. Sediment and surface water samples were collected from multiple locations in the East River as part of the remedial investigation. Additional investigation and remediation are pending NYSDEC review. Chosen remedial methods were excavation and in situ stabilization/reduction. As project manager was responsible for construction management aspect of implementing the remedial strategy.

Database setup and management for multiple large remedial investigation projects using GIS/Key. Database outputs include geologic and chemical cross sections, isoconcentration maps, graphs, data tables, and statistical analysis. Exports from databases have been used in ground water flow and solute transport modeling.

Management of a large ISRA project on a site contaminated with metals and chlorinated solvents. Key aspects of this project include; litigation support, active ground water remediation, off site plume delineation, ground water monitoring, data management and soil remediation.

Gregory K. Shkuda, Ph.D.

Dr. Gregory Shkuda has more than 30 years of environmental consulting experience including project direction, regulatory agency negotiation, cost and schedule control, and expert opinion/testimony in matters ranging from fate and transport of chemical contaminants to fingerprinting of environmental contaminants.

Professional Affiliations & Registrations

- American Chemical Society

Fields of Competence

- Environmental Forensics including fingerprinting of petroleum fuels/oils/PCBs/MGP waste and chlorinated hydrocarbons
- Evaluation of complex ground-water quality problems
- Analysis of biodegradation of organics in groundwater
- Expert testimony on hazardous waste compliance
- Review of QA/QC plans
- Development of analytical protocols for litigation purposes
- Risk Evaluation/Communication

Education

- Ph.D. Organic Chemistry, New York University, 1976
- M.S. Organic Chemistry, New York University, 1973
- B.A. Chemistry, New York University, 1968

Publications

Shkuda, G.K., Repetti, N., Coenen, A., Domaradzki, C., Speis, D. 2010. Cost and Data Quality Implications in Current TO-15 Sampling Procedures. Remediation of Chlorinated and Recalcitrant Compounds, Seventh International Conference, Monterey, California.

Shkuda, G.K. 2010. Daubert vs Emil Fischer vs Merrill-Dow Pharmaceuticals. Remediation of Chlorinated and Recalcitrant Compounds, Seventh International Conference, Monterey, California.

Domaradzki, C., Frak, M., Shkuda, G.K., and Coenen, A. 2008. Design and Performance of an Innovative Vapor Sampling Apparatus. Remediation of Chlorinated and Recalcitrant Compounds, Sixth International Conference, Monterey, California.

Key Projects

Provided expert testimony for a major petroleum company regarding the identity, age, and origin of petroleum hydrocarbons detected in the subsurface at a bulk terminal facility in Texas. Gas chromatographic fingerprinting and component ratio analyses were used to demonstrate that the client was not the source of the contamination impacting a nearby park.

Provided litigation support for a petroleum company at a refinery site in California. The expert analysis involved fingerprinting of free product detected below the area of the refinery where finished gasoline was produced to determine origin, type, and age of product so that the on-site contamination could be distinguished from the product detected off-site. Various techniques were applied including high-resolution gas chromatography, biomarker and PIANO analyses and the occurrence and nature of organic lead species.

Provided expert testimony on behalf of a petroleum company regarding the origin of product detected in a former underground storage tank (UST) pit. Use of high-resolution gas chromatography allowed determination that the product was not related to the client's operations but resulted from subsequent usage of the property. The expert opinion was a key element in the summary judgment motion, which was granted by the court.

Evaluated dioxin analytical methodologies and the potential for dioxin formation from copper recovery operations at New Jersey Secondary Smelter impacting New York City.

Evaluated dioxin formation for a chemical manufacturer in Newark, New Jersey to determine the likelihood of dioxin formation and transport of putative dioxins to the Passaic River.

Evaluated on- and off-site dioxin and dibenzofuran sources and distributions at a 70-acre chemical plant in Portland, Oregon.

Served as Project Manager for the investigation of the extent of MGP contamination at the former Niagara Mohawk corporate offices in Syracuse, New York. Installed a monitoring well network to define the extent of contamination. Evaluated remedial options.

Provided litigation support regarding the sources of polychlorinated biphenyls (PCBs) and polychlorinated naphthalenes (PCNs) at former wire and cable manufacturing facility. Fingerprinting of the PCBs and PNCs was carried out to determine if the source of these materials in sediments and soil was manufacturing operations at the site or from sources up-river. Detailed PCB and PCN fingerprinting analyses were carried out to supplement standard USEPA analyses.

