VIA VERDE

NEW HOUSING NEW YORK LEGACY PROJECT

700-730 BROOK AVENUE

BRONX, NEW YORK

Remedial Action Work Plan

NYSDEC BCP Number: C203043

Prepared for:

Via Verde Homes, LLC
Via Verde Rental Associates, L.P.
902 Broadway, 13th Floor
New York, New York 10010

And

City of New York
Department of Housing Preservation and Development
Environmental Planning Unit
100 Gold Street
New York, New York 10038

Prepared by:

Stephen J. Osmundsen, PE
514 Pontigo Road
East Hampton, New York 11937

JULY 2009

CERTIFICATIONS

I, Stephen Osmundsen, am currently a registered professional engineer licensed by the State of New York and am a consulting engineer for CA Rich Consultants, Inc. I have primary direct responsibility for implementation of the remedial program for the Via Verde aka New Housing New York Legacy Site (NYSDEC BCA Index No. W2-1129-08-11 Site No. C203043).

I certify that the Site description presented in this RAWP is identical to the Site descriptions presented in the Brownfield Cleanup Agreement for Via Verde aka New Housing New York Legacy Site and related amendments.

I certify that this plan includes proposed use restrictions, Institutional Controls, Engineering Controls, and plans for all operation and maintenance requirements applicable to the Site and provision for development of an Environmental Easement to be created and recorded pursuant ECL 71-3605. This RAWP requires that all affected local governments, as defined in ECL 71-3603, will be notified that such Easement has been recorded. This RAWP requires that a Site Management Plan must be submitted by the Applicant for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, for approval by the Department.

I certify that this RAWP has a plan for transport and disposal of all soil, fill, fluids and other material removed from the Site under this Plan, and that all transport and disposal will be performed in accordance with all local, State and Federal laws and requirements. All exported material will be taken to facilities licensed to accept this material in full compliance with all Federal, State and local laws.

I certify that this RAWP has a plan for import of all soils and other material from off-Site and that all activities of this type will be in accordance with all local, State and Federal laws and requirements.

I certify that this RAWP has a plan for nuisance control during the remediation and all invasive development work, including a dust, odor and vapor suppression plan and that such plan is sufficient to control dust, odors and vapors and will prevent nuisances from occurring.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

056136 NYS PE#	July 21, 2009	
NYS Professional Engineer #	Date	Signature

STATE OF NEW YORK
STEPHEN J. OSMUNDSEN
No. 056136
LICENSED PROFESSIONAL ENGINEER

Professional Engineer's Stamp

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

REMEDIAL ACTION WORK PLAN

TABLE OF CONTENTS

ATTACHMENTS

FIGURES

FIGURES

TABLES

TABLES CONTINUED

APPENDICES

LIST OF ACRONYMS

Acronym	Definition
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
CAMP	Community Air Monitoring Plan
CP Plan	Citizen's Participation Plan
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
DSHM	Division of Solid & Hazardous Materials
DUSR	Data Usability Summary Report
ELAP	Environmental Laboratory Approval Program
FER	Final Engineering Report
HASP	Health and Safety Plan
HPD	New York City Department of Housing Preservation and Development
IRM	Interim Remedial Measure
ISCO	In-Situ Chemical Oxidation
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
PCBs	Polychlorinated Biphenyls
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
RIWP	Remedial Investigation Work Plan
SVOCs	Semi-volatile Organic Compounds

SCGs	Standards, Criteria, and Guidance
SCOs	Soil Cleanup Objectives
TAL	Target Analyte List
TOGS	Technical and Operational Guidance Series
USGS	United States Geological Survey
VOCs	Volatile Organic Compounds
QAPP	Quality Assurance Project Plan
QHHEA	Qualitative Human Health Exposure Assessment
SMP	Site Management Plan
SOMP	Soil/Materials Management Plan
SSDS	Sub-Slab Depressurization System
SWPPP	Storm-Water Pollution Prevention Plan
UUSCO	Unrestricted Use Soil Cleanup Objective
SSSALs	Site Specific Soil Action Levels

EXECUTIVE SUMMARY

Site Description/Physical Setting/Site History

Via Verde, also know as New Housing New York Legacy Project, is located at 700-730 Brook Avenue in the Bronx, New York (hereinafter referred to as the "Site"). The Site is being redeveloped on behalf of Via Verde Homes, LLC, Via Verde Rental Associates, L.P., and the New York City Department of Housing Preservation and Development ("NYCHPD"). These entities are collectively known as the Brownfield Cleanup Program ("BCP") Volunteer. The Volunteer was accepted into the BCP on December 18, 2008 and the Brownfield Cleanup Agreement ("BCA") was executed on February 13, 2009. The Site has been assigned BCP #C203043.

The Site consists of a vacant approximately 1.4-acre irregularly-shaped parcel located on the southeast corner of the intersection of East 156th Street and Brook Avenue. Along the west side (Brook Avenue) of the Site, a steep slope of approximately 10 feet descends from the sidewalk eastward. The eastern portion of the Site consists of an abandoned rail spur that connected the former New York and Harlem Railroad to Port Morris. The Site is located in a mixed-use residential/commercial section of the Bronx, New York. Surrounding properties include a commercial shopping center, an athletic field, residences, and a school. A Site Location Map is included as Figure 1. A Site Plan is included as Figure 2. A Site Plan illustrating the various elevations throughout the Site is enclosed as Figure 3.

The Site is designated on the New York City tax map as Block 2359, part of Lot 1 and part of Lot 3. New York City ("NYC") has owned Block 2359, part of Lot 3 since June 1972 when it was acquired through condemnation as part of the Bronxchester Urban Renewal Plan. Block 2359, part of Lot 1 was purchased on November 19, 2008 by an affiliate of the Volunteer. The metes and bounds of the Site are enclosed as Appendix A.

Although the Site is currently vacant, historical records indicate that it was originally developed circa 1908 with three small buildings and included part of the New York Central and Hudson River Railroad Company's freight yard. Circa 1927, the Site was further developed with a provisions facility. Historical Sanborn Maps show a gasoline service station existed on the Site circa 1935 through the late 1970's. In the early 1980's, the provisions facility was closed and the rail spurs were removed. Although the Site is currently vacant, remnants of the foundations of the former gas station and provisions facility still exist on the Site.

Environmental investigations conducted at the Site identified elevated concentrations of organic solvents and petroleum-related compounds. These contaminants are likely associated with the Site's former usage as a gasoline service station, and were detected in the soil, soil vapor, and/or groundwater. In addition, one polychlorinated biphenyl ("PCB") Aroclor, possibly associated with the former hydraulic lifts used at the gasoline service station, was detected in the soil and groundwater. Heavy metals and semi-volatile organic compounds ("SVOCs") possibly associated with oil and/or emissions associated with the former use as a rail yard, or as a result of historic fill placement, were also detected in on-Site soils.

Summary of the Remedial Investigation

A Remedial Investigation ("RI") was conducted at the Site in February 2009. The RI was completed as a further characterization of the Site based upon the results already reported from two earlier subsurface investigations performed: Site Characterization and Data Summary Report dated September 2006 conducted by URS Corporation (Ref. 1); and Supplemental Site Investigation Report dated April 2007 conducted by CA RICH (Ref. 2). The Scope of Work of the RI included:

- Utility clearance;
- Installation of ten soil vapor points;
- Installation of four soil borings;
- Installation of five groundwater monitoring wells;

- Monitoring well elevation survey; and,
- Analysis of ten soil vapor samples, eight soil samples, and five groundwater samples.

Based on the analytical results obtained during the 2009 RI, the Site Characterization and Data Summary Report dated September 2006, and the Supplemental Site Investigation Report dated April 2007, CA RICH concluded:

- The Site elevation ranges from 8 to 24 feet above mean sea level based on the Borough of the Bronx Datum. The on-Site topography slopes down towards the east.

- Based upon the Geology and Engineering Geology of the New York Metropolitan Area, Field Trip Guidebook T361, July 20 – 25, 1989, edited by Charles A. Baskerville for the 28th International Geologic Congress (Ref. 3), the Site is underlain by bedrock belonging to the Ordovician-Cambrian Inwood Marble Formation consisting of dolomite marble, calcschist, and grades to underlying patchy Lowerre Quartzite of early Cambrian age. Surficial geologic materials are characterized as ground moraine and/or urban fill consisting of sand, silt, clay and gravel. The upper eight feet of the Site contains unconsolidated fill materials.

- Due to extreme elevation differences at the Site, the uppermost groundwater surface was encountered from approximately 16 to 22 feet below sidewalk grade (or at an elevation of two to three feet above sea level) within the unconsolidated materials. Based upon Site-specific groundwater elevation data, groundwater flows in a south-westerly direction. Underlying groundwater in this area of the South Bronx is not used for potable supply purposes. A groundwater elevation contour map is included as Figure 4.

- The contaminants of concern at the Site include volatile organic compounds ("VOCs"), SVOCs, PCB Aroclor 1260, and select metals.

- No pesticides were detected above 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives ("SCOs") (Ref. 7) or New York State Department of Environmental Conservation ("NYSDEC") Technical and Operational Guidance Series ("TOGS") 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations memorandum dated June 1998 (Ref. 6).

- The VOCs of concern were detected in the soil, soil vapor, and groundwater samples collected at the Site. These include both organic solvents and petroleum-related compounds along with their degradation products, including benzene, acetone, chloroform, ethylbenzene, isopropylbenzene, methyl tert-butyl benzene, n-propylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, toluene, tetrachlroethylene, and xylenes. VOCs detected in soil vapor samples are illustrated on Figure 5. Soil concentrations above 6NYCRR Part 375 Unrestricted Use SCOs are illustrated on Figure 6. Groundwater concentrations above NYSDEC TOGS are illustrated on Figure 7.

- Several SVOCs commonly referred to as polynuclear aromatic hydrocarbons ("PAHs") were detected at varying depths in soil samples throughout the Site above 6 NYCRR Part 375 Unrestricted Use SCOs and in shallow groundwater samples above NYSDEC TOGS.

- PCB Aroclor 1260 was detected in the soil beneath the former gasoline station portion of the Site at concentrations below 6 NYCRR Part 375 Unrestricted Use SCOs, however Aroclor 1260 was detected in the groundwater from a direct-push temporary well point at one location above NYSDEC TOGS.

- Several metals were detected in the soil and groundwater samples above the 6 NYCRR Part 375 Unrestricted Use SCOs and NYSDEC TOGS, respectively.

Qualitative Human Health Exposure Assessment

Currently, there are potential exposure pathways from: surface soil/fill materials to trespassers, dust emanating from the Site to off-Site pedestrians, commercial workers, and residents, and soil gas emanating from VOCs within the soil and groundwater to enter into the adjoining buildings as a result of any sub-basement floor or lower wall openings/cracks. Once remediation and redevelopment activities begin, there will be potential exposure pathways from contaminated surface soil/fill to construction workers through potential ingestion, inhalation or dermal contact. Once remediation and redevelopment of the Site has been completed, there will be a potential exposure pathway from residual organic vapors in the soil and/or groundwater through soil vapor intrusion to on-Site and off-Site residents, maintenance staff, community residents utilizing the community facilities, and commercial workers.

Based on the results of the Qualitative Human Health Exposure Assessment ("QHHEA"), the impacted soil/fill materials need to be remediated and certain Engineering and/or Institutional Controls ("EC/ ICs") need to be put in place on-Site to ensure that the potential exposure pathways identified do not become complete. This RAWP includes excavation and off-Site disposal of impacted soil/fills as needed, installation of a composite cover system (consisting of the building foundations, roadways and sidewalks and a minimum of two feet of clean fill on open or landscaped areas of the Site), incorporation of a vapor barrier and a SSDS into the building's foundation, and in-situ chemical oxidation ("ISCO") treatment of groundwater. By properly employing these remedial measures and EC/ICs, the future occupants of the proposed new development will not be exposed to soil vapors within the planned structures. In addition, the composite cover system would eliminate the potential for dermal contact, ingestion of soil and/ or groundwater, or inhalation of vapors associated with residual, contaminated subsurface soils and/or groundwater.

Summary of the Remedy

A Track 4 cleanup as per 6NYCRR Part 375-3.8(e)(4) is proposed for the Site. The following is a summary of the selected remedy including all EC/ ICs:

1. Excavation of all soil/fill materials exceeding the Track 4 Site Specific Soil Action Levels (SSSALs) established for the Site. The Track 4 SSSALs proposed for this Site are listed in Table 32. The anticipated limits of the proposed soil excavation are shown on Figure 10.

2. Collection of waste characterization samples as needed to profile the soil/fill that is to be excavated for disposal purposes. A waste disposal facility will be selected based on the data that has been collected to date. Based on the requirements of the selected facility, additional soil/fill samples will be collected and analyzed as needed to obtain an approval for soil disposal.

3. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil/fill during any intrusive Site work.

4. Collection and analysis of end-point samples in accordance with Draft DER-10 Technical Guidance for Site Investigation and Remediation ("DER-10") to evaluate the performance of the remedy with respect to attainment of the Track 4 SSSALs.

5. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal.

6. Removal of all USTs and hydraulic lifts and any associated grossly contaminated soil, if encountered on-Site, in accordance with applicable regulations.

7. Injection of Regenox™ and ORC® Advanced (in-situ chemical oxidation ("ISCO") treatment) into the shallow groundwater (approximately 22 feet below sidewalk grade) and soil/fill in the smear zone (approximately 17-21 feet below sidewalk grade) in the northern portion of the Site.

8. Construction and maintenance of an engineered composite cover consisting of: (1) a composite cover system in all landscaped and non-covered areas; and (2) concrete building foundations, sidewalks/pathways and asphalt roadways to prevent human exposure to residual contaminated soil/fill remaining under the Site.

9. A vapor barrier and an active SSDS will be incorporated into the building's foundation as illustrated on Figures 12 and 13. The SSDS will consist of horizontal trenches filled with perforated pipes. The horizontal pipes will be connected to vertical risers that extend above the roof of the building. Any pipe penetrations through the vapor barrier will be sealed in accordance with the manufacturer's recommendations. The vapor barrier specifications are enclosed as Appendix C.

10. Collection and analysis of post-remedial groundwater samples to evaluate the performance of the remedy. Proposed post-remedial groundwater monitoring well locations are illustrated on Figure 14.

11. Recording of an Environmental Easement, including ICs, to prevent future exposure to any residual contamination remaining at the Site [a copy of the Environmental Easement will be provided in the Site Management Plan ("SMP")].

12. Publication of an SMP for long-term management of residual contamination as required by the Environmental Easement, including plans for: (1) Institutional and Engineering Controls; (2) monitoring; (3) operation and maintenance; and (4) reporting.

13. Import of all materials to be used for fill will be in compliance with (1) the soil cleanup objectives outlined in 6 NYCRR Part 375-6.7(d); and (2) all Federal, State and local rules and regulations for handling and transport of material.

All responsibilities associated with the remedial action, including permitting requirements and pretreatment requirements, will be addressed by the Volunteer and it's representatives in accordance with all applicable federal, state and local rules and regulations.

REMEDIAL ACTION WORK PLAN

1.0 INTRODUCTION

Via Verde Homes, LLC, Via Verde Rental Associates, L.P., and the City of New York Housing Preservation and Development entered into a Brownfield Cleanup Agreement with the New York State Department of Environmental Conservation in February 2009 to investigate and remediate an approximately 1.4-acre Site located at 700-730 Brook Avenue in the Bronx, New York. Via Verde Homes, LLC, Via Verde Rental Associates, L.P., and HPD are collectively a Volunteer in the Brownfield Cleanup Program. Residential and commercial use is proposed for the Site. When completed, the Site will contain a multi-story residential affordable housing building with approximately 20,000 square feet of open space as well as community facility and retail space. Refer to the Brownfield Cleanup Program ("BCP") application for additional details.

This Remedial Action Work Plan ("RAWP") summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation ("RI"), performed in February 2009, as well as previous investigations. The RAWP provides an evaluation of a Track 1 cleanup and other applicable Remedial Action alternatives, their associated costs, and the recommended remedy. The remedy described in this document is consistent with the procedures defined in DER-10 and complies with all applicable standards, criteria and guidance. The remedy described in this document also complies with all applicable Federal, State and local laws, regulations and requirements. The NYSDEC and New York State Department of Health ("NYSDOH") have determined that this Site does not pose a significant threat to human health and the environment. The RI for this Site did not identify fish and wildlife resources.

A formal Remedial Design document will not be prepared.