Directed an Investigation and Clean-up of a Site under the New York State Voluntary Clean-up Program. The property was formerly the location of a municipal solid waste incinerator. Waste materials containing polychlorinated biphenyls (PCBs) and polynuclear aromatic hydrocarbons (PAHs) were detected on the site during sampling conducted as part of a property transfer. The PCBs and PAHs were detected at depth and risk analysis demonstrated that the PCBs and PAHs could safely remain in place and only limited clean-up of metal impacted soil was necessary.

Prepared clean-up plans for two transformer reconditioning/disposal facilities. Sampling plans included "decision-tree" based sampling to determine the area and vertical extent of polychlorinated biphenyl (PCB) contamination. The sites were located in two different states and the plans also had to address differing PCB regulations at each of the venues.

Project Director for a New York State Department of Environmental Conservation State Superfund Standby Contract. Managed Oversight of the Cleanup of Five MGP Sites throughout the State of New York. Reported on contractor clean-up activities and compliance with approved work plans. Provided air quality monitoring and reviewed final reports.

Evaluated the potential presence of MGP wastes at a site just outside the limits of the Lower Falls MGP Superfund Site in Rochester New York. Performed a forensic evaluation of MGP impacts at Two Areas of Concern (AOC) at then MGP site in Atlantic Highlands, New Jersey. The forensic evaluation focused on determining if contamination on the AOCs was MGP derived or whether they were other sources of polynuclear aromatic hydrocarbons.

Provided litigation support at a New Jersey Superfund site. Detailed analysis of production records of chemical manufacturing, review of analytical methodologies and the fate and transport of product chemicals and by products was required for the production of an Expert Report. Assisted in critique of other experts.

Provided litigation support and expert testimony for a Potentially Responsible Party (PRPs) Group at a Superfund site in Indiana. The litigation support required detailed analysis of production records to of the PRPs and other landfill users to determine the chemical manufacturing processes used, likely products, and whether unwanted by-products could be contained in waste streams. Identified hazardous substances contained in the waste streams of potential users of the disposal site to identify additional PRPs to require them to share in clean-up costs.

Directed an environmental study at a chemical plant in New Jersey, which included determination of the impacts to both ground and surface water of releases from the plant, detection, and mitigation of the impacts of non-aqueous phase liquids (NAPL) and assessment of the risk to local residences presented by the NAPL via volatilization and intrusion of the vapors into homes.

Analyzed the groundwater transport and fate, distribution, and analytical methodology used to quantify a pesticide used on Long Island. Provided expert testimony on behalf of the manufacturer to defend a toxic tort.

Provided expert testimony for the Department of Justice regarding the nature, mobility, persistence, and fate of organic and inorganic contaminants at a Superfund site in Jacksonville, Florida.

Directed the remedial investigation at a closed aircraft manufacturing facility on Long Island including negotiations with the NYSDEC regarding the scope of the investigation, evaluation of the monitoring data, supervision of Resource Conservation Recovery Act (RCRA) closure activities and coordination of cleanup activities.

Directed an RI/FS at two municipal landfills on Long Island. Was responsible for; negotiating the scopes of the work plans including assessment of risks to both human health and the environment with the New York State Department of Environmental Conservation (NYSDEC), implementing the studies, coordination of activities with the regulatory agencies (state, federal, and local), obtaining access for off-site activities with municipalities and residents. Presented the results of the RI/FS including communication of the risk assessment results at the CERCLA required public meeting.
Collected ambient air monitoring data determining the concentrations of vinyl chloride being emitted from a municipal landfill and potentially impacting an adjacent elementary school.

John Mohlin, P.E.

Mr. John Mohlin has more than 16 years of environmental engineering consulting experience with emphasis on remediation of contaminated soil and groundwater, remedial investigations, feasibility studies, operation of remedial systems, industrial and domestic wastewater treatment, and air emission permitting and control. He is experienced in conducting pilot studies to evaluate the feasibility of soil and groundwater treatment systems using: air sparging, soil vapor extraction, ozonation, carbon adsorption, chemical precipitation, filtration, and dissolved air flotation. He has also performed several vapor intrusion investigations, as well as pilot tested and designed mitigation systems.

Mr. Mohlin has prepared designs for air sparging, soil vapor extraction, groundwater treatment, and vapor intrusion mitigation systems. He has also prepared industrial air emissions surveys and the corresponding air permit applications, and performed construction oversight during remediation projects.