1.1 SITE LOCATION AND DESCRIPTION

The Site is located in the County of Bronx, the Bronx, New York and is identified as Block 2359 part of Lot 1 and part of Lot 3 on the Bronx County Tax Map. A United States Geological Survey ("USGS") topographical quadrangle map (Figure 1A – Site Location Map) shows the Site location. In addition, Figure 1B shows the Site Location on an Aerial photograph. The Site is situated on an approximately 1.4-acre area bounded by East 156th Street to the north, an athletic field to the south, New York City Housing Authority Bronxchester Houses and South Bronx High School to the east, and Brook Avenue to the west (see Figure 2 – Site Plan). A boundary map is attached to the BCA as required by Environmental Conservation Law ("ECL") Title 14 Section 27-1419. The approximately 1.4-acre Site is fully described in Appendix A – Metes and Bounds. A global positioning system coordinate for the starting point is included.

1.2 CONTEMPLATED REDEVELOPMENT PLAN

The Remedial Action to be performed under the RAWP is intended to make the Site protective of human health and the environment consistent with the contemplated end use. The proposed redevelopment plan and end use is described here to provide the basis for this assessment. However, the Remedial Action contemplated under this RAWP may be implemented independent of the proposed redevelopment plan.

The Volunteer plans to develop the Site into a new residential building complex with ground floor commercial space. The proposed new construction will consist of two building components ranging in height from 3 to 20 stories containing 221 units; 150 units will be rentals affordable to households at or below 90% of Area Median Income ("AMI"); 71 units will be co-ops affordable to households at 110% of the AMI. The ground level will include approximately 9,000 square feet of community facility and retail space. The proposed redevelopment will also include approximately 20,000 square feet of open space. An architectural Site plan of the proposed redevelopment is enclosed as Figure 8.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is located in a mixed-use residential/commercial section of the Bronx, New York. The Site occupies the entirety of a M1-1 zone that is immediately surrounded by residential (R7-2), commercial (C4-4), and manufacturing (M1-1) zones. Specific neighboring property usage is outlined below:

North: Residences (across East 156th Street)
South: Athletic field
East: NYC Housing Authority Bronxchester Houses and South Bronx High School
West: Commercial shopping center with a Staples, a Nine West shoe store, Furman Mills (across Brook Avenue), and a garage

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated in accordance with the scope of work presented in the NYSDEC-approved RI Work Plan dated February 2009. The investigation was conducted in February 2009 as was completed as a further characterization of the Site based upon the results reported from two earlier subsurface investigations: Site Characterization and Data Summary Report dated September 2006 conducted by URS Corporation (Ref. 1); and Supplemental Site Investigation Report dated April 2007 conducted by CA RICH (Ref. 2). The RI Report was submitted to NYSDEC in April 2009.

2.1 SUMMARY OF REMEDIAL INVESTIGATIONS PERFORMED

The objectives of the RI were to:

- Determine the nature and extent of soil, groundwater, and soil vapor contamination at the Site; and,

- Obtain all necessary information needed to design and implement an RAWP for this Site compatible with the proposed redevelopment.

The scope of work of the RI included:

- Utility clearance;
- Installation of ten soil vapor points;
- Installation of four soil borings;
- Installation of five groundwater monitoring wells;
- Monitoring well elevation survey;
- Analysis of ten soil vapor samples, eight soil samples, and five groundwater samples; and
- Report preparation.

2.1.1. Soil Vapor Point Installation and Sampling

On February 6, 2009, ten temporary soil vapor points were installed throughout the Site (see Figure 5 for soil vapor point locations). The soil vapor points were installed by drilling a 2 ¼-inch hole to ten feet below the sidewalk grade or one-foot above the groundwater interface, whichever was shallower, using the Geoprobe™ drilling system. Once the bottom depth was reached, a vapor point comprised of a two-inch long stainless steel screen connected to ¼-inch stainless steel tubing was advanced into the hole. The tubing was then connected with a sample fitting to allow for the soil gas collection. The annular space around the stainless steel screen was packed with coarse sand to one foot above the screen, creating a sampling zone. A six-inch bentonite seal was then placed above the sampling zone. The remaining annular space was backfilled with clean fill.

On February 10, 2009, soil vapor samples were collected from each temporary soil vapor point over a two hour time period in accordance with NYSDOH's "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" dated October 2006 (Ref. 4). On February 25, 2009, CA RICH re-sampled SVP-3 since the canister used on February 10, 2009 did not collect the necessary amount of air for analysis. The samples were submitted to Accutest Laboratories of Dayton, New Jersey, an ELAP certified laboratory, for analysis of VOCs via EPA method TO-15 with NYSDEC ASP Category B deliverables under proper chain of custody documentation.

2.1.2 Soil Sampling

From February 6-9, 2009, one soil boring was advanced in the northeast portion of the Site, (identified as SB-1). SB-1 was installed via a Geoprobe™ 6610DT direct-push drilling machine. Three additional soil borings (MW-1, MW-4, and MW-5) were advanced throughout the Site using a truck-mounted hollow stem auger drill-rig.

The truck-mounted or limited-access drill-rig utilized five-foot long, 2¼-inch inner diameter ("ID") hollow stem augers. Continuous soil samples were collected from MW-1, MW-4, and MW-5 at two foot intervals using a two-inch outer-diameter, two-foot long split-spoon barrel sampler. The split-spoon barrel sampler was advanced using a 140-pound hammer with a three-foot drop. Continuous soil samples were collected from SB-1 via the Geoprobe™ using five-foot macro cores.

A shallow soil sample was collected from each boring at approximately 0-2 feet below grade and a second sample was collected from soil exhibiting the highest degree of impact based upon both visual inspections and photo-ionization detector ("PID") readings and/or the deepest sample above the groundwater interface.

In addition, quality assurance/ quality control ("QA/QC") samples were collected: 1 field blank, 1 duplicate sample, 1 matrix spike and 1 matrix spike duplicate. Each sample was placed in sterilized laboratory-supplied containers. The sampled soil was compacted and capped to ensure that little or no headspace was present within the sample. The samples were stored on ice in a cooler to preserve the samples at approximately $4^{+/-2o}$ Celsius prior to and during shipment. All samples were uniquely identified, and all information associated with the samples were recorded utilizing standard chain-of-custody sampling protocols.

Following completion of the borings, SB-1 was backfilled with drill cuttings and MW-1, MW-4, and MW-5 were converted into monitoring wells. Sample locations are illustrated on Figure 6.

The samples were submitted to Accutest Laboratories of Dayton, New Jersey an ELAP certified laboratory for chemical analysis. The soil sample collected from MW-1 was analyzed for PCBs via EPA Method 8082 to further investigate a detection of PCBs in the groundwater during the Site Characterization and Data Summary ("SCDS") in September 2006 conducted by URS Corporation (Ref. 1). The soil samples collected from SB-1, MW-4, and MW-5 were analyzed for VOCs via EPA Method 8260, SVOCs via EPA Method 8270, pesticides via EPA Method 8081, PCBs via EPA Method 8082, and the TAL metals list.

2.1.3 Monitoring Well Installation and Development

From February 6-10, 2009, five groundwater monitoring wells (MW-1 through MW-5) were installed using the hollow stem auger drilling method. MW-1 was installed on the former gasoline station located on the upgradient portion of the Site. MW-2 was installed near the western Site boundary near the former provisions facility. MW-3 was installed on the former provisions facility near the southwestern Site boundary. MW-4 was installed along the former railroad bed near the southeastern Site boundary. MW-5 was installed along the former railroad bed on the eastern portion of the Site. The monitoring well locations are illustrated on Figure 7.

Groundwater was encountered at approximately 20 feet below grade at MW-1 and MW-2, which are located on the higher elevation portion of the Site. Groundwater was encountered between four and nine feet below grade at MW-3, MW-4, and MW-5, which are located at lower ground elevations (base of the Site's slope).

Each well was constructed of two-inch diameter schedule 40 PVC casing and two-inch diameter 0.020-inch slotted (20 slot) well screen flush-threaded onto the PVC casing. A sand pack of number two Morie sand was then placed around the screen to two feet above the top of the screened interval and covered with two feet of bentonite pellets. The bentonite pellets were given time to hydrate (i.e. expand) before filling the remainder of the borehole with drill cuttings. Excess drill cuttings were drummed and properly disposed of off-Site. MW-1, MW-2, MW-4, and MW-5 were completed with locking j-plugs and flush-mounted bolt-down monitoring well covers, while MW-3 was left above the ground surface with a locking j-plug.

Once installed, the wells were developed using a small-diameter submersible pump that was capable of discharging at a rate of about one gallon per minute to minimize turbidity. The wells were pumped until the discharge water was observed to be relatively turbid-free to ensure fresh groundwater flow through the wells.

2.1.4 Monitoring Well Survey

The well casing elevations of wells MW-1, MW-2, MW-3, MW-4 and MW-5 were surveyed by Montrose Surveying Co. LLP, a NYS licensed surveyor, on February 12, 2009 to the nearest 0.01-foot. Depth to groundwater was measured on February 25, 2009 using a chalked steel tape. The elevations were then plotted and a water table elevation contour map was then prepared to determine the horizontal direction of groundwater flow. Based upon the data collected on February 25, 2009, the Site-specific direction of groundwater flow is toward the southwest. The regional direction of groundwater flow is believed to be to the south and towards the confluence of the Harlem and East Rivers. The groundwater elevation contour map, a tabulation of the casing elevations, and depth to water measurements are included on Figure 4.

2.1.5 Groundwater Sampling

On February 25, 2009, two weeks after well development, depth-to-water measurements and groundwater samples were collected from the five monitoring wells (MW-1 through MW-5). Prior to sampling, at least three times the volume of water was removed from each well using new polyethylene tubing and a submersible pump.

After purging was complete, a sample of the groundwater was then collected directly from the pump discharge into laboratory-issued containers. All groundwater samples were packaged into laboratory-issued containers, placed in a cooler on ice, and hand delivered to Accutest Laboratories of Dayton, New Jersey, an ELAP certified laboratory, on the same day. The samples were analyzed for VOCs using USEPA Method 8260, SVOCs using EPA Method 8270, pesticides via EPA Method 8081, PCBs via EPA Method 8082, and total metals using EPA Method 6000/7000 series with NYSDEC ASP Category B deliverables. The following samples were also collected for QA/QC purposes: 1 trip blank, 1 field blank, 1 duplicate sample, 1 matrix spike and 1 matrix spike duplicate.

2.1.6 Summary of RI findings

The following is a summary of RI findings:

- The subsurface soil/fill materials encountered at the higher Site elevations (along Brook Avenue) generally consisted of concrete and/or asphalt at the surface, followed by loose fill materials containing asphalt and brick fragments, underlain by coarse sands and gravels. The subsurface soils at the lower elevations on the Site did not include loose fill materials, but mostly consisted of medium to coarse grain sand and gravel. Soil boring logs were included in Appendix B of the RI Report.

- Eight soil samples were analyzed from multiple depths across the Site. No VOCs, SVOCs, PCBs, or pesticides were detected above 6 NYCRR Part 375 Unrestricted Use SCOs. A metal, chromium, was detected above 6 NYCRR Part 375 Unrestricted Use SCOs in all soil/fill samples. The analytical results are summarized on Tables 2-6 and Figure 6.

- The shallow groundwater table was encountered from four to twenty-two feet below grade due to extreme elevation changes across the Site. The direction of shallow groundwater flow based upon static water levels collected from the network of five monitoring wells, MW-1 through MW-5, is toward the southwest. A groundwater elevation contour map is enclosed as Figure 4.

- Petroleum-related compounds including isopropylbenze, benzene, n-propylbenzene, 1, 2,4-trimethylbenzene, and 1,3,5-trimethylbenzene were detected above NYSDEC TOGS standards in the groundwater sample collected from MW-1 and its associated duplicate. Analytical results are summarized on Table 7 and Figure 7.

- One chlorinated solvent (chloroform) was detected above NYSDEC TOGS in the groundwater sample collected from MW-3. Analytical results are summarized on Table 7 and Figure 7.

- One SVOC (bis(2-ethylhexyl)phthalate) was detected above NYSDEC TOGS in the groundwater sample collected from MW-1 and its associated duplicate sample. Analytical results are summarized on Table 8 and Figure 7.

- Three metals (iron, manganese, and sodium) were detected above NYSDEC TOGS standards in the groundwater sample collected from MW-1 and its associated duplicate as well as from MW-4. Sodium was detected above NYSDEC TOGS in the sample collected from MW-2 and MW-5. Analytical results are summarized on Table 11 and Figure 7.

- No pesticides or PCBs were detected in the groundwater samples collected from the monitoring wells. Analytical results are summarized on Tables 9-10 and Figure 7.

- Soil vapor points were installed at ten different locations across the Site. Samples collected from each of the soil vapor points indicated the presence of petroleum-related compounds as well as chlorinated solvents in the soil vapor. Compounds that were detected above 50 micrograms per meter cubed (ug/m^3) include acetone, benzene, chloroform, dibromochloroemethane, tetrachloroethylene, and toluene. Analytical results are summarized on Table 1 and Figure 5.

2.2 SIGNIFICANT THREAT

The NYSDEC and NYSDOH have determined that this Site does not pose a significant threat to human health and the environment. Notice of this determination has been provided for public review. A copy of the notice is included in Appendix H.

2.3 SITE HISTORY

2.3.1 Past Uses and Ownership

Although the Site is currently vacant, historical records indicate that it was originally developed circa 1908 with three small buildings and was part of the New York Central and Hudson River Railroad Company's freight yard. Circa 1927, the Site was also developed with a provisions facility. In addition, a gasoline station existed on the Site circa 1935 through the late 1970's. In the early 1980's, the provisions facility was closed and the rail spurs were removed. Although the Site is currently vacant, remnants of the foundations of the former gas station and provisions facility still exist on the Site. A Site Plan is included as Figure 2. A Site Plan illustrating the various elevations throughout the Site is enclosed as Figure 3.

2.3.2 Phase I and Phase II Reports

A Phase I Environmental Site Assessment ("Phase I ESA") was conducted by Earth Tech, Inc. (Ref. 5) in December 2004. The Phase I ESA concluded and recommended the following:

- Based upon information provided in the historic maps and photographs, the northern, western, and eastern portions of the Site were occupied by a filling station, a store/warehouse operated by a provisions company, and railroad spurs, respectively, prior to being vacated. The western portion of the Site may have been used for manufacturing or industrial uses. The maps indicated that the Site had three gasoline tanks along the northern portion of the Site. No records could be obtained to confirm if the gasoline tanks and appurtenances were removed prior to the demolition of the former Site buildings. Based on this conclusion, it was recommended that a geophysical survey be performed.

- A site investigation consisting of the collection of soil samples should be performed to evaluate the potential impact from the presence of former gasoline tanks and the former operations of the New York Central Railroad Company at the Site. Based on the results of the geophysical survey, additional samples may need to be collected.

The findings of the Phase I ESA were further investigated as part of the Site Characterization and Data Summary ("SCDS") Report dated September 2006 conducted by URS Corporation (Ref. 1) and Supplemental Site Investigation ("SSI") Report dated April 2007 conducted by CA RICH (Ref. 2).

The SCDS conducted by URS Corporation in 2006 included the following:

- Historical database review;
- Geophysical survey of the former gasoline station portion of the Site;
- Excavation of three test trenches;
- Drilling of eight soil borings;
- Installation of eight temporary wells; and
- Collection of seven soil samples from the borings, three soil samples from the test trenches, and eight groundwater samples from the temporary wells for analysis.

The geophysical survey revealed several anomalies that may be representative of buried USTs. SVOCs and metals were detected above NYSDEC Determination of Soil Cleanup Objectives and Cleanup Levels, Technical and Administrative Guidance Memorandum ("TAGM") #4046, January 24, 1994 (Ref. 6) and/or Eastern USA background levels in one or more of the samples. VOCs, SVOCs, PCB Aroclor 1260 and metals were detected above TOGS in one or more of the samples. It is noted that PCB analysis was not requested for the soil samples; therefore, the presence of the PCB Aroclor 1260 in the groundwater could not be correlated with its associated soil sample.

The SCDS also noted that strong to moderate petroleum odors were identified at three soil borings in the former gasoline station area at a depth of 17 – 21 feet. A petroleum sheen with strong to moderate petroleum odors were noted while collecting groundwater samples in the former gas station area.

The SSI conducted by CA RICH in 2007 included the collection and analysis of surface (0-2”) and shallow (0-2’) soil samples at six locations at the Site. The lithology encountered during advancement of the borings revealed that the Site contains fill material from the surface to the explored depth of two feet below grade.

Based on the analytical results, VOCs, PCBs, and pesticides were detected below NYSDEC TAGM guidance values in soil samples. However, benzo(a)anthracene, benzo(a)pyrene, and chrysene were detected above TAGM values in all soil samples, and benzo(b)fluoranthene, dibenzo(a,h)anthracene, and benzo(k)fluoranthene were detected above TAGM values in several borings.

In addition, arsenic, chromium, copper, lead, magnesium, mercury, and nickel were detected above NYSDEC TAGM values or Eastern USA Background levels in one or more of the soil borings. The SSI Report noted that the occurrence of PCBs and pesticides at the Site may be attributable to former rail line operations and use. The SVOCs and metals detected are typical of fill material found in New York City, but their occurrence may be attributable to the former use as a rail yard.

2.3.3 Sanborn Maps

All Sanborn® Maps available for this Site were reviewed and analyzed as part of the Phase I ESA prepared by Earth Tech, Inc. (Ref. 5) prior to preparation of the RAWP. The Sanborn® Maps are also attached to this RAWP as Appendix B. The following summarizes the findings of the Sanborn® Map review:

- 1891 – Site is undeveloped except for the Port Morris Branch of the New York and Harlem Railroad on eastern portion of Site.
- 1908 - The Site is developed with the New York Central & Hudson River Co. freight yard and three small buildings.
- 1936 - The Site is developed with the New York Central & Hudson River Co. freight yard, a provisions facility, and a gasoline station.
- 1944 to 1946 – The Site is developed with the New York Central & Hudson River Co. freight yard, a provisions facility, and a gasoline station with three tanks.
- 1947 to 1951 - The Site is developed with the New York Central & Hudson River Co. freight yard, a provisions facility, and a gasoline station. The three tanks no longer appear on the map.
- 1977 - The Site is developed with the New York Central & Hudson River Co. freight yard and a provisions facility. The gasoline station no longer appears on the map.
- 1981 to 1996 – The Site no longer appears as developed.

2.4 GEOLOGICAL CONDITIONS

According to survey measurements obtained during the RI, the Site elevation ranges from 8 to 24 feet above mean sea level based on the Borough of the Bronx Datum. Along the Brook Avenue (west) side of the Site, a steep slope of approximately 10 feet descends from the sidewalk eastward.

Based upon the *Geology and Engineering Geology of the New York Metropolitan Area*, Field Trip Guidebook T361, July 20 – 25, 1989, edited by Charles A. Baskerville for the 28th International Geologic Congress (Ref. 3), the Site is underlain by bedrock belonging to the Ordovician-Cambrian Inwood Marble Formation consisting of dolomite marble, calcschist, and grades to underlying patchy Lowerre Quartzite of early Cambrian age. Surficial geologic materials are characterized as ground moraine and/or urban fill consisting of sand, silt, clay and gravel. According to Site-specific geological data collected from borings and test pits during the SCDS, the SSI and the RI, the upper eight feet of the Site contains unconsolidated fill materials. A geologic section is shown in Figure 9.

Due to extreme differences in elevation, the uppermost groundwater surface occurs at a depth of approximately 16-22 feet below sidewalk grade (or at an elevation of two to three feet above sea level) within the unconsolidated materials. Based upon Site-specific groundwater elevation data, groundwater flows in a south-westerly direction. Underlying groundwater in this area of the South Bronx is not used for potable supply purposes. A groundwater elevation contour map that includes a tabulation of the casing elevations and depth to water measurements are included as Figure 4.

2.5 CONTAMINATION CONDITIONS

2.5.1 Conceptual Model of Site Contamination

The source of the VOCs detected in soil and groundwater at the Site are generally related to the historic use of the property as a gasoline service station. Several SVOCs and metals have been identified which are related to historic fill materials. Based on the degree of soil and groundwater contamination, the former gasoline service station has been identified as a primary source area for the VOCs and PCBs. Meanwhile, the former rail yard/ provision facility mostly likely contributed to the detection of SVOCs and metals.

2.5.2 Description of Areas of Concern

- **Suspect USTs**

The SCDS conducted in 2006 by URS Corporation included a historical database review of the Site and a geophysical survey of the former gasoline station portion of the Site. According to the 1935 Sanborn Map, three gasoline tanks were located on the former gasoline station portion of the Site. The geophysical survey revealed several anomalies that may be representative of buried underground storage tanks, indicating that the tanks noted on the 1935 Sanborn Map, may still be present at the Site.

- **Suspect Hydraulic Lifts**

The PCB Aroclor 1260 was detected in the soil and groundwater in the former gasoline station portion of the Site. One of the detections of Aroclor 1260 in the groundwater was above NYSDEC TOGS groundwater standards. Although no source was identified, there does appear to be remnants of a hydraulic lift associated with the former gas station operations, which could potentially be the source of the PCBs detected. In addition, if there was electrical connection to the Site, then there could have been transformers (pole-mounted or otherwise) on-Site.

- **Unrecorded Historic Spills**

VOCs including petroleum-related compounds and chlorinated solvents were detected in the soil, soil vapor, and groundwater samples collected at the Site, mainly in the former gasoline station portion of the Site. In addition, the SCDS identified strong to moderate petroleum odors at the former gasoline station area at a depth of 17 – 21 feet. A petroleum sheen was also noted during the collection of groundwater samples. Based on the analytical results from the RI and fields observations during the previous investigations, surface or subsurface spills from the former gasoline station may have occurred.

- **Historic Fill**

In all areas of the Site that were tested, the soil displayed characteristics of historic fill. Elevated levels of several SVOCs commonly referred to as PAHs and metals were detected throughout the Site at varying depths.

2.5.2.1 Contaminated Media

- **Soil**

VOCs: Several VOCs were detected in the soils at the Site, but only acetone was detected above 6 NYCRR Part 375 Unrestricted Use SCOs.

SVOCs: SVOCs including benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene were detected in the soils throughout the Site above 6 NYCRR Part 375 Unrestricted Use SCOs.

Pesticides: No detections of pesticides exceeded 6 NYCRR Part 375 Unrestricted Use SCOs.

PCBs: No detections of PCBs exceeded 6 NYCRR Part 375 Unrestricted Use SCOs.

Metals: Several metals were detected in the soils throughout the Site. Of these occurrences, arsenic, barium, copper, chromium, lead, mercury, nickel, and zinc were detected above 6 NYCRR Part 375 Unrestricted Use SCOs.

- **Soil Vapor**

VOCs were detected in the soil vapor throughout the Site. VOCs including chloroform, dibromochloromethane, tetrachloroethylene, acetone, and toluene were detected in the soil vapor at concentrations of 50 ug/m^3 or greater.

- **Groundwater**

VOCs including acetone, benzene, chloroform, ethylbenzene, isopropylbenzene, methyl tert-butyl ether, n-propylbenzene, 1,2,4-trimethylbenzene, 1,3,5-triemthylbenzene, xylene (total), and toluene were detected in groundwater samples at the Site above NYSDEC TOGS.

SVOCs including benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-Ethylhexyl)phthalate, chrysene, indeno(1,2,3-cd)pyrene, naphthalene, and phenol were detected in groundwater samples at the Site above NYSDEC TOGS.

No pesticides were detected above NYSDEC TOGS.

PCB Aroclor 1260 was detected at NYSDEC TOGS in one groundwater sample.

Metals including antimony, iron, magnesium, manganese, and sodium were detected in the dissolved groundwater samples above NYSDEC TOGS.

2.5.3 Identification of Standards, Criteria and Guidance

The concentrations of the media and contaminants of concern found at the Site were comparedto the following standards or guidance values:

- Soil Vapor – There are no standards or guidance for soil vapor.

- Soil – (1) 6 NYCRR Part 375, Track 1 Unrestricted Use SCOs; (2) NYCRR Part 371 - Identification and Listing of Hazardous Wastes; (3) 6 NYCRR Part 376 - Land Disposal Restrictions; and (4) NYCRR Part 360 - Solid Waste Management Facilities

- Groundwater – (1) 6 NYCRR Parts 700-706 - Water Quality Standards; and (2) TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations

2.5.4 Soil/Fill Contamination

In all areas of the Site that were tested, the soil displayed characteristics of historic fill. Elevated levels of several SVOCs commonly referred to as polynuclear aromatic hydrocarbons ("PAHs) and metals were detected throughout the Site at varying depths above 6 NYCRR Part 375 Unrestricted Use SCOs. In addition, several VOCs were detected in the soils at the Site, but only acetone was detected above 6 NYCRR Part 375 Unrestricted Use SCOs.

2.5.4.1 Summary of Soil/Fill Data

Acetone, benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, arsenic, barium, copper, chromium, lead, mercury, nickel, and zinc were detected above 6 NYCRR Part 375 Unrestricted Use SCOs in the on-site soils/fill materials. A summary of the chemical analysis of the soil/fill is included on Tables 2-6 and Figure 6. Ranked data tables of the compounds above 6 NYCRR Part 375 Unrestricted Use SCOs are illustrated on Tables 12 through 31.

2.5.4.2 Comparison of Soil/Fill with SCGs

The results of laboratory data presented in the RI indicate that soil is a media of concern. The following compounds of concern were detected above the 6NYCRR Part 375 Unrestricted Use SCOs in the on-site soils/fill materials:

	Compound	Maximum Concentration Detected (ppm)	UUSCOs (ppm)
VOCs	acetone	1	0.05
SVOCs	benzo(a)pyrene	92	1
	benzo(a)anthracene	120	1
	benzo(b)fluoranthene	120	1
	benzo(k)fluoranthene	39	0.8
	chrysene	97	1
	dibenzo(a,h)anthracene	110	0.33
	fluoranthene	240	100
	indeno(1,2,3-cd)pyrene	42	0.5
	naphthalene	14	12
	phenanthrene	210	100
	pyrene	210	100
Metals	arsenic	27.5	13
	barium	740	350
	copper	234	50
	chromium	66.7	1
	lead	6,290	63
	mercury	0.53	0.18
	nickel	43.9	30
	zinc	590	109

Based on this comparison to regulatory criteria, 1 VOC, 12 SVOCs, and 8 metals exceed the soil cleanup objectives for unrestricted use under 6 NYCRR Part 375 – Track 1. The SVOCs and metals appear to be linked to the historic fill conditions at the Site as well as the Site's former usage as a gasoline service station, a provisions facility, and a rail yard. Tables 2 through 6 show exceedances of Track 1 Unrestricted Use SCOs for all soil/fill at the Site. Figure 6 is a box plot map that shows the location and summarizes exceedances from Track 1 Unrestricted SCOs for all soil/fill.

2.5.5 Groundwater Contamination

Groundwater samples were collected from soil borings during the SCDS in 2006 and from five groundwater monitoring wells during the RI in 2009. VOCs, SVOCs, metals, and Aroclor 1260 were detected in the groundwater samples above NYSDEC TOGS groundwater standards. The petroleum-related VOCs were only detected above NYSDEC TOGS in the groundwater samples collected from the former gasoline service station portion of the Site. In addition, Aroclor 1260 was only detected above NYSDEC TOGS in one groundwater sample collected from a soil boring on the former gasoline station portion of the Site.

2.5.5.1 Summary of Groundwater Data

Groundwater samples were collected from soil borings during the SCDS in 2006 and from five groundwater monitoring wells during the RI in 2009. Elevated concentrations of VOCs, SVOCs and metals were found in groundwater across the site. The following section summarizes the groundwater data.

2.5.5.2 Comparison of Groundwater with SCGs

The following compounds were detected in the groundwater samples above NSYDEC TOGS groundwater standards:

	Compounds	Maximum Concentration Detected (ug/L)	TOGS (ug/L)
VOCs	acetone	110	50
	benzene	3.8	1
	chloroform	23.4	7
	ethylbenzene	8.7	5
	isopropylbenzene	43	5
	methyl tert-butyl ether	2,100	10
	n-propylbenzene	21	5
	1,2,4-Trimethylbenzene	8.6	5
	1,3,5-Triemthylbenzene	6.9	5

	xylene (total)	22.8	5
	toluene	19	5
SVOCs	benzo(a)pyrene	9.9	0.002
	benzo(a)anthracene	11	0.002
	benzo(b)fluoranthene	12	0.002
	benzo(k)fluoranthene	4.6	0.002
	bis(2-Ethylhexyl)phthalate	46	5
	chrysene	9.5	0.002
	indeno(1,2,3-cd)pyrene	4.7	0.002
	naphthalene	120	10
	phenol	1.4	1
PCBs	Aroclor 1260	62	0.09
Metals	antimony	6.5	3
	iron	3990	300
	magnesium	45000	35000
	manganese	3030	300
	sodium	70800	20000

VOCs, SVOCs, metals, and PCB Aroclor 1260 were detected in the groundwater above NYSDEC TOGS groundwater standards. The petroleum-related VOCs were only detected above NYSDEC TOGS in the groundwater samples collected from the former gasoline service station portion of the Site. In addition, PCB Aroclor 1260 was only detected above NYSDEC TOGS in one groundwater sample collected from a soil boring on the former gasoline station portion of the Site. The chlorinated VOC, chloroform, was detected above NYSDEC TOGS in one well located on the southeastern portion of the Site. Five metals also exceeded groundwater standards.

A table that indicates exceedances from GA groundwater standards in monitoring wells prior to the remedy is shown on Tables 7-11. A spider map that indicates the locations of and summarizes exceedances from GA groundwater standards prior to the remedy is shown on Figure 7.

The VOCs and the PCB Aroclor 1260 are believed to be related to the Site's former usage as a gasoline station. The SVOCs and naturally occurring metals are believed to be a ramification of the historic fill conditions at the Site.

2.5.6 Soil Vapor Contamination

The results indicate petroleum-related VOCs and chlorinated solvents exist in the subsurface soil vapor and are linked to the Site's former use as a gasoline station. The other compounds are believed to be related to the Site's former use as a provisions facility and rail yard or a ramification of the Site's historic fill condition.

2.5.6.1 Comparison of Soil Vapor with SCGs

The following compounds of concern were analyzed in the on-Site soil vapor. Currently, there are no standards or guidance values for soil vapor. Therefore, the following is a list of the highest detections of each compound detected within the soil vapor samples.

Compounds	Maximum Concentration Detected (ug/m^3)
acetone	359
benzene	130
bromodichloromethane	12
carbon disulfide	42.7
chloroform	615
dichlorodifluoromethane	5.9
dibromochloromethane	152
p-dichlorobenzene	3.5 J
ethanol	40.5
ethyl benzene	1.7 J
heptane	18
hexane	15
2-hexanone	1.8
Isopropyl alcohol	3.2

methylene chloride	7.6
methyl ethyl ketone	32.1
methyl isobutyl ketone	3.4
propylene	10.8
2,2,4-trimethlpentane	8.9
tertiary butyl alcohol	2.4 J
tetrachloroethylene	121
tetrahydrofuran	3.5
toluene	50.9
trichloroethylene	2.3J
trichlorofluoromethane	5
m,p-xylene	10
o-xylene	2.5 J
xylenes (total)	12

The results indicate petroleum-related VOCs and chlorinated solvents exist in the subsurface soil vapor and are linked to the Site's former use as a gasoline station. The other compounds are believed to be related to the Site's former use as a provisions facility and rail yard or a ramification of the Site's historic fill condition.

A table of soil vapor data collected prior to the remedy is shown on Table 1. A spider map that indicates the locations of and summarizes soil vapor data prior to the remedy is shown in Figure 5.

2.6 ENVIRONMENTAL AND PUBLIC HEALTH ASSESSMENTS

2.6.1 Qualitative Human Health Exposure Assessment

2.6.1.1 Introduction

A Human Health Qualitative Exposure Assessment ("HHQEA") was performed to evaluate current and potential exposures to Site contaminants. The sampling data from the RI as well as from previous environmental investigations performed at the Site were evaluated to determine whether there are any health risks by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. This EA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC DER-10.

The five elements of an exposure pathway are: (1) a contaminant source; (2) contaminant release and transport mechanisms; (3) a point of exposure; (4) a route of exposure; and (5) a receptor population. An exposure pathway is considered complete when all five elements of an exposure pathway are documented. A potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway cannot be documented. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and will not exist in the future.

2.6.1.2 Contaminants of Concern

The source of the VOCs detected in soil and groundwater at the Site are generally related to the historic use of the property as a gasoline service station. Several SVOCs and metals have been identified which are related to historic fill materials. Based on the degree of soil and groundwater contamination, the former gasoline service station has been identified as a primary source area for the VOCs and PCBs. Meanwhile, the former rail yard/ provision facility mostly likely contributed to the detection of SVOCs and metals. These two locations serve as the identified source areas for the purpose of evaluating on and off-Site exposure.

The presence of VOCs and chlorinated solvents in soil vapor samples throughout the Site can also be considered a source of exposure.

Based upon all of the background information and analytical detections in soil, soil vapor and/or groundwater from the RI as well as previous environmental investigations preformed at this Site (Refs. 1 & 2), the contaminants of concern include:

VOCs: Acetone, benzene, chloroform, ethylbenzene, isopropylbenzene, methyl tert-butyl ether, n-propylbenzene, toluene, 1,2,4-trimethylbenzene, 1,3,5-triemthylbenzene, xylenes, dibromochloroemethane, and tetrachloroethylene.

SVOCs: PAHs including benzo(a)pyrene, bis(2-Ethylhexyl)phthalate, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, and phenol.

Metals: Arsenic, barium, copper, chromium, lead, mercury, nickel, zinc, antimony, iron, manganese, and sodium.