Mr. Mohlin is continuously involved in engineering oversight of several remediation systems, including those utilizing air stripping, UV peroxidation, soil vapor extraction, air sparging, metals removal, carbon adsorption, multiphase extraction, and catalytic oxidation. Oversight includes system trouble-shooting, constant air and water quality testing and evaluation of results, management of operation subcontractors, maintenance operations, preparation of reports, and design of system upgrades.

Professional Affiliations and Registrations

- Registered Professional Engineer in New York State
- American Society of Civil Engineers
- American Academy of Environmental Engineers

Fields of Competence

- Management of site investigation and remediation projects
- Design and engineering support of soil, groundwater, and wastewater treatment systems
- Design and operations of air sparging, soil vapor extraction, and other remediation systems
- Vapor intrusion investigation and mitigation
- Soil and groundwater remediation pilot studies
- Industrial wastewater treatment
- Development of feasibility studies
- Hazardous waste management
- Regulatory permitting and compliance for air and qater
- Air quality engineering
- Construction oversight
- Health and safety monitoring

Education

- M.S. Environmental Engineering, Polytechnic University, New York, 1997
- B.S. Environmental Engineering, Florida Institute of Technology, 1993
- 40 hour OSHA 1910.120 Health and Safety Training
- Computer Aided Drafting, 50-hour Course, Island Drafting and Technical Institute, 2001.

Key Projects

Designed a 50-gpm groundwater treatment system to remove metals and BTEX, using equalization, metals precipitation, UV peroxidation, and pH adjustment. Specified equipment and prepared an equipment layout. Developed a pipe arrangement. Calculated necessary head for pumps, and specified pumps. Determined process logic and prepared control narrative. Currently, managing long-term operation of this system and the groundwater monitoring program.

Served as project manager for the investigation of a groundwater PCE plume in a residential/commercial neighborhood. Investigation techniques included vertical profile borings using Hydropunch groundwater sampling, indoor air sampling, and sub-structure soil vapor sampling. Presented at public meeting and prepared Feasibility Study and Site Management Plan to address the plume.

Designed two sub-slab depressurization systems for 150,000+ sf warehouse operations in New York.

Evaluated the extent of vapor intrusion at seven homes in France, and proposed mitigation options. Building constraints included: heated floor slabs, 300+ year old home, multiple basement levels, and limited interior access.

Designed a sub-slab vapor mitigation system consisting of a spray-applied vapor barrier with recovery of sub-slab vapors using wind-driven ventilators.

Served as project manager for the evaluation of an industrial wastewater stream prior to shutdown of a production line. Reviewed raw materials, flow rates, and existing data, and predicted future wastewater characteristics. Recommended changes to the existing treatment process. Prepared a request to the local POTW for a modification in pretreatment limits, and provided justification for the change in limits.

As project manager, evaluated the unexpected presence of acetone in the wastewater of a vitamin manufacturer, and determined the source of the acetone.

Served as project manager for the investigation of soil impacts beneath two large buildings using horizontal drilling techniques.

Served as project manager for remedial investigation report and feasibility study for urban site with PCBs, metals, and SVOCs in soil and groundwater. Also managed the design for the removal of 4,000 cy of impacted soil.

Served as project manager for the remedial investigation of the property of an active airport. Developed scope of work and coordinated project team to perform soil borings, groundwater sampling, well installation, and test pit installation. Prepared a remedial investigation report based on the results.

Served as project manager for designing and constructing upgrades to an industrial wastewater treatment process to remove excess lint and powder from the water. Utilized an inline filter press with continuous recycle and an industrial vibrator on the existing clarifier.

Served as project manager for the development and implementation of a Remedial Action Work Plan for two former petroleum research facilities to address soil and groundwater, and the subsequent remediation activities, including: soil excavation, monitored natural attenuation, enhanced biodechlorination, soil capping, and soil mixing.

As project engineer, performed extensive pilot study for remediation of contaminated soil and groundwater at a major gasoline terminal. The study included operation of a soil vapor extraction/air sparging system and a catalytic oxidizer. Performed sampling of soil, soil vapor, and groundwater. Involved in the conceptual-level and full-scale designs of the soil vapor extraction/air sparging system. Pilot study included computer modeling to estimate remedial clean-up time.

Served as project engineer for engineering support for the water and wastewater systems for two summer camps in remote locations. Collected monthly compliance samples, recommended treatment system upgrades, performed sampling for Microscopic

Particulate analysis, and prepared application for a new drinking water supply well.

Assisted health and safety officer and field engineer to provide site health and safety and engineering oversight of a $7,000,000 soil excavation.

As project engineer, evaluated the feasibility of using an in-situ iron treatment wall for the removal of chlorinated VOCs from groundwater. Developed a conceptual design for a wall that is 15 feet deep and 600 feet long.

Served as project engineer responsible for air emissions survey of a manufacturing facility with over 30 separate processes and emission points. The survey included an evaluation of each process such that mass balances could be used to calculate the emissions of each raw material. The emissions were then used to determine the potential annual impact and the short-term impact. These impacts were compared with guidance concentrations in order to determine the need for air emission controls. The resulting survey was used for the preparation of New York State applications for a permit to operate.

As project engineer, determined the capability of a domestic wastewater plant to accommodate an increased flow. Then, evaluated the potential and ultimately recommended the use of the treated domestic wastewater (i.e., "gray water") in an industrial cooling system. Assisted in the design of a gray water reuse system.

As project engineer, completed EPA Hazard Ranking System scoring for a site in Puerto Rico contaminated with mercury.

Karen L. Pickering

Ms. Karen Pickering has three years of experience in the environmental consulting field specializing in Geology. Ms. Pickering's field experience includes ground water, soil, and rinsate, sampling, field parameter measurement, monitoring well installation, installation of vertical profile wells, logging of soil and bedrock, subsurface and indoor air sampling, oversight of underground storage tank removals and oversight of remediation activities.

Before ERM, Ms. Pickering worked as a Geology lab assistant, where she prepared lab work and assisted introductory students. She was also a research student at the University of Mary Washington and participated in the identification of precipitates found at Acid Mine Drainage contaminated stream in Contrary Creek, Virginia. Her research consisted of, but was not limited to

- Measuring field parameters such as pH, temperature, specific conductivity, and total alkalinity;
- Identifying elements and minerals in the stream using Inductively Couple Plasma-Optical Emission Spectrometry and X-Ray Diffraction.

Ms. Pickering presented her findings at the Summer Science Research Symposium.

Registrations & Professional Affiliations

- 40-hour Health and Safety Certification
- 10-hour OSHA Construction Training
- ExxonMobil Loss Prevention System-Certified

Fields of Competence

- Site Assessment and Remediation
- Geologic and Hydrogeologic Correlation, Analysis, Interpretation and Assessments
- Soil and Ground Water Investigations
- Air Quality Investigations and Monitoring
- Health and Safety Site Officer
- Field Management

Education

- Bachelor of Science in Geology, May 2006
  University of Mary Washington, Fredericksburg, Virginia

Languages

- English, native speaker
- Spanish, beginner

Honors & Awards

Completed Summer Science Research Program identifying/evaluating the effects of Acid Mine Drainage in streams.

Key Projects

Ms. Pickering has diversified experience working on projects such as Becton Dickinson, Genesco, Long Island Jewish Medical Center, Alcan Packaging, ExxonMobile, Invensys, GDC Properties, Morgan Carbon Americas, Phipps Houses, Alcan Packaging, ExxonMobile, Invensys, BICC, and Honeywell.

Ms. Pickering serves as a project manager for the Konica Minolta Graphic Imaging U.S.A. Inc, (KMGI) Glen Cove facility semi-annual ground water sampling activities in response to a No. 6 fuel oil UST release. Responsibilities include interpretation of laboratory data, report writing, and overseeing semi-annual ground water sampling events.

Field Team Leader for Becton Dickinson ISRA project. Contaminants of concern at the facility included chlorinated volatile organic compounds (VOCs). Responsibilities included interpretation of laboratory data and report writing. Investigative activities included sampling of ground water, soil, soil vapor, sub-slab, and indoor air, as well as overseeing installation of soil borings and monitoring wells. Ms. Pickering was also responsible for logging of soils throughout the site and composing geologic cross-sections with the soil classification data. A vapor intrusion investigation was also conducted which involved contacting and arranging access to off-site residences and businesses to sample indoor air and sub-slab air.