PCBs: Aroclor 1260

The concentrations of the media and contaminants of concern found at the Site were compared to the following standards or guidance values:

Soil: The evaluation of data presented in Section 4 of this RI compared the soil analytical results to 6 NYCRR Part 375 Unrestricted Use SCOs (Ref. 4). While previous investigations compared analytical results to NYSDEC TAGM (Ref. 8), for the purposes of this QHHEA, this data was re-evaluated and compared to Part 375 Unrestricted Use SCOs only.

Groundwater: NYSDEC TOGS (Ref. 9).

Soil Vapor: There are no standards or guidance values for soil vapor.

2.6.1.3 Media of Concern

Soil: The results of the laboratory data presented in the RI as well as previous investigations indicate that soil is a media of concern. The following compounds of concern were detected above the Part 375 SCOs in the on-Site soil/fill materials and are illustrated on Figure 6.

	Compound	Maximum Concentration Detected (ppm)	UUSCOs (ppm)
VOCs	acetone	1	0.05
SVOCs	benzo(a)pyrene	92	1
	benzo(a)anthracene	120	1
	benzo(b)fluoranthene	120	1
	benzo(k)fluoranthene	39	0.8
	chrysene	97	1
	dibenzo(a,h)anthracene	110	0.33
	fluoranthene	240	100
	indeno(1,2,3-cd)pyrene	42	0.5
	naphthalene	14	12
	phenanthrene	210	100
	pyrene	210	100
Metals	arsenic	27.5	13
	barium	740	350
	copper	234	50
	chromium	66.7	1
	lead	6,290	63
	mercury	0.53	0.18
	nickel	43.9	30
	zinc	590	109

Soil Vapor: The results of the laboratory data from the RI indicate that soil vapor is a media of concern. Although there are no standards for soil vapor, for the purposes of this EA, all VOCs detected in the soil vapor above 50 ug/m^3 were considered compounds of concern. VOCs detected in soil vapor samples above ug/m^3 are illustrated on Figure 5.

Compounds	Maximum Concentration Detected (ug/m^3)
acetone	359
benzene	130
bromodichloromethane	12
carbon disulfide	42.7

chloroform	615
dichlorodifluoromethane	5.9
dibromochloromethane	152
p-dichlorobenzene	3.5 J
ethanol	40.5
ethyl benzene	1.7 J
heptane	18
hexane	15
2-hexanone	1.8
Isopropyl alcohol	3.2
methylene chloride	7.6
methyl ethyl ketone	32.1
methyl isobutyl ketone	3.4
propylene	10.8
2,2,4-trimethlpentane	8.9
tertiary butyl alcohol	2.4 J
tetrachloroethylene	121
tetrahydrofuran	3.5
toluene	50.9
trichloroethylene	2.3J
trichlorofluoromethane	5
m,p-xylene	10
o-xylene	2.5 J
xylenes (total)	12

Ground Water: The results of the laboratory data presented in the RI as well as previous investigations indicate that groundwater is a media of concern. The following compounds were detected above NYSDEC TOGS in groundwater and are illustrated on Figure 7.

	Compounds	**Maximum Concentration Detected (ug/L)**	**TOGS (ug/L)**
VOCs	acetone	110	50
	benzene	3.8	1
	chloroform	23.4	7
	ethylbenzene	8.7	5
	isopropylbenzene	43	5

	methyl tert-butyl ether	2,100	10
	n-propylbenzene	21	5
	1,2,4-Trimethylbenzene	8.6	5
	1,3,5-Triemthylbenzene	6.9	5
	xylene (total)	22.8	5
	toluene	19	5
SVOCs	benzo(a)pyrene	9.9	0.002
	benzo(a)anthracene	11	0.002
	benzo(b)fluoranthene	12	0.002
	benzo(k)fluoranthene	4.6	0.002
	bis(2-Ethylhexyl)phthalate	46	5
	chrysene	9.5	0.002
	indeno(1,2,3-cd)pyrene	4.7	0.002
	naphthalene	120	10
	phenol	1.4	1
PCBs	Aroclor 1260	62	0.09
Metals	antimony	6.5	3
	iron	3990	300
	magnesium	45,000	35,000
	manganese	3030	300
	sodium	70,800	20,000

2.6.1.4 Potential Sensitive Receptors

Current and Future Land Use of the Site and Neighboring Properties

The Site is currently vacant. The area immediately surrounding the Site is residential/ commercial. There are several housing developments, a school and its associated fields, commercial retail units, and a high rise apartment complex.

The proposed future use of the Site is residential with ground floor commercial space. The land use in the surrounding area is anticipated to remain residential/commercial since several similar projects have recently been completed or are under construction in this neighborhood.

On-Site Receptors: Since the Site is currently vacant, the only on-Site potential sensitive receptors are trespassers. The proposed redevelopment of the Site includes the construction of an affordable housing multi-story residential building with ground floor community and retail space as well as open space. During redevelopment of the Site, the on-Site potential sensitive receptors will include construction workers. Once the Site is redeveloped, the on-Site potential sensitive receptors will include: adult and child residents, maintenance staff, community residents and commercial workers.

Off-Site Receptors: Potential off-Site receptors within a 0.25-mile radius of the Site include: adult and child residents, and commercial and construction workers, pedestrians, trespassers, and cyclists, based on the following:

2.6.1.3 Contaminant Release and Transport Mechanisms

Potential On-Site Exposures: Although the Site is currently vacant, there is a potential exposure pathway from surface soil/fill materials to trespassers. Once redevelopment activities begin, there will be a potential exposure pathway from contaminated surface and subsurface soil/fill to construction workers as a result of on-Site construction/excavation activities. On-Site construction workers potentially could ingest, inhale or have dermal contact with any exposed impacted fill or soils.

The planned excavation is not expected to encounter groundwater and dewatering is not anticipated at this time. If the redevelopment plans change to include dewatering, there will be a potential exposure pathway from the groundwater to on-Site construction workers. On-Site construction workers could potentially inhale or have dermal contact with any soil/fill that is saturated with contaminated groundwater, vapors off-gassing from the groundwater, and/or the contaminated groundwater itself.

Once the redevelopment of the Site has been completed, there will be a potential exposure pathway to residents, maintenance staff, community residents, and commercial workers from the inhalation of any potential off-gassing of VOC vapors from the soil and groundwater. The VOC vapors could migrate from residual compounds in the soil and/or groundwater and enter the building through any cracks or openings in the foundation.

There will also be a potential exposure pathway from dermal contact, inhalation, or ingestion of surface soil/fill in any landscaped or non-capped areas by adult and child residents and trespassers.

Potential Off-Site Exposures: There is an existing as well as future potential exposure pathway from soil gas emanating from VOCs within the soil and groundwater to enter into the adjoining buildings as a result of any sub-basement floor or lower wall openings/cracks. The indoor air quality at the adjoining properties may be susceptible to contamination from subsurface vapor intrusion attributable to VOCs emitted from the shallow contaminated groundwater beneath the Site. The potential receptors from such a migration pathway into the building would be to off-Site construction and commercial workers, and adult and child residents. The primary route of exposure would be inhalation.

There is also a potential exposure pathway from any dust emanating from the Site to off-Site pedestrians and residents.

2.6.1.4 Exposure Route

An exposure route is the mechanism by which a receptor comes into contact with a chemical. Three potential primary routes exist by which chemicals can enter the body:

- Ingestion of water, fill or soil;
- Inhalation of vapors and particulates; and,
- Dermal contact with water, fill, soil or building materials.

2.6.1.5 Potential Receptor Population

On-Site Receptors: Since the Site is currently vacant, the only on-Site potential sensitive receptors are trespassers. The proposed redevelopment of the Site includes the construction of an affordable multi-story residential building with ground floor community, retail space, and open space. During redevelopment, the on-Site potential sensitive receptors will include construction workers. Once the Site is redeveloped, the on-Site potential sensitive receptors will include adult and child residents, maintenance staff, community residents and commercial workers.

Off-Site Receptors: Potential off-Site receptors within a 0.25-mile radius of the Site include adult and child residents, and commercial and construction workers, pedestrians, trespassers, and cyclists, based on the following:

- Commercial Businesses (up to 0.25 mile) – existing and future
- Residential Buildings (up to 0.25 mile) – existing and future
- Building Construction/Renovation (up to 0.25 mile) – existing and future
- Pedestrians, Trespassers, Cyclists (up to .25 mile) – existing and future

2.6.1.6 Exposure Assessment Conclusions and Recommendations

Based upon this analysis, potential exposure to contaminated soil, groundwater, and/ or soil vapor exists and may continue to exist into the foreseeable future.

To minimize exposure, the impacted soil/fill materials need to be remediated and certain EC/ ICs need to be put in place on-Site to ensure that the potential exposure pathways identified do not become complete.

To effectively address the contaminate of concern, the RAWP proposes to excavate impacted soil/fills as needed, install a composite cover system that includes a minimum two-foot clean fill buffer for all landscape/ non-covered areas, install a vapor barrier and a sub-slab depressurization system, and in-situ chemical oxidation treatment of groundwater.

By properly employing these remedial measures in addition to EC/ ICs , the occupants of the redeveloped building will be subject to minimal/no accumulation of vapors within the planned structures. In addition, a composite cover system would minimize the potential for dermal contact, ingestion of soil or groundwater, or inhalation of vapors associated with subsurface soils and/or groundwater underneath the building.

2.7 REMEDIAL ACTION OBJECTIVES

Based on the results of the Remedial Investigation, the following Remedial Action Objectives (“RAOs”) have been identified for this Site.

2.7.1 Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.

RAOs for Environmental Protection

- Restore groundwater aquifer, to the extent practicable, to pre-disposal/pre-release conditions.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.

2.7.2 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota due to ingestion/direct contact with contaminated soil that would cause toxicity or bioaccumulation through the terrestrial food chain.

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

3.1 EVALUATION OF REMEDIAL ALTERNATIVES

The goal of the remedy selection process under the BCP is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing RAOs for media in which chemical constituents were found in exceedance of NYSDEC SCGs. A remedy is then developed based on the following nine criteria:

- Overall Protection of Public Health and the Environment;
- Compliance with Standards, Criteria, and Guidance;
- Short-Term Effectiveness and Impacts;
- Long-Term Effectiveness and Permanence;

- Reduction of Toxicity, Mobility or Volume of Contaminated Material;
- Implementability;
- Cost Effectiveness;
- Community Acceptance; and,
- Land Use.

This section includes a description of three remedial alternatives considered for this Site as well as a comparison of the alternatives and the Remedial Action SCGs.

STANDARDS, CRITERIA AND GUIDANCE

A criterion for remedy selection is an evaluation for conformance with SCGs that are applicable, relevant and appropriate. Principal SCGs that are applicable, relevant and appropriate for evaluating the alternatives for remediation of this BCP Site include the following:

- 6 NYCRR Part 375-6 Soil Cleanup Objectives;
- New York State Groundwater Quality Standards – 6 NYCRR Part 703;
- NYSDEC Ambient Water Quality Standards and Guidance Values – TOGS 1.1.1;
- NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation - December 2002;
- NYSDEC Draft Brownfield Cleanup Program Guide – May 2004;
- New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan;
- NYS Waste Transporter Permits – 6 NYCRR Part 364; and,
- NYS Solid Waste Management Requirements – 6 NYCRR Part 360 and Part 364.

Additional regulations and guidance are applicable, relevant, and appropriate to the remedial alternatives and will be complied in connection with implementation of the remedial program; however, the list above is intended to represent the principal SCGs which should be considered in evaluating the remedial alternatives for the BCP Site.

Conformance with the appropriate standards for remediation of contaminated soil is an important criterion in evaluating the remedial alternatives for the BCP Site. Presently, in New York State 6 NYCRR Part 375 establishes the primary SCGs associated with remediation of contaminated soil at sites which are in the BCP. If proposing remediation pursuant to a Track other than Track 1 (Unrestricted Use), 6 NYCRR Part 375 requires evaluation of at least one remedial alternative pursuant to Track I (Unrestricted Use) and one other alternative developed by the applicant for the proposed use of the BCP Site. The remedial alternatives presented in Section 3.3 of this work plan have been prepared in conformance with this requirement.

3.2 REMEDIAL ALTERNATIVE 1 (NO ACTION)

This alternative consists of allowing the Site to remain in its current condition. No remedial activities would occur under this Remedy.

3.2.1 Protection of Human Health and the Environment

This alternative will not be protective of human health and the environment since contaminated soil would remain at the surface and subsurface and the groundwater would remain impacted.

3.2.2 Compliance with Standards, Criteria, and Guidelines

Under this alternative, compounds detected in the soil and groundwater will not meet their applicable SCGs.

3.2.3 Short-Term Effectiveness and Impacts

This alternative will not be effective in the short-term because the potential exposure pathways identified in the QHHEA would remain.

3.2.4 Long-Term Effectiveness and Permanence

This alternative will not be effective in the long-term because the potential exposure pathways identified in the QHHEA would remain.

3.2.5 Reduction of Toxicity, Mobility, or Volume of Contaminated Material

This alternative will not cause a reduction of toxicity, mobility or volume and would rely only on the natural breakdown process to reduce contaminant levels.

3.2.6 Implementability

This alternative is easily implemented because it requires no action.

3.2.7 Cost Effectiveness

This alternative is cost-effective as there are no upfront costs associated with it.

3.2.8 Community Acceptance

This alternative would not be acceptable to the community because the potential exposure pathways identified in the QHHEA as well as the contamination would remain.

3.2.9 Land Use

The Site is currently vacant and has not been used for many years with the exception of the suspected unauthorized presence of transients. The Site is considered to be an unattractive blight on the community in its current, undeveloped condition. The Bronxchester Urban Renewal Plan calls for the Site to be redeveloped into multi-story residential buildings with community and retail space with approximately 20,000 square feet of open space. As this remedy will allow the contamination and potential exposure pathways identified in the QHHEA to remain, the Site would remain in a vacant and unusable condition since redevelopment would most likely not occur.

3.3 REMEDIAL ALTERNATIVE 2 (TRACK 1)

This alternative will include removal and/or treatment of all contaminated soil and/or groundwater to comply with Unrestricted Residential SCOs and NYSDEC TOGS respectively. This will include, but is not limited to, excavation of all contaminated material, removal of all USTs and associated hydraulic lifts, and in-situ chemical oxidation treatment of groundwater.

3.3.1 Protection of Human Health and the Environment

This alternative will be protective of human health and the environment as it would achieve all RAOs presented in Section 2.8. This means that soil and groundwater would meet 6 NYCRR Part 375 Unrestricted Residential and NYSDEC TOGS standards respectively.

3.3.2 Compliance with Standards, Criteria, and Guidelines

As this alternative will include removal of all soil/fill materials from the Site that exceed Unrestricted Residential SCOs and in-situ chemical oxidation treatment of groundwater until it meets NYSDEC TOGS groundwater standards. This remedy would achieve all the RAOs presented in Section 2.8.

3.3.3 Short-Term effectiveness and Impacts

This alternative will be most effective in reducing soil contaminant levels in the short-term as all impacted soil will be removed from the Site. There is, however, a risk of short-term impacts to the Site workers and the community as the process of excavating impacted soil may cause the release of dust and organic vapors. This risk can be controlled by employing health and safety procedures during construction.

3.3.4 Long-Term Effectiveness and Permanence

This alternative will achieve long-term effectiveness for all three media of concern in accordance with the RAOs presented in Section 2.8.

Soil: All of soil at the Site exceeding 6NYCRR Part 375 Unrestricted Residential standards will be removed.

Soil Gas: As all of the contaminated soil/fill materials will be removed, the soil gas within the impacted material will be greatly reduced or eliminated. In addition, groundwater would be treated until the organic compounds meet their respective NYSDEC TOGS groundwater standards. Therefore, off-gassing from groundwater would be minimized or eliminated completely.

Groundwater: By removing the impacted soil/fill, the source of organic compounds in the groundwater would be eliminated. In addition, groundwater would be treated so that any residual compounds within the groundwater would meet NYSDEC TOGS. Post-remediation groundwater monitoring will be included as part of the remedy to track the degradation of these organic compounds over time. Development of a SMP will assure the long-term effectiveness of this control.

3.3.5 Reduction of Toxicity, Mobility, or Volume of Contaminated Material

Soil: As all of the impacted soil/fill at the Site will be removed to Track 1 SCOs, the toxicity, mobility, and the volume of contaminants will be greatly reduced.

Soil Gas: As all of the impacted soil/fill at the Site will be removed to Track 1 SCOs, the soil gas within the impacted material will be greatly reduced or eliminated. In addition, groundwater would be treated until the organic compounds meet their respective NYSDEC TOGS groundwater standards, off-gassing from groundwater would be minimal or eliminated completely. Therefore the toxicity, mobility, and volume will be reduced.

Groundwater: By removing the impacted soil/fill, the source of organic compounds in the groundwater would be eliminated. Over time, this should reduce the volume, mobility and toxicity of the organic compounds in the groundwater. In addition, the groundwater would be treated so that any residual compounds within the groundwater would meet NYSDEC TOGS. Post-remedial groundwater monitoring would be included in the remedy to track the degradation of these organic compounds over time.

3.3.6 Implementability

This proposed alternative is implementable. This remedy will require extensive excavation, significantly beyond the anticipated depth of the proposed structures. Excavation may extend into the water table, which would require dewatering.

3.3.7 Cost Effectiveness

This alternative is least cost-effective as it will require extensive excavation, significantly beyond the anticipated depth of the proposed structures, and down to or into the water table. In addition, significant volumes of clean fill would need to be imported to bring the Site elevation up to development depth.

Based on the elevations and dimensions of the Site, in order to achieve Track 1, approximately 22,000 cubic yards of soil/fill would need to be excavated from the Site for off-Site disposal. Using a conversion factor of 1.5, this equals approximately 33,000 tons. The market rate for the transportation and disposal of non-hazardous, regulated soil ranges from $40-$70 per ton. Using this range, the soil/fill disposal for this amount of contaminated soil would be on the order of $1,320,000 – $2,310,000. It is noted that this cost does not include dewatering, which may be needed to excavate into the groundwater table.

As the elevation of the foundation of the proposed new buildings and courtyard ranges from 14-20 feet, approximately 30,000 cubic yards of clean fill will then need to be imported. Using a market rate of $12.50 per cubic yard, this equals $375,000.

The market rate for removing three USTs and one hydraulic lift is $20,000.

The market rate for an air sparge/soil vapor extraction ("AS/SVE") system to treat the groundwater with post-remedial groundwater monitoring is $250,000.

The market rate for purchase and installation of a vapor barrier is approximately $1-2 per square foot. Using the building foot print plus the wall portions that will require a vapor barrier, the area of vapor barrier is estimated to be 9,000 square feet. The estimated cost of the vapor barrier is therefore $18,000.

Inspection, testing, oversight, and reporting associated with this alternative are estimated at a rate of 10% of total costs or approximately $297,300.

In order to perform an excavation of this magnitude, excessive shoring, sheeting, and underpinning would have to be performed for old retaining walls and existing roadways. The costs associated with this massive excavation, and especially the unknown liabilities, would be prohibitive. Instead, we would mitigate these with secant walls, which would shore surrounding properties and provide foundation support. At a depth of 25 feet, these walls are quoted at $7,000/linear foot. With a perimeter of approximately 1,050 feet, the estimated fee for this is $7,350,000.

The cost for this alternative was estimated by combining these figures for an approximate total of $10,323,000. This assumes the remedial work will be performed concurrent with the planned redevelopment of the Site.

3.3.8 Community Acceptance

The Track 1 alternative would result in the cleanup of the Site for unrestricted use in conjunction with the proposed redevelopment.

3.3.9 Land Use

The proposed redevelopment plan matches well with other recent developments in the area which include residential and commercial properties.

The Site is serviced by public transportation in the form of both buses and trains. The area is sewered with municipal water and utilities available. Cultural resources are also available both locally in the Bronx and in nearby Manhattan. There are no known natural resources, such as fish and wild life or floodplains, in close proximity to the Site. The Site does not appear to have ICs in place.

3.4 REMEDIAL ALTERNATIVE 3 (TRACK 4)

This alternative will include removal of impacted soil/fill on the Site as needed to comply with the proposed Track 4 SSSALs, removal of USTs (if encountered) and hydraulic lifts (if encountered), installation of a composite cover system over all landscaped/non-covered areas, installation of a vapor barrier and an active SSDS, ISCO (injection of Regenox™ and ORC® Advanced), and post-remedial groundwater monitoring.

3.4.1 Protection of Human Health and the Environment

This alternative will be protective of human health and the environment through the application of a Site-specific Health and Safety Plan ("HASP"). By employing HASP procedures throughout construction, workers will be protected from exposure pathways indentified in Section 2.6.1.

As part of this alternative, a composite cover system will be installed over all landscaped/non-capped areas to prevent any residents from exposure to contaminated materials. A vapor barrier and a sub-slab depressurization system will be incorporated into the proposed structure to prevent volatile vapors from entering and accumulating within the new structure. All soil/fill exceeding the Track 4 SSSALs will be removed and disposed of off-Site. All USTs and hydraulic lifts, if encountered, will also be removed to aid in reducing the levels of organic compounds in the groundwater. In addition, injection of Regenox™ and ORC® Advanced will further reduce the levels of organic compounds within the groundwater.

3.4.2 Compliance with Standards, Criteria, and Guidelines

The proposed remedial action meets the objectives of the RAOs by removing the potential for human and environmental exposures to chemical constituents above SSSALs in soil. The proposed alternative will effectively remove the source areas and all overburden soils resulting in compliance with SSSALs for soils. Removal of the source area and the ISCO treatment program will result in significant improvement of groundwater quality with respect to SCGs. Post-remediation groundwater monitoring is included in this alternative to track the degradation of these organic compounds over time. Nevertheless, the presence of contaminated soil vapor will be minimized since off-gassing from groundwater would be significantly reduced or eliminated completely.

With implementation of this alternative, the soil/fill materials in two "hot spot" areas (anticipated to be the first two feet from TT-01 to TT-03 and the first foot around SSB-6) will be excavated and disposed of off-Site, thereby meeting the SSSALs established for this Site and achieving the RAOs presented in Section 2.8. If the SSSALs at either excavation are not met at their anticipated proposed excavation depths, then the excavations will continue until SSSALs are met.

Soil Vapor: Removing all impacted soil/fill that exceed the Track 4 SSSALs established for this Site as well as any USTs or hydraulic lifts (if encountered) will reduce the presence of organic vapors within the soil. As groundwater will be treated under this alternative, vapor generation from groundwater would be significantly reduced or eliminated completely. Incorporation of a vapor barrier and active sub-slab depressurization system into the building's design will prevent the possible migration of these vapors into the proposed new buildings thereby achieving the RAOs presented in Section 2.8.

Ground Water: The treatment of groundwater will significantly reduce or eliminate completely the concentrations of any residual compounds within the groundwater, thereby achieving the RAOs presented in Section 2.8. Post-remediation groundwater monitoring is included in the alternative to track the degradation of these organic compounds over time.

3.4.3 Short-Term Effectiveness and Impacts

The proposed alternative will be very effective in reducing soil contaminant levels in the short-term since soil/fill exceeding the Track 4 SSSALs as well as any USTs and hydraulic lifts encountered will be removed from the Site. There is, however, a risk of short-term impacts to on-Site workers and the community as the process of excavating impacted soil may cause the release of dust and volatile organic vapors. This risk can be controlled by employing the Site-specific health and safety procedures throughout remediation/ construction.

3.4.4 Long-Term Effectiveness and Permanence

Alternative 3 will likely achieve long-term effectiveness for all three media of concern in accordance with the RAOs presented in Section 2.8.

Soil: All impacted soil/fill that exceed the Track 4 SSSALs established for this Site as well as any USTs or hydraulic lifts (if encountered) will be excavated and disposed of off-Site. The residual contaminated soils will be capped by the proposed building foundation/ pavement or a composite cover system. These elements will effectively serve as a long-term barrier between the soil and the potential receptors indentified in Section 2.6.1.5.

Soil Gas: Incorporation of a vapor barrier and an active SSDS into the proposed structure. These ECs will prevent volatile vapors from entering and accumulating within the proposed structure. Development of a SMP will assure the long-term effectiveness of these ECs.

Groundwater: Removal of the source area and the ISCO will result in significant improvement of groundwater quality with respect to SCGs. Post-remediation groundwater monitoring will be included to track the degradation of the organic compounds over time. Development of a SMP will assure the long-term effectiveness of this EC.

3.4.5 Reduction of Toxicity, Mobility, or Volume of Contaminated Material

Soil: The proposed alternative will effectively remove the source areas and all overburden soils resulting in compliance with SCGs for soils. The residual contaminated soils will be covered by the proposed building foundation/ pavement or a minimum of two feet of clean fill buffer, thereby reducing the mobility of contaminants in the soil.

Soil Gas: The proposed remedial actions will greatly reduce the source contributing to soil vapors. Incorporation of a vapor barrier and an SSDS into the proposed structure will reduce its mobility with respect to migrating into the structure.

Groundwater: Removal of the source area and the in-situ chemical oxidation treatment program will result in significant improvement of groundwater quality with respect to SCGs. Post-remediation groundwater monitoring will be included in the alternative to track the degradation of these organic compounds over time.

3.4.6 Implementability

This alternative is implementable. The equipment and personnel needed to perform the proposed remedial actions are readily available. The materials needed to construct the proposed vapor barrier in accordance with ASTM standards are available with the manufacturers recommended installation procedures. The SSDS will be constructed of readily available PVC or another approved pipe. The on-Site soil/fill to be excavated and disposed of off-Site are expected to be classified as non-hazardous, regulated soil. Landfill/beneficial re-use space for these types of materials is readily available. Clean fill materials needed to bring the Site up to grade are available locally.

3.4.7 Cost Effectiveness

This alternative is cost- effective. Under this alternative, approximately 384.85 cubic yards or 577.28 tons of impacted soil/fill will need to be excavated and disposed of off-Site. The market rate for the transportation and disposal of non-hazardous, regulated soil ranges from $40 to $70 per ton. Using this range, the soil disposal for this project would be on the order of $23,091 – $40,410. The remaining soil/fill from the northern and western portion will be cut and used to fill in the eastern portion of the Site. Based on Figure 18, after the cut/fill is complete, an additional 13,645 cubic yards of clean fill will need to be imported to bring the Site up to the proposed foundation/courtyard depth. Using a market rate of $12.50 per cubic yard, this equals $170,562.50.

The market rate for removing three USTs and one hydraulic lift (if encountered) is $20,000. The market rate for one injection of Regenox™ and ORC® Advanced with post-remedial groundwater monitoring is $57,500. The market rate for purchase and installation of a vapor barrier is approximately $1-2 per square foot. Using the building foot print plus the wall portions that will be below grade, the area of vapor barrier is estimated to be of 9,000 square feet. The estimated cost of the vapor barrier is therefore $18,000. The market rate for installation of an SSDS for the proposed Site buildings is $150,000. Inspection, testing and reporting associated with this work was estimated at a rate of 10% of total costs or approximately $45,538. The proposed building foundation cost is estimated at $5,400,000.

The cost for this alternative was estimated by combining these figures for an approximate total of $5,902,010.50. This assumes the work will be performed concurrent with the planned Site redevelopment.

3.4.8 Community Acceptance

CA RICH expects that implementation of this alternative in conjunction with the proposed redevelopment to achieve community acceptance. The Site, which is comprised of former Urban Renewal Sites 1A, 13, and part of 14, was part of the Bronxchester Urban Renewal Plan. The Bronxchester Urban Renewal Plan has the following objectives:

- Eliminate blight and maximize appropriate land use;
- Remove substandard and insanitary structures;
- Remove impediments to land assemblage and orderly development;
- Provide new low and/or moderate income housing exhibiting good design in terms of privacy, light, air, and open space; and,
- Redevelop the area in a comprehensive manner.

The proposed development will meet all of the aforementioned goals of the Bronxchester Urban Renewal Plan. According to the NYCHPD's Community District Needs Assessment, housing affordability problems in the Bronx have been a persistent problem, with 29.1% of the Bronx residents spending more than 50% of their incomes on housing, which is the highest rate of any borough in NYC. The proposed development will alleviate this problem by providing rental and cooperative ownership housing for low-, moderate-, and middle-income families, with all units targeted to households earning less than 130% of HUD's Income Limits.

Via Verde is the winning response to the New Housing New York Legacy Competition, sponsored by the NYCHPD, the New York Chapter of the American Institute of Architects, the New York State Energy Research and Development Authority, and the Enterprise Foundation. The New Housing New York Legacy Competition aimed to promote affordable, sustainable, and mixed-income housing by using innovative design on a challenging Site. The development, a joint effort of Phipps Houses, Jonathan Rose Companies, Dattner Architects, and Grimshaw architects, will be a new model of green affordable housing that prioritizes sustainable, healthy urban living.

The proposed development will aim to achieve Leadership in Energy and Environmental Design ("LEED") Gold certification through the incorporation of a range of green design features such as green roofs, energy efficient mechanical systems, sustainable building materials, and photovoltaic panels. The development will also be Energy Star certified. At the heart of the project is a series of gardens that begin in the courtyard, and then spiral up through a series of green roofs. The building massing utilizes passive solar design and almost all units feature two exposures to promote cross-ventilation and natural light. The exterior cladding system uses innovative modular rainscreen materials along with high performance windows and solar shading devices.

The Site is currently vacant and has not been used for many years with the exception of the suspected unauthorized presence of transients. The Site is considered to be an unattractive blight on the community in its current undeveloped condition. The proposed redevelopment will transform the vacant blighted lots into a new affordable residential building with 221 rental and co-op units. The ground level will include approximately 9,000 square feet of community facility and retail space. The proposed redevelopment will also feature approximately 20,000 square feet of open space.

The proposed redevelopment plan has been developed in cooperation with the local community and the local Community Board One. Overall, the local community reports overwhelming support for the proposed redevelopment plan. The proposed redevelopment plan will resolve the current concerns in connection with the Site's current blighted condition and any presence of on-Site transients, while providing affordable housing, community resources, local retail and open space.

3.4.9 Land Use

The Site is currently vacant and has not been used for many years with the exception of the suspected unauthorized presence of transients. The Site is considered to be an unattractive blight on the community in its current undeveloped condition. Implementation of this alternative in conjunction with the proposed redevelopment will transform the vacant blighted lots into a new affordable, residential building with 221 rental and co-op units. The ground level will include approximately 9,000 square feet of community facility and retail space. The proposed redevelopment will also feature approximately 20,000 square feet of open space. The proposed redevelopment plan matches well with other recent developments in the area, which include residential and commercial properties. In addition, the proposed development will meet all of the aforementioned goals of the Bronxchester Urban Renewal Plan.

The Site is serviced by public transportation in the form of both buses and trains. The area is sewered with municipal water and utilities available. Cultural resources are available both locally in the Bronx and in nearby Manhattan. There are no known natural resources, such as fish and wild life, or floodplains in close proximity to the Site. The Site does not appear to have ICs in place.

3.5 SELECTION OF THE PREFERRED REMEDY

Remedial Alternative 1 (no action) allows the Site to remain in its current conditions. This remedial alternative was reviewed and found to be unacceptable. Since contaminated soil/fill would remain in the ground and groundwater left untreated, this alternative would not achieve the RAOs presented in Section 2.8. Therefore, this remedial alternative is not considered a feasible solution.

Remedial Alternative 2 (Track 1) was also reviewed and found to be unacceptable. This remedial alternative included excavating all soil/fill that exceeds Unrestricted Residential SCOs, removal of all USTs and hydraulic lifts, and treatment of groundwater with post-remedial groundwater monitoring. While this remedial alternative would achieve the RAOs presented in Section 2.8, this alternative is not cost-effective from a redevelopment stand point. This alternative will require extremely deep excavations, which will likely extend to the water table. In addition, the excavation and backfill costs to achieve Track 1 would be prohibitive. The total cost to implement this remedial alternative is economically unfeasible.

Remedial Alternative 3 (Track 4) was the only remedial alternative that achieves the RAOs presented in Section 2.8 while being cost-effective. Alternative 3 will include the removal of impacted soil/fill that exceeds the Site Specific Action Levels, the removal of all USTs and hydraulic lifts if encountered, the installation of a vapor barrier and an active SSDS, the installation of a composite cover system in uncapped/landscape areas, ISCO (injection of Regenox™ and ORC® Advanced), and post-remedial groundwater monitoring. This remedial alternative is effectively at meeting the RAOs while being economically sound.

After careful consideration with respect to evaluation factors listed in Section 3.1, Remedial Alternative 3 is determined to be the preferred remedy since it adequately addresses the subsurface contamination with the most cost-effective approach.

3.5.1 Zoning

The proposed redevelopment complies with the current zoning for this Site.

3.5.2 Applicable Comprehensive Community Master Plans or Land Use Plans

The Site is currently vacant and has not been used for many years with the exception of the suspected unauthorized presence of transients. The Site is considered to be an unattractive blight on the community in its current undeveloped condition. Implementation of the remedy in conjunction with the proposed redevelopment will transform the vacant blighted lots into a new affordable residential building with 221 rental and co-op units. The ground level will include approximately 9,000 square feet of community facility and retail space. The proposed redevelopment will also include approximately 20,000 square feet of open space. In addition, the proposed redevelopment plan matches well with other recent developments in the area which include residential and commercial properties. Nevertheless, the proposed development will meet all of the goals of the Bronxchester Urban Renewal Plan.