Ms. Pickering served as the Field Team Leader for a Remedial Investigation for Morgan Chemical Products located in Irvington, New Jersey. Ms. Pickering provided oversight of rotosonic drilling through bedrock and installation and abandonment of monitoring wells. She was also responsible for carrying out soil gas and air sampling, as well as multiple rounds of low-flow ground water sampling events.

Ms. Pickering also served as a Field Team Leader for a Freon Investigation for Long Island Jewish Medical Center. Office responsibilities included writing Monthly Progress Reports and Reports of Findings and Ground Water Flow and Contour Maps. She oversaw multiple vertical profile borings on and off-site, as well as monitoring well installations. She also serves as the Field Team Leader for ground water sampling activities and vapor intrusion investigation activities at the site.

Ms. Pickering also held the role of Health and Safety Site Officer for a Phipps Houses Remediation and Construction Management project. The project, located in Bronx, NY, included oversight of hazardous waste remediation, dewatering, stabilization and solidification, decontamination, drilling, and mass excavation. She was also responsible for implementing the Community Air Monitoring Plan (CAMP) for the entire site.

Andrew Coenen

Mr. Coenen has 19 years of general analytical chemistry experience, 6 years of analytical laboratory experience, and 13 years of environmental consulting experience, including analytical data validation, sampling and analysis programs, quality assurance programs, technical support, laboratory audits, and QA oversight for fixed laboratory and field analysis. Mr. Coenen has knowledge of numerous analytical methodologies and experience in data validation of analytical data package deliverables for adherence to USEPA CLP and non-CLP, NYSDEC ASP, and NJDEP protocols. He is proficient with GIS/Key environmental management software and has operated a mobile gas chromatograph laboratory used to test soil and water samples for quick-turn volatile analysis.

Fields of Competence

- Analytical data review and validation
- Environmental database management (GIS/Key)
- Laboratory Subcontractor Management
- Analytical protocols for pollutants by USEPA methodologies
- Methods of analysis of organic and inorganic parameters
- Review and preparation of QA/QC plans
- Field analytical techniques
- Multi-Media Sampling

Education

- 8-Hour OSHA Annual Refresher Training, 1999 - current
- 40-Hour OSHA [29 CFR 1910.120 (e) (2)] Health and Safety Training, 1998
- Rutgers University / Cook College - NJDEP Using GIS for Environmental Evaluations, October 1999
- Computer Aided Drafting, 50-Hour Course, Island Drafting and Technical Institute, 1998
- Immunoassay Testing Training Program, Strategic Diagnostics Inc., 1998
- B.S. Chemistry, University of Michigan, 1991

Key Projects

Data validation for numerous projects located in New York, New Jersey, Connecticut, Pennsylvania, Illinois, Massachusetts, Iowa, Indiana, Michigan, and Wisconsin, involving evaluation of aqueous, soil, sediment, leachate and air samples analyzed by USEPA Contract Laboratory Protocols, New York State DEC Contract Laboratory and Analytical Services Protocols and SW-846 methodologies for organic, inorganic, wet chemistry parameters, TPH and various other analyses.

Reviewed sampling and laboratory chemical data for adherence to New Jersey Department of Environmental Protection protocols and New York State Department of Environmental Conservation on numerous projects. Also constructed electronic deliverables for submission to NJDEP and NYSDEC in required electronic formats.

Database construction & management for numerous investigations utilizing GIS/Key software. Compiled field and laboratory data and generated result summary tables, contours, isopleths, contaminant plume maps, cross-sections and boring logs.

Prepared numerous Sampling and Analysis Plans (SAPs) and Quality Assurance Project Plans (QAPPs) for adherence to state and federal guidelines.

Project Manager responsible for the coordination and performance of a major hydrogeologic investigation for an ISRA site (NJDEP Site Remediation) in East Rutherford, NJ. Conducted an extensive volatile organic compound plume delineation, a vapor intrusion investigation, installation of an extensive ground water monitoring well network, ground water sampling.

Quality Assurance Officer responsible for review of all data collected at several sites including the former Brooklyn Navy Yard Industrial Park, several NYSDEC Standby Contract Projects, Sherwin Williams Superfund Site, Hydrite Chemical Company in Waterloo, Iowa.

Project management and technical support for Special Analytical Services required to delineate low-level PAH contamination at a Superfund Site. This included method development and validation of a Selected Ion Monitoring (SIM) GC/MS technique.