The Site is serviced by public transportation in the form of both buses and trains. The area is sewered with municipal water and utilities available. Cultural resources are available both locally in the Bronx and in nearby Manhattan. There are no known natural resources, such as fish and wild life, or floodplains in close proximity to the Site.

3.5.3 Surrounding Property Uses

The proposed redevelopment matches well with other recent developments in the area, which include residential and commercial properties. Other land uses in the area include multi-story residences, a high school, an athletic field, and a retail complex.

3.5.4 Citizen Participation

As required under the BCP. A Citizen Participation Plan ("CPP") has been developed and has been approved by NYSDEC.

The CPP identifies informational needs that are related to the Site. It also identifies information that NYSDEC needs from the community. In addition, the CPP also describes outreach activities conducted to date and those expected in the foreseeable future. The CP activities include:

- Establishing a Site Contct List consisting of government contacts, residents, owners, and occupants of adjacent properties, local news media, public water supplier, administrator of schools or day care facilities located near the Site, and community, civic, religious and other educational institutions;
- Developing Fact Sheets that are sent to the Site Contact List; and
- Other relevant CP activities.

These activities are designed to achieve the following objectives:

- Help the interested and affected public to understand the contamination problems at the Site;
- The nature and progress of NYSDEC's program to investigate and clean up the Site;
- Ensure open communication between the public and project staff throughout the remedial process; and,

- Create opportunities for the public to contribute information, opinions and perspectives that have a potential to influence decisions about the Site's investigation/ remediation/ redevelopment.

Copies of the CPP are available at the document repositories established for this Site.

3.5.5 Environmental Justice Concerns

The redevelopment plan for this Site was developed in cooperation with the local community and the local Community Board One. Overall, the local community reports overwhelming support for the proposed redevelopment plan. The proposed redevelopment plan will resolve the current concerns in connection with the Site's current blighted condition and any presence of on-Site transients, while providing affordable housing, community resources, local retail and open space. The CPP has provisions for keeping English as a Second Language residents information through dissemination of Spanish language Fact Sheets, etc. Currently, there are no known Environmental Justice Concerns at the Site.

3.5.6 Land Use Designations

The proposed redevelopment plan complies with the current land use designation for this Site.

3.5.7 Population Growth Patterns

The population of the City of New York is expected to increase in the future. This project will help provide necessary housing units to meet that need.

3.5.8 Accessibility to Existing Infrastructure

The Site is located within close proximity to NYC subway and bus lines. The area is also supplied with municipal sewers and water, electric, telephone, natural gas, and fiber-optic lines.

3.5.9 Proximity to Cultural Resources

The Site is in close proximity to many cultural resources including Yankee Stadium, the Bronx Zoo, and the Bronx Botanical Gardens as well as many museums and theaters in Manhattan that can be easily accessed via public transportation.

3.5.10 Proximity to Natural Resources

The Site is located in the area of the South Bronx, which is not a significant source of natural resources. However, natural resources such as parks and the waterfront can be easily accessible from the Site via public transportation.

3.5.11 Off-Site Groundwater Impacts

The Applicant for this project entered into the BCP as a Volunteer. As such, the Remedial Investigation was limited to on-Site.

3.5.12 Proximity to Floodplains

The Site is not located within a floodplain.

3.5.13 Geography and Geology Of the Site

The Site elevation ranges from 8 to 24 feet above mean sea level based on the Borough of the Bronx Datum. The on-Site topography slopes towards the east.

Based upon the Geology and Engineering Geology of the New York Metropolitan Area, Field Trip Guidebook T361, July 20 – 25, 1989, edited by Charles A. Baskerville for the 28th International Geologic Congress (Ref. 11), the Site is located in bedrock belonging to the

Ordovician-Cambrian Inwood Marble Formation consisting of dolomite marble, calcschist, and grades to underlying patchy Lowerre Quartzite of early Cambrian age. Surficial geologic materials are characterized as ground moraine and/or urban fill consisting of sand, silt, clay and gravel.

3.5.14 Current Institutional Controls

Currently, there are no known institutional controls on the Site.

3.6 SUMMARY OF SELECTED REMEDIAL ACTIONS

Based on the Evaluation of Remedial Alternatives presented in Section 3.5, Remedial Alternative 3 (Track 4) is the preferred remedy for this Site. Details of Remedial Alternative 3 (Track 4) are presented below:

1) Excavation of all soil/fill materials exceeding the Track 4 SSSALs established for the Site. The Track 4 SSSALs proposed for this Site are listed in Table 32. The anticipated limits of the proposed soil excavation are shown on Figure 10.

2) Collection of waste characterization samples as needed to profile the soil/fill that is to be excavated for disposal purposes. A waste disposal facility will be selected based on the data that has been collected to date. Based on the requirements of the selected facility, additional soil/fill samples will be collected and analyzed as needed to obtain an approval for soil disposal.

3) Screening for indications of contamination (by visual means, odor, and monitoring with PID of all excavated soil/fill during any intrusive Site work.

4) Collection and analysis of end-point samples in accordance with DER-10 to evaluate the performance of the remedy with respect to attainment of the Track 4 SSSALs.

5) Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal.

6) Removal of all USTs and hydraulic lifts and any associated grossly contaminated soil, if encountered on-Site, in accordance with applicable regulations.

7) Injection of Regenox™ and ORC® Advanced (in-situ chemical oxidation (ISCO)) into the shallow groundwater (approximately 22 feet below sidewalk grade) and soil/fill in the smear zone (approximately 17-21 feet below sidewalk grade) in the northern portion of the Site.

8) Construction and maintenance of an engineered composite cover consisting of: (1) a composite cover system in all landscaped and non-covered areas; and (2) concrete building foundations, sidewalks/pathways and asphalt roadways to prevent human exposure to residual contaminated soil/fill remaining under the Site.

9) A vapor barrier and an active SSDS will be incorporated into the building's foundation as illustrated on Figures 12, 13, 13A, and 13B. The SSDS will consist of horizontal trenches filled with perforated pipes. The horizontal pipes will be connected to vertical risers that extend above the roof of the building. Any pipe penetrations through the vapor barrier will be sealed in accordance with the manufacturer's recommendations. The vapor barrier specifications are enclosed as Appendix C.

10) Collection and analysis of post-remedial groundwater samples to evaluate the performance of the remedy. Proposed post-remedial groundwater monitoring well locations are illustrated on Figure 14.

11) Recording of an Environmental Easement, including ICs, to prevent future exposure to any residual contamination remaining at the Site [a copy of the Environmental Easement will be provided in the SMP.

12) Publication of an SMP for long-term management of residual contamination as required by the Environmental Easement, including plans for: (1) Institutional and Engineering Controls; (2) monitoring; (3) operation and maintenance; and (4) reporting.

13) Import of all materials to be used for fill will be in compliance with (1) the soil cleanup objectives outlined in 6 NYCRR Part 375-6.7(d); and (2) all Federal, State and local rules and regulations for handling and transport of material.

All responsibilities associated with the remedial action, including permitting requirements and pretreatment requirements, will be addressed by the Volunteer and it's representatives in accordance with all applicable federal, state and local rules and regulations.

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP. All deviations from the RAWP will be promptly reported to NYSDEC for approval and fully explained in the Final Engineering Report ("FER").

4.0 REMEDIAL ACTION PROGRAM

4.1 GOVERNING DOCUMENTS

4.1.1 Site-specific Health & Safety Plan (HASP)

The Site-specific HASP is included as Appendix D.

Activities performed under the HASP will comply with applicable parts of Occupational Safety and Health Association ("OSHA") Regulation, primarily 29 CFR Parts 1910 and 1926. Modficiations to the HASP may be made with the approval of the Remedial Engineer ("RE"), Site Safety Manager ("SSM") and/ or Project Manager ("PM").

All remedial work performed under this plan will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal.OSHA.

The Volunteer and associated parties preparing the remedial documents submitted to the State and those performing the construction work, are completely responsible for the implementation of an appropriate Site-specific HASP and for the appropriate performance of work according to that plan and applicable laws.

The HASP and requirements defined in this RAWP to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion.

The Field Supervisor/Site Safety Manager will be Victoria Whelan of CA RICH. Her resume as well as the resumes of key personnel involved in this project are attached as Appendix E.

Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gasses.

4.1.2 Quality Assurance Project Plan (QAPP)

A Quality Assurance Project Plan ("QAPP") is enclosed as Appendix F. This document includes proposed sampling and analytical methods for the excavation end-point sampling as well as post-remedial groundwater monitoring.

4.1.3 Construction Quality Assurance Plan (CQAP)

The CQAP will provide a detailed description of the observation and testing activities that will be used to monitor construction quality and confirm that remedial construction is in conformance with the remediation objectives and specifications. The following procedures will be employed:

- A Qualified Environmental Professional (QEP) under the direct supervision of the RE will be on-Site during remedial action to monitor particulates and organic vapor in accordance with the Community Air Monitoring Plan (CAMP). Any exceedances will be reported to the NYSDEC and NYSDOH in the daily reports.

- A QEP will meet with the Construction Superintendent on a daily basis to discuss the plans for that day and schedule upcoming activities. The QEP will document all remedial activities in the daily report. This document will be forwarded to the Field Supervisor on a daily basis and to the PM and the RE on a weekly basis.

- A QEP will screen the excavation with a PID during intrusive activities. All readings will be noted in the record. Elevated readings will be reported to the NYSDEC and NYSDOH in the daily reports.

- A QEP will collect the excavation endpoint and post-remedial groundwater samples in accordance with the Plan.

- The RE or his designee will be on-Site during the installation of the SSDS vent pipes and the vapor barrier to ensure proper installation.

- After the SSDS vents, vapor barrier, and concrete slab have been installed, the RE will supervise the performance of an on-Site pilot test to confirm the vents are working properly and to select the correct make and model for the SSDS fans.

- After the fans are installed, the RE will supervise the performance of a start-up test to confirm the vents and fans are working properly.

4.1.4 Soil/Materials Management Plan (SoMP)

A Soil/Materials Management Plan (SoMP) is included in Section 5.4 of this document. The SoMP included detailed plans for managing all soils/materials that are disturbed at the Site, including excavation, handling, storage, transport and disposal. It also includes all of the procedures that will be applied to assure effective, nuisance-free performance in compliance with all applicable Federal, State and local laws and regulations.

4.1.5 Storm-Water Pollution Prevention Plan (SWPPP)

An SWPPP is enclosed as Appendix G. The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control.

4.1.6 Community Air Monitoring Plan (CAMP)

The CAMP was prepared as part of the Site-specific HASP, which is enclosed as Appendix D.

4.1.7 Contractors Site Operations Plan (SOP)

The RE or his designee has reviewed all plans and submittals for this remedial project and confirms that they are in compliance with this RAWP. The RE is responsible to ensure that all later document submittals for this remedial project, including contractor and sub-contractor document submittals, are in compliance with this RAWP. All remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

4.1.8 Community Participation Plan

As required under the BCP, a CPP (Ref. 9) was developed and approved for use by NYSDEC for this purpose. The Volunteer is committed to informing and involving the public concerning the remedial/ construction activities of the Site under the BCP.

The CPP identifies informational needs that are related to the Site. It also identifies information that NYSDEC needs from the community. In addition, the CPP also describes outreach activities conducted to date and those expected in the foreseeable future. The CP activities include:

- Establishing a Site Contact List consisting of government contacts, residents, owners, and occupants of adjacent properties, local news media, public water supplier, administrator of schools or day care facilities located near the Site, and community, civic, religious and other educational institutions;

- Developing Fact Sheets that are sent to the Site Contact List; and,

- Other relevant CP activities.

These activities are designed to achieve the following objectives:

- Help the interested and affected public to understand the contamination problems at the Site;
- The nature and progress of NYSDEC's program to investigate and clean up the Site;

- Ensure open communication between the public and project staff throughout the remedial process; and

- Create opportunities for the public to contribute information, opinions and perspectives that have a potential to influence decisions about the Site's investigation/ remediation/ redevelopment.

Copies of the CPP are available at the following document repositories established for this Site:

New York Public Library
Woodstock Branch
761 East 160th Street
Bronx, NY 10456-7816
(718) 665-6255

Hours:

Mon	Tue	Wed	Thurs	Fri	Sat	Sun
10-8	10-6	10-6	10-8	10-5	10-5	Closed

Community Board One
of the City of New York
3024 Third Avenue
Bronx, NY 10455
(718) 585-7117
Hours: Mondays-Fridays 9am to 5pm

A certification of mailing will be sent by the Volunteer to the NYSDEC project manager following the distribution of all Fact Sheets and notices that includes: (1) certification that the Fact Sheets were mailed, (2) the date they were mailed; (3) a copy of the Fact Sheet; (4) a list of recipients (contact list); and (5) a statement that the repository was inspected on (specific date) and that it contained all of applicable project documents.

No changes will be made to approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing.

4.2 GENERAL REMEDIAL CONSTRUCTION INFORMATION

4.2.1 Project Organization

Personnel responsible for implementation of the Remedial Action work are included on the organization chart enclosed as Figure 15. Resumes of these key personnel are included in Appendix E.

4.2.2 Remedial Engineer

The RE for this project will be Stephen Osmundsen. The RE is a registered professional engineer licensed by the State of New York. The RE will have primary direct responsibility for implementation of the remedial program for the Via Verde aka New Housing New York Legacy Project Site (NYSDEC BCA Index No. W2-1129-08-11 Site No. C203043). The RE will certify in the FER that the remedial activities were observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in the RAWP and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other RE certification requirements are listed later in this RAWP.

The RE will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of back fill material, and management of waste transport and disposal. The RE will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The RE will review all pre-remedial plans submitted by contractors for compliance with this RAWP and will certify compliance in the FER.

The RE will provide the certifications listed in Section 10.1 in the FER.

4.2.3 Remedial Action Construction Schedule

A proposed Remedial Action/Construction Schedule is included in Section 11.0.

4.2.4 Work Hours

The hours for operation of remedial construction will conform to the New York City Department of Buildings ("NYCDOB") construction code requirements or according to specific variances issued by that agency. NYSDEC will be notified by the Applicant of any variances issued by the NYCDOB. NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 Site Security

The Site will be secured with a locking fence that will be placed around the entire perimeter. During all remedial activities access to the properties will be limited and all persons entering the Site will be required to sign a log book and meet all applicable health and safety requirements. All excavations will be secured with snow fencing and the Site will be secured during non-working hours. If necessary, security patrols will be implemented during non-working hours.

4.2.6 Traffic Control

A traffic control plan will be developed by the construction contractor. The traffic control plan will illustrate the location of the construction trailer, truck washing/ decontamination pad, truck staging area, and proper Site ingress/egress for Site workers including deliveries. At a minimum, the traffic control plan will include the following provisions:

- All trucks entering the Site will stop inside the entrance gate for inspection by the Contractor and RE (or his designee). Trucks will be inspected for caked on soils and debris. If the truck is not clean as determined by the Contractor or Engineer, it will be rejected and not allowed to enter the Site until such time the vehicle is cleaned by the transport subcontractor to the satisfaction of the RE. The transport vehicle will then be directed to the designated staging areas for loading.

- On-Site vehicle traffic will be maintained on paved portions of the Site or on temporary construction access roads, to minimize disturbance of surface soils. The Contractor will be responsible for notifying drivers of transport vehicles what roadways and traffic patterns exist on-site.

- Off-Site transport vehicles will be inspected at the exit/decontamination pad to ensure they meet the requirements established for off-Site waste transport. They will be inspected for caked on soils or debris, and for transport integrity (i.e. leaking trailer bed, appropriately covered). At this location, corrective measure will be taken prior to leaving the Site.

- All vehicles leaving the Site will proceed to the on-site decontamination pad, prepared and maintained by the Contractor. Cleaning of the vehicle wheels and under carriage will be performed to eliminate soils tracked off-Site by transport vehicles exiting the Site.

- The Contractor will be responsible for maintaining all onsite roadways (permanent or temporary), construction zone exit pads, and decontamination pads, and keeping the on-Site roadways clear of debris or soils. Maintenance of roadways will consist of new asphalt or concrete (permanent) or stone (temporary).

4.2.7 Contingency Plan

A contingency plan has been developed to describe the procedures to be followed upon discovery of an unknown source of contamination or AOC that may require remediation (USTs, stained soil, drums, etc.).

The identification of an unknown source structure or unexpected contaminated media discovered by screening during invasive Site work will be promptly communicated by phone to NYSDEC's PM. These findings will be also included in daily and periodic electronic reports.

If underground tanks or other previously unidentified contaminant sources are found during on-Site remedial excavation or development related construction, sampling will be performed on product, sediment and surrounding soils, etc. Chemical analytical work will be for full scan parameters (TAL metals, TCL volatiles and semi-volatiles, TCL pesticides and PCBs). These analyses will not be limited to STARS parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC's PM. These findings will be also included in daily and periodic electronic reports.