Utilized Immunoassay test kits for field measurement of PCB contamination at the former Brooklyn Navy Yard, Brooklyn, New York. Performed data validation of all field analytical samples and off-site laboratory samples and compared off-site results to test kits.

Conducted subsurface investigations with a Geoprobe. Performed various field tests.

Supervision of tank removal and subsequent soils evaluation for contamination.

NANCY WEAVER
Project Manager/Senior Chemist

OVERALL EXPERIENCE

Ms. Weaver has over twenty years combined laboratory, data validation and project management experience. She is the President and co-founder of EDS and is responsible for the technical data review and validation of laboratory data. Ms. Weaver has performed data validation on hundreds of data validation projects. She has extensive knowledge in applying the various regional and project specific data validation guidelines and QAPPs. Her experience also includes writing Quality Assurance Project Plans (QAPPs), managing subcontracted analytical laboratories, performing laboratory audits, participating in field sampling activities and analyzing samples in a laboratory.

PROFESSIONAL EXPERIENCE

Environmental Data Services, Inc., Williamsburg, Virginia
August 1994 - Present
Principal/Senior Chemist

- Responsible for the supervision and direction of the data validation department including the day-to-day assignment of tasks.
- Senior technical review of all data validation reports including specific review of all qualified data. Performance of data validation including organic, inorganic, wet chemistry, and radiological data. Perform laboratory audits and prepare reports.

City & County of Denver, Denver, Colorado
June 1992 - August 1994
Chemist-Analyst Specialist

- Supervised performance and compliance sampling for O & M requirements at groundwater treatment facility. Provided assessment of analytical data for quarterly reports to local regulatory agencies. Acted as liaison between technical group and laboratory to coordinate sampling events and resolve problems with analyses. Performed data validation for organic, inorganic and radiological analyses. Managed database for groundwater and treatment plant sampling events.
- Performed environmental site assessments for commercial and residential properties. Provided technical review and recommendations of Phase I and Phase II site investigations performed by outside consultants. Analyzed policy and interpreted city, state and federal environmental regulations.

C.C. Johnson & Malhotra, Lakewood, Colorado
January 1990 to June 1992
Contractor/Data Validation Specialist

- Performed data validation and interpretation of organic analytical data generated from the EPA Contract Laboratory Program (CLP). Data analysis included volatiles, semivolatiles, pesticides, and polychlorinated biphenyls.
- Interpreted gas chromatograms, gas chromatography/mass spectral data and verified mathematical calculations. Provided written assessment of data quality. Researched and authored technical reports for specific sites.

The Anschutz Corporation - SP Environmental Systems, Inc., Denver, Colorado
July 1990 to January 1992
Environmental Chemist
Assisted in the management of site investigations and remediation for Southern Pacific Transportation Company properties. Experience with the following activities:

- Performed environmental audits and site assessments;
- Conducted site investigations at potential Superfund sites with state and federal agencies;
- Researched and prepared responses to regulatory agencies for non-compliant sites;
- Defined the needs for hazardous waste disposal including the analysis required and disposal;
- Supervised the removal of underground storage tanks and remediation;
- Prepared closure reports for UST removals;
- Prepared annual waste summary forms for TSD facilities throughout the state of Texas;
- Constructed, developed, and sampled groundwater monitoring wells.

Martin Marietta Astronautics Group, Denver, Colorado
January 1988 to January 1990
Environmental Specialist

- Performed organic analysis and sampling of wastewater, groundwater, and drinking water in support of NPDES permit. Operated and maintained laboratory instrumentation including GC and GC/MS for volatile, semi-volatile, and pesticide/PCB analysis. Coordinated sample collection and preparation activities, developed and authored standard operating procedures for laboratory analysis, and followed EPA protocol for QA/QC requirements for analysis. Calculated and interpreted data and reported results.

Camp, Dresser, & McKee, Boston, Massachusetts
April 1986 to October 1987
Environmental Chemist

- Analyzed water/wastewater for organic compounds. Operated and maintained laboratory instrumentation including GC and infrared spectrophotometer for volatile, pesticide/PCB, and petroleum hydrocarbon analysis. Calculated and interpreted data and reported results.

EDUCATION/CREDENTIALS

B.S., Chemistry, University of Colorado
State of New York Department of Environmental Conservation certified Asbestos Inspector
40-Hour OSHA Hazardous Waste Training
8-Hour Health and Safety Supervisor Training for Hazardous Waste Operations
Professional Member - American Chemical Society