4.2.8 Worker Training and Monitoring

As discussed in the HASP, the environmental personal at the Site, such as Field Technicians and Site Health and Safety Officers or their designees, will have completed the OSHA-HAZWOPER courses, site safety training and medical monitoring.

4.2.9 Agency Approvals

The Applicant has addressed all SEQRA requirements for this Site. All permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction.

The planned end use for the Site is in conformance with the current zoning as determined by NYC Department of Planning. A Certificate of Completion will not be issued for the project unless conformance with zoning designation is demonstrated.

A complete list of all local, regional and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work is attached in Table 33. This list includes a citation of the law, statute or code to be complied with, the originating agency, and a contact name and phone number in that agency. This list will be updated in the FER.

All planned remedial or construction work in regulated wetlands and adjacent areas will be specifically approved by the NYSDEC Division of Natural Resources to ensure that it meets the requirements for substantive compliance with those regulations prior to the start of construction. Nothing in the approved RAWP or its approval by NYSDEC should be construed as an approval for this purpose.

4.2.10 NYSDEC BCP Signage

A project sign will be erected at the main entrance to the Site prior to the start of any remedial activities. The sign will indicate that the project is being performed under the "New York State Brownfield Cleanup Program". The sign will meet the detailed specifications provided by the NYSDEC PM.

4.2.11 Pre-Construction Meeting with NYSDEC

A pre-construction meeting among NYSDEC, the Volunteer's representatives and the selected remedial contractor will be scheduled and will take place prior to the start of major remedial/ construction activities.

4.2.12 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in the HASP (Apendix D). The document defines the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

4.2.13 Remedial Action Costs

The total estimated cost of the Remedial Action is $5,902,010.50 as indicated below.

Activity	Estimated Cost
Soil Disposal	$23,091-40,410
Importation of Clean Fill	$170,562.50
Removal of USTs and Hydraulic Lift (if encountered)	$20,000
One Injection of Regenox™ and ORC® Advanced with Post-remedial Groundwater Monitoring	$57,500
Vapor Barrier Installation	$18,000
Installation of SSDS	$150,000

Reporting	$45,538
Proposed Building Foundation	$5,400,000

The actual costs will be submitted as an Appendix to the FER.

4.3 SITE PREPARATION

4.3.1 Mobilization

Equipment and materials will be mobilized to the Site via NYCDOT-approved truck routes and will be stored within the boundaries of the Site.

4.3.2 Erosion and Sedimentation Controls

Silt fencing will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the silt fencing functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the RAWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Should excessive quantities of storm water accumulate on-Site, a need to discharge this water to the local sewer connect may arise. Should this occur, a NYCDEP wastewater discharge permit will be obtained.

A Site-specific SWPPP has been developed, which addresses all erosion and sedimentation controls to be employed during remediation/construction. The SWPPP is attached as Appendix G.

4.3.3 Stabilized Construction Entrance(s)

A 2 to 2-½ foot diameter crushed stone path will be constructed at all truck entrances for the Site. All trucks will drive over this path prior to leaving so that they do not get recontaminated prior to departure from the Site. A laborer with a hose connected to a NYC fire hydrant will check the trucks as they leave. If necessary, the hose will be used to wash off soil from the truck tires and body as it leaves the Site.

4.3.4 Utility Markout and Easements Layout

The Applicant and its contractors are solely responsible for the identification of utilities that might be affected by work under the RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. The Applicant and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Applicant and its contractors must obtain any local, State or Federal permits or approvals pertinent to such work that may be required to perform work under this RAWP. Approval of this RAWP by NYSDEC does not constitute satisfaction of these requirements.

The presence of utilities and easements on the Site will be investigated by the Remedial Engineer. It will be determined that no risk or impediment to the planned work under this RAWP is posed by utilities or easements on the Site.

4.3.5 Sheeting and Shoring

Appropriate management of structural stability of on-Site or off-Site structures during on-Site activities including excavation is the sole responsibility of the Applicant and its contractors. The Applicant and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The Applicant and its contractors must obtain any local, State or Federal permits or approvals that may be required to perform work under this Plan. Further, the Applicant and its contractors are solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

4.3.6 Equipment and Material Staging

For soil/fills to be removed and disposed of off-Site, the direct load approach is intended, when possible, whereby the soil is excavated and then placed directly into trucks for disposal. This eliminates the need for staging excavated soil on-Site. Should excavated soil have to be staged, it will be placed on, and covered with, secured plastic sheeting to prevent erosion by precipitation. In addition, all construction equipment and materials will be stored within the fenced area of the Site.

4.3.7 Decontamination Area

Where effective, the equipments will be “dry” decontaminated using a broom and/or brushes. If significant amounts of soil or other contaminants remain after the dry decontamination, the equipment will also be washed before leaving the Site.

Wastewater from equipment decontamination will be collected and either disposed of off-Site or through another appropriate method. Disposable items will be containerized within the Site and transported for appropriate off- Site disposal.

The only other equipment that will require decontamination is the soil and groundwater sampling tools. These will be decontaminated in accordance with the procedures outlined in the QAPP.

4.3.9 Demobilization

Demobilization will consist of the restoration of staging areas, decontamination areas, etc., the removal of any sediment and erosion control measures, equipment decontamination and the disposal of materials and/or general refuse in accordance with acceptable rules and regulations.

Open excavations will be enclosed with fencing to limit access to the excavations by the public.

4.4 REPORTING

All daily and monthly Reports will be included in the FER.

4.4.1 Daily Reports

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers via email by the end of each day following the reporting period and will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to alpha-numeric map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP finding, including excursions; and,

- An explanation of notable Site conditions.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the RAWP or other sensitive or time critical information. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the RAWP will be addressed directly to NYSDEC PM via personal communication.

Daily Reports will include a description of daily activities keyed to an alpha-numeric map for the Site that identifies work areas. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

A Site map that shows a predefined alpha-numeric grid for use in identifying locations described in reports submitted to NYSDEC is attached in Figure 16. In addition, the NYSDEC assigned project number will appear on all reports.

4.4.1 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH PMs within one week following the end of the month of the reporting period and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e. tons of material exported and imported, etc.);

- Description of approved activity modifications, including changes of work scope and/or schedule;

- Sampling results received following internal data review and validation, as applicable; and,

- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

4.4.3 Other Reporting

Photographs will be taken of all remedial activities and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to any Remedial Actions will be provided. Representative photos will be provided of each contaminant source, source area and Site structures before, during, and after remediation. Photos will be submitted to NYSDEC on CD or other acceptable electronic media and will be sent to NYSDEC's PM and to NYSDOH's PM. CD's will have a label and a general file inventory structure that separates photos into directories and sub-directories according to logical Remedial Action components. A photo log keyed to photo file ID numbers will be prepared to provide explanation for all representative photos. For larger and longer projects, photos should be submitted on a monthly basis or another agreed upon time interval.

Job-site record keeping for all remedial work will be appropriately documented. These records will be maintained on-Site at all times during the project and be available for inspection by NYSDEC and NYSDOH staff.

4.4.4 Complaint Management Plan

A log of all complaints from the public regarding nuisance or other Site conditions will be compiled by the Project Director. All complaints will be reported in the Daily Reports.

4.4.5 Deviations from the Remedial Action Work Plan

Any deviations from the RAWP will be recorded in both the monthly progress reports and in the FER. At a minimum, the report of the deviation will include the following:

- Reasons for deviating from the approved RAWP;
- Approval process to be followed for changes/editions to the RAWP; and,
- Effect of the deviations on overall remedy.

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

The removal of materials from the Site will include: (1) the limited excavation and off-Site disposal soil/fill in the areas shown on Figure 10; (2) removal of USTs; and (3) removal of hydraulic lifts . Location of suspect USTs and hydraulic lifts are also illustrated on Figure 10. It is estimated that 373 cubic yards of contaminated soil will be removed from the Site and disposed of at a facility licensed to accept such material.

5.1 SOIL CLEANUP OBJECTIVES

The remedy selected for this Site includes a Track 4 cleanup with SSSALs and implementation of certain EC/ICs. The SSSALs were developed based upon 6 NYCRR Part 375 and NYSDEC-approved Track 4 SSSALs developed for other BCP sites with the same usage located in close proximity to the Site.

The SCOs are protective of human health and the environment and are justified based on the planned remedial activities and future Site use. It is anticipated that all excavation end-point soil samples will meet the SSSALs that have been established. The SSSALs for this Site are listed in Table 32.

Soil and materials management on-Site and off-Site will be conducted in accordance with the Soil Management Plan as described below. UST closures and removal of hydraulic lifts will, at a minimum, conform to criteria defined in DER-10.

5.2 REMEDIAL PERFORMANCE EVALUATION (POST EXCAVATION END-POINT SAMPLING)

Excavation end-point samples will be obtained from the two areas of limited excavation and the excavation of any USTs and hydraulic lifts, if encountered, as shown on Figure 17.

5.2.1 End-Point Sampling Frequency

Based on the sampling frequency discussed in Section 5.4 of DER-10 (Ref. 8), a total of five endpoint samples consisting of four sidewalls and one bottom will be obtained from the excavation on the southern portion of the Site as well as the excavation of any USTs and hydraulic lifts, if countered. A total of 13 endpoint samples consisting of two sidewalls from the northern extents, three sidewalls from the western extents, three sidewalls from the eastern extents, two sidewalls from the southern extents and three bottoms will be obtained from the excavation on the western portion of the Site. A total of five endpoint samples consisting of four sidewalls and one bottom sample will be obtained from the excavation of the USTs, if encountered. In addition, a total of five endpoint samples consisting of four sidewalls and one bottom sample will be obtained from the excavation of the hydraulic lifts, if encountered.

5.2.2 Methodology

The excavation endpoint samples will be collected using a decontaminated stainless steel sampling trowel, hand auger or an unused wooden tongue depressor and placed directly into pre-sterilized laboratory issued containers. The sample containers will be properly labeled and immediately placed on ice within a cooler. Sample time and location will be recorded on a chain of custody. The samples will be submitted to an ELAP-Certified laboratory for analysis of VOCs via EPA Method 8260, SVOCs via EPA Method 8270 and the metal Lead using EPA

Method 6000/7000 series. The laboratory will follow the NYSDEC – Analytical Services Protocol dated 1995. The laboratory will compile and submit the data package using NYSDEC ASP Category B deliverables.

Further details regarding the specific sampling methodology and analytical procedures are presented in the QAPP (Appendix F).

5.2.3 Reporting of Results

The analytical results of the end-point samples will be tabulated and compared to the Site-specific SCOs. The tabulated data as well as the laboratory reports will be included in the FER.

5.2.4 QA/QC

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

Collected samples will be appropriately packaged, placed in coolers and shipped or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved to maintain a temperature of 4^{o}C.

Dedicated disposable sampling materials will be used for both soil and groundwater samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected.

Decontamination of non-dedicated sampling equipment will consist of the following:

- Gently tap or scrape to remove adhered soil
- Rinse with tap water
- Wash with alconox® detergent solution and scrub
- Rinse with tap water
- Rinse with distilled or deionized water

Prepare field blanks by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers.

One trip blank and one field blank will be collected during the end-point sampling event. The field blank will include all of the parameters included in the sample analysis while the trip blank will be limited to VOCs. One duplicate field sample, one matrix spike and one matrix spike duplicate will also be collected and submitted for analysis.

5.2.5 DUSR

A qualified data validator will review the laboratory reports and prepare a Data Usability Summary Report (DUSR) for the endpoint sampling event. The DUSR will be included in the FER.

5.2.6 Reporting of End-Point Data in FER

The FER will include a detailed description of endpoint sampling activities, data summary tables, box plot map showing endpoint sample locations and concentrations, DUSR, and laboratory reports. Chemical laboratories used for all end-point sample results and contingency sampling will be NYSDOH ELAP certified.

Endpoint sampling, including bottom and side-wall sampling, will be performed in accordance with DER-10 sample frequency requirements. Side-wall samples will be collected a minimum of every 30 linear feet. Bottom samples will be collected at a rate of one for every 900 square feet.

The FER will provide a tabular and illustrated summary of all endpoint sample results and exceedances of SSSALs.

5.3 ESTIMATED MATERIAL REMOVAL QUANTITIES

To comply with the Track 4 SSSALs, the excavation of soil/fill from two small areas of the Site for off-Site disposal is required. The first area consists of approximately the top two feet from investigation point TT-01 to TT-03, which is approximately 50'x100'. The estimated quantity of soil/fill to be removed from this area is approximately 370 cubic yards. The second area consists of the top one foot around investigation point SSB-6, which is approximately 20'x20'. The estimated quantity of soil/fill to be removed from this area is approximately 14.85 cubic yards. In addition, if the soil surrounding any USTs and hydraulic lifts (if encountered) are impacted, these soils will be excavated as well. As it is unknown at this time whether any USTs or hydraulic lifts will be encountered and if the soil surrounding the USTs or hydraulic lifts is impacted, the quantity of soil/fill to be excavated can not be estimated. The proposed areas of excavation are illustrated on Figure 10. The estimated total quantity of soil/fill to be removed from the Site is 384.85 cubic yards.

Due to extreme elevation differences at the Site, the proposed redevelopment plans include cut and fill, and the importation of clean fill, with minimal off-site disposal of soil/fill materials. The soil/fill from the western portion of the Site will be used to bring up the elevation on the eastern portion of the Site. In addition, importation of clean fill will be needed to bring the Site up to grade. The cut/fill thicknesses are illustrated on Figure 18.

The estimated quantity of soil to be imported into the Site for backfill and cover soil as shown on Figure 18 is approximately 13,645 cubic yards. The estimated quantity of soil/fill expected to be reused/relocated on Site is approximately 2,376 cubic yards.

5.4 SOIL/MATERIALS MANAGEMENT PLAN

The Soil/Materials Management Plan describes the procedures to be performed during the handling of soil/fill materials on-Site during the remedial activities.

5.4.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed by a qualified environmental professional during all remedial and development excavations into known or potentially contaminated material (Residual Contamination Zone). Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during development phase, such as excavations for foundations and utility work, prior to issuance of the Certificate of Completion ("COC").

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the FER.

Screening will be performed by qualified environmental professionals. Resumes for all personnel responsible for field screening (i.e. those representing the Remedial Engineer) of invasive work for unknown contaminant sources during remediation and development work are enclosed as Appendix E.

5.4.2 Stockpile Methods

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

A dedicated hose connected to a fire hydrant will be available on-Site for dust control.

5.4.3 Materials Excavation and Load Out

The Applicant and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The RE or a qualified environmental professional under his/her supervision will oversee all invasive work and the excavation and load-out of all excavated material and will keep a record of the load out of all excavated materials.

The presence of utilities and easements on the Site will be investigated by the RE prior to the start of remedial activities. Based on the utility markout that was conducted during the RI, it has been determined that no risk or impediment to the planned work under this RAWP is posed by utilities or easements on the Site.

Loaded vehicles leaving the Site will be appropriately tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-Site. The RE will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the remedial construction is complete.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-Site sediment tracking.

The RE will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

The Applicant and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The RE will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP.

Each area and structure to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the area or structure.

Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan.

Mechanical processing of contaminated soil on-Site will be prohibited.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the FER.

5.4.4 Materials Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Truck transport routes will be determined after the disposal facilities for this project are selected. All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes.

Proposed in-bound and out-bound truck routes to the Site are shown in Figure 19. The route shown is the most appropriate and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) minimizing off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport;

Trucks will be encouraged not to stop or idle in the neighborhood outside the project Site.

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development.

Queuing of trucks will be performed on-Site to the extent possible in order to minimize off-Site disturbance. Off-Site queuing will be used only when necessary.
Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks will be washed prior to leaving the Site. Truck wash waters will be collected and disposed of off-Site in an appropriate manner.

5.4.5 Materials Disposal Off-Site

Disposal locations will be established at a later date and will be reported to the NYSDEC PM.

Approximately 384.85 cubic yards of fill containing petroleum-related contaminants and metals are expected to be disposed of off-Site. Waste characterization samples will be collected from the planned excavation areas prior to commencing construction activities. Based on the waste characterization results, a properly permitted waste disposal facility will be selected for off-Site disposal. The disposal facility information including location will be reported to the NYSDEC PM, prior to commencing with the disposal activities.

All soil/fill excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed of in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e. clean soil removed for development purposes), which is not anticipated at this time, a formal request with an associated plan will be made to NYSDEC's PM. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 Unrestricted USE SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the Remedial Engineer for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the Remedial Engineer or BCP Applicant to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2

Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Solid & Hazardous Materials (DSHM) in NYSDEC to be Construction and Demolition (C/D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DSHM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DSHM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a NYSDEC DER remediation Site, that the soil material is contaminated and that it must not be redirected to on-Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

The FER will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

Bill of Lading system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the Final Engineering Report.

Hazardous wastes derived from on-Site will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with all applicable local, State and Federal regulations.

Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the FER. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

5.4.6 Materials Reuse On-Site

Due to extreme elevation differences at the Site, the proposed redevelopment plans include cut and fill. After the limited excavation and off-Site disposal of soil/fill is completed from the western and southern portions of the Site, the soil/fill from the northern and western portions of the Site will be used to bring up the elevation on the southern and eastern portions of the Site. The cut/fill thicknesses are illustrated on Figure 18.

The criteria for the on-Site reuse of material have been established. All of the materials to be reused on the Site will comply with Track 4 SSSALs as acceptable to NYSDEC/NYSDOH. The proposed Track 4 SSSALs are illustrated on Table 32.

As there are no buildings on the Site, demolition material from buildings are not proposed to be reused on-Site. Concrete crushing or processing on-Site will be prohibited. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will also be prohibited for reuse on-Site.

The RE will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-Site.

Contaminated on-Site material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer (top two feet), within landscaping berms, or as backfill for subsurface utility lines. This will be expressed in the final SMP.

5.4.7 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed of in accordance with applicable local, State, and Federal regulations. Liquids discharged into the NYC sewer system will be addressed through approval by NYCDEP.

Dewatered fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-Site.

Discharge of water generated during remedial construction to surface waters (i.e. a local pond, stream or river) is prohibited without a SPDES permit.

5.4.8 Demarcation

After the completion of soil removal and any other invasive remedial activities and prior to importation of clean fill, a land survey will be performed by a New York State licensed surveyor. The survey will define the top elevation of residual contaminated soils. A physical demarcation layer, consisting of orange snow fencing material or equivalent material will be placed on this surface to provide a visual reference. This demarcation layer will constitute the top of the 'Residuals Management Zone', the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in the SMP. The survey will measure the grade covered by the demarcation layer before the placement of cover soils, pavement and sub-soils, structures, or other materials. This survey and the demarcation layer placed on this grade surface will constitute the physical and written record of the upper surface of the 'Residuals Management Zone' in the SMP. A map showing the survey results will be included in the FER and the SMP.

5.4.9 Backfill from Off-Site Sources

Due to extreme elevation differences at the Site, the proposed redevelopment plans include cut and fill as well as the importation of clean fill. After the soil/fill from the northern and western portions of the Site will be used to bring up the elevation on the southern and eastern portions of the Site (refer to Section 5.4.6), the importation of clean fill from an off-Site source(s) will be needed Site-wide to bring the Site up to grade. In addition, a composite cover system that includes a two-foot clean fill buffer will be placed over all non-covered, landscaped areas. Further, as noted in Section 5.4.8, above, a highly visible demarcation barrier (such as an orange plastic construction fence or equivalent) will be installed beneath the two feet of clean fill/top soil cap.

All materials proposed for import onto the Site will be approved by the RE and will be in compliance with provisions in this RAWP prior to receipt at the Site.

All imported soils will comply with the lower of the protection of groundwater or the protection of public health SCOs for restricted residential use as outlined in 6 NYCRR Part 375-6.7(d) and table 375-6.8(b). Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved RAWP or its approval by NYSDEC should be construed as an approval for this purpose.

The source(s) of clean fill to be imported to the Site will be contracted by the Volunteer at a later date. Documentation identifying the source(s) and location for imported soil, and certifying that the fill complies with 6 NYCRR Part 375-6.7(d) will be submitted to NYSDEC for review and approval prior to delivery of the fill to the Site. Documentation will include analytical results from a NY State ELAP-certified laboratory of soil samples collected by an environmental professional at the fill source. The samples will be collected at a frequency of one per every 250 cubic yards of clean fill to be delivered to the Site. Chemical analysis will include VOCs via EPA Method 8260, SVOCs via EPA Method 8270, pesticides, PCBs, and TAL metals. The clean fill will be transported to the Site following receipt of NYSDEC written or email approval.

Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site. Solid waste will not be imported onto the Site. Trucks entering the Site with imported soils will be securely covered with tight fitting covers.

Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Nothing in this RAWP should be construed as an approval for this purpose.

Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers.

The FER will include the following certification by the Remedial Engineer: "I certify that all import of soils from off-Site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan".

5.4.10 Storm-Water Pollution Prevention

A Site-specific Storm-Water Pollution Prevention Plan (SWPPP) that conforms to the requirements of NYSDEC Division of Water guidelines and New York State regulations was prepared and is enclosed as Appendix G. The plan mentions the following:

- Barriers and hay bale checks will be installed and inspected periodically and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately;

- Accumulated sediments will be removed as required to keep the barrier and hay bale check functional;

- All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials;

- Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering;

- Erosion and sediment control measures identified in the RAWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters; and,

- Silt fencing or hay bales will be installed around the entire perimeter of the remedial construction area.

5.4.11 Contingency Plan

It is anticipated that three USTs and one hydraulic lift may be encountered and therefore, removed from the Site in accordance with applicable regulations. If additional underground tanks, hydraulic lifts, or other previously unidentified contaminant sources are found during on-Site remedial excavation or development related construction, sampling will be performed on product, sediment and surrounding soils, etc. Chemical analytical work will be for full scan parameters (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs). These analyses will not be limited to STARS parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC’s PM. These findings will be also included in daily and periodic electronic media reports.

5.4.12 Community Air Monitoring Plan

A Site-specific HASP containing a CAMP has been prepared for this Site and is enclosed as Appendix D.

The CAMP calls for real-time air monitoring for volatile compounds and particulate levels at the perimeter of the work area will be conducted during all invasive Site work. This plan includes the following:

- Volatile organic compounds will be monitored at the downwind perimeter of the work area on a continuous basis. If total organic vapor levels exceed 5 ppm above background, work activities will be halted and monitoring will be continued under the provisions of a Vapor Emission Response Plan (see section following). All readings will be recorded and be available for State (DEC & DOH) personnel to review, and will be included in the FER.

- Particulates will be continuously monitored upwind, downwind and within the work area at temporary particulate monitoring stations during all intrusive activities. If the downwind particulate level is 150 µg/m^3 greater than the upwind particulate level, then dust suppression techniques will employed (see Section 5.4.12.2). All readings will be recorded and be available for State (NYSDEC & NYSDOH) personnel to review, and will be included in the FER.

Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- The organic vapor level 200 ft. downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source are unsuccessful and, if organic vapor levels are approaching 5 ppm above background for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect;

However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in the Health and Safety Plan will go into effect.

2. The local fire and police authorities will immediately be contacted by the Safety Officer and advised of the situation.

3. Continuous air monitoring will be conducted at 30 minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

Fixed and mobile sampling stations will be established prior to commencement of remedial activities. Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers as previously stated and included in the Daily Report.

5.4.13 Odor, Dust and Nuisance Control Plan

The FER will include the following certification by the RE: "I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology defined in the Remedial Action Work Plan."

5.4.13.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used on a routine basis will include use of a PID meter to screen for VOCs and olfactory observations by Field Technicians. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project in the daily reports. Implementation of all odor controls, including the halt of work, will be the responsibility of the Applicant's RE, who is responsible for certifying the FER.

All necessary means will be employed to prevent on- and off-Site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

5.4.13.2 Dust Control Plan

A dust suppression plan that addresses dust management during invasive on-Site work, will include, at a minimum, the items listed below:

- Dust suppression will be achieved though the use of a dedicated hose connected to a fire hydrant. The hose will be equipped with a nozzle capable of spraying water directly onto off-road areas including excavations and stockpiles.

- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.

- Gravel apron will be provided at truck entry/exit points to the Site to provide a clean and dust-free road surface.

- On-Site roads will be limited in total area to minimize the area required for water truck sprinkling.

5.4.13.3 Other Nuisances

A plan for rodent control was developed and will be utilized by the contractor prior to and during Site clearing and Site grubbing, and during all remedial work. The rodent plan includes the following:

- Within the construction Site, tamper resistant rodent bait stations will be installed in appropriate locations and active rodent burrows will be baited.

- Upon installation, each bait station will be baited, labeled, and secured to the ground. Bait will be replenished and bait stations relocated as necessary to control rodent populations. A baiting program will be initiated prior to mobilization by the contractor in the construction area. Regular inspections and rebaiting of bait stations will be performed to ensure rodents will not be dispersed by construction activities and that rodents will not infest work areas.

- Safety signs will be posted on-Site, which will include a copy of the product label and MSDS for the rodenticide in used. Signs will also list practical medical treatment, first aid procedures, and antidote. Caution signs in English and Spanish will be posted when bait stations are placed in areas accessible to the general public, domestic animals, and pets.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Since residual contaminated soil, groundwater, and soil vapor will exist beneath the Site after the remedy is complete, ECs and ICs are required to protect human health and the environment. These ECs and ICs are described hereafter. Long-term management of EC/ICs and of residual contamination will be executed under a Site-specific SMP that will be developed and included in the FER.

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The Site will have three primary EC systems. These are: (1) a composite cover system consisting of concrete covered sidewalks/pathways, concrete building slabs/foundations, and a two-foot clean fill buffer; (2) 15-mil vapor barrier; and, (3) a sub-slab depressurization system.

The FER will report residual contamination on the Site in tabular and graphic form. This will include presentation of exceedances of both Track 1 SCOs and Track 4 SSSALs.

7.0 ENGINEERING CONTROLS: COMPOSITE COVER SYSTEM

7.1 COMPOSITE COVER SYSTEM

Exposure to residual contaminated soils will be prevented by an engineered, composite cover system that will be built on the Site. This composite cover system will be comprised of concrete covered sidewalks/pathways, concrete building slabs/foundations, and a two-foot clean fill buffer. The two-foot clean fill buffer will consist of imported soil that will comply with the lower of the protection of groundwater or the protection of public health SCOs for restricted residential use as outlined in 6 NYCRR Part 375-6.7(d) and table 375-6.8(b) in accordance with the requirements stated in Section 5.4.9. A Site Plan showing covered sidewalks/pathways, building slab/foundation locations as well as the landscaped/non-covered areas where the clean fill buffer will be placed are shown on Figure 8.

Maintenance of this composite cover system will be described in the SMP in the FER. In addition, a Soil and Underground Structure Management Plan will be included in the SMP and will outline the procedures to be followed in the event that the composite cover system and underlying residual contamination are disturbed after the Remedial Action is complete.

A map showing the aerial distribution and design detail of each of the cover types to be built at the Site is included in Figure 20.

8.0 ENGINEERING CONTROLS: TREATMENT SYSTEMS

8.0.1 In-Situ Chemical Oxidation

Injection of Regenox™ and ORC® Advanced into the shallow groundwater table (approximately 22 feet below sidewalk grade) and soil/fill in the smear zone (approximately 17-21 feet below sidewalk grade) will be conducted in the northern portion of the Site to treat the VOCs in groundwater. Regenox™ is an in situ chemical oxidation process using a solid oxidant complex (sodium percarbonate/catalytic formulation) and an activator complex (a composition of ferrous salt embedded in a micro-scale catalyst gel). The ORC® Advanced is primarily composed of magnesium peroxide. ORC® Advanced acts as an electron acceptor for the existing in-situ bacteria, thereby facilitating metabolism of residual fuel-related organic compounds. A slurry-mix of the Regenox™ and ORC® Advanced will be slowly injected between 22 and 17 feet below sidewalk grade as the Geoprobe™ tools are recovered from the shallow groundwater table. The total volume of saturated and unsaturated materials treated with Regenox™ and ORC® Advanced (Treatment Zone) is estimated to be 66,000 cubic feet. Proposed groundwater injection locations are illustrated on Figure 11.

Volume and density application rates for the Regenox™ and ORC® Advanced injection will be based on the manufacturer's recommendations. A letter from the manufacturer stating recommended dosage rates will be provided to NYSDEC and will be included in the FER. In addition, a work schedule will be submitted to NYSDEC for injection and reinjection (if needed) of Regenox™ and ORC® Advanced. If the concentration of VOCs and SVOCs have not been reduced after the initial post-remedial groundwater monitoring and sampling round, then a second round of Regenox™ and ORC® Advanced injection will occur.

All as-built drawings, diagrams, calculation and manufacturer documentation for treatment systems will be presented in the FER.

8.0.2 Sub-Slab Depressurization System and Vapor Barrier

The results of the soil vapor sampling conducted during the RI, showed the presence of VOCs in the soil vapor. To prevent residual soil vapor from entering the new building's interior, installation of an engineered plastic vapor barrier as well as an active SSDS will be included in the construction of the new buildings' foundation. A Stego™ 15-mil vapor barrier or equivalent membrane that meets or exceeds ASTM's E-1745 standard for installation of a vapor barrier between granular fill and concrete will be selected. The membrane will be installed in accordance with the manufacturer's installation procedures. Prior to pouring the concrete slab, the PE will visit the Site to inspect and photograph the installed material. In addition, the elevation(s) of the vapor barrier will be recorded by a licensed surveyor for inclusion on an "as built" drawing prepared by the PE. A set of the installation photos in addition to the "as built" drawings will be included in the FER.

The SSDS will maintain a negative pressure underneath the slab while allowing the vapors below the concrete slab to vent without intruding into the building. The SSDS will consist of horizontal trenches filled with perforated pipe. The horizontal pipes will be connected to vertical risers that extend above the roof of the building. Any pipe penetrations through the vapor barrier will be sealed in accordance with the manufacturer's recommendations. The proposed SSDS and vapor barrier layout is illustrated on Figure 12. The typical vent pipe cross-section and piping details are illustrated on Figures 13, 13A, and 13B.

8.1 ENGINEERING CONTROL SYSTEMS

8.1.1 Criteria for Completion of Remediation/Termination of Remedial Systems

8.1.1.1 Composite Cover System

The composite cover system described in Section 7 is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in perpetuity.

8.1.1.2 Sub-slab Depressurization System (SSDS)

The active SSDS will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the active SSDS may be submitted by the Site owner based on confirmatory data that justifies such request. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

8.1.1.3 In-Situ Chemical Oxidation

Four post-remedial groundwater monitoring wells will be installed on the Site (see Figure 14 for proposed monitoring well locations). These wells will be used to monitor the success of the Regenox™ and ORC® Advanced injection/natural attenuation. Groundwater samples will be collected from the wells on a quarterly basis, submitted to an ELAP-Certified Laboratory and analyzed for VOCs via EPA Method 8260, SVOCs via EPA Method 8270, PCBs, and dissolved TAL metals. The results of the first round of post-remedial groundwater monitoring will be included in the FER. Groundwater monitoring activities to assess ISCO will continue, until residual groundwater concentrations are found to be below NYSDEC standards or have become asymptotic over an extended period. Monitoring will continue until permission to discontinue is granted in writing by NYSDEC and NYSDOH. Monitoring activities will be outlined in the Monitoring Plan of the SMP.

9.0 INSTITUTIONAL CONTROLS

After the remedy is complete, the Site will have residual contamination remaining in place. ECs for the residual contamination have been incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an Environmental Easement and a SMP. These elements are described in this Section. A Site-specific Environmental Easement will be recorded with Bronx County to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors and assigns adhere to all ECs/ICs placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. The SMP describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

9.1 ENVIRONMENTAL EASEMENT

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-Site after the Remedial Action is complete. If the Site will have residual contamination after completion of all Remedial Actions than an Environmental Easement is required. As part of this remedy, an Environmental Easement approved by NYSDEC will be filed and recorded with the Bronx County Clerk. The Environmental Easement will be submitted as part of the FER.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement must be recorded with the Bronx County Clerk before the Certificate of Completion can be issued by NYSDEC. A series of ICs are required under this remedy to implement, maintain and monitor these Engineering Control systems, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to residential/commercial uses only. These ICs are requirements or restrictions placed on the Site that are listed in, and required by, the Environmental Easement. ICs can, generally, be subdivided between controls that support ECs, and those that place general restrictions on Site usage or other requirements. ICs in both of these groups are closely integrated with the SMP, which provides all of the methods and procedures to be followed to comply with this remedy.

The ICs that support ECs are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;

- All ECs must be operated and maintained as specified in this SMP;

- A composite cover system consisting of covered roads and pathways, concrete covered sidewalks, two-foot clean fill buffer, and concrete building slabs/foundations must be inspected, certified and maintained as required in the SMP;

- A soil vapor mitigation system consisting of a SSDS under all building structures must be inspected, certified, operated and maintained as required by the SMP;

- All ECs on the Site must be inspected and certified at a frequency and in a manner defined in the SMP;

- Groundwater, soil vapor and other environmental or public health monitoring must be performed as defined in the SMP;

- Data and information pertinent to Site Management for the Site must be reported at the frequency and in a manner defined in the SMP;

- On-Site environmental monitoring devices, including but not limited to, groundwater monitor wells and SSDS vents, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP;

- ECs may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these ICs for the Site is mandated by the Environmental Easement and will be implemented under the SMP (discussed in the next section). The Site will also have a series of ICs in the form of Site restrictions and requirements. The Site restrictions that apply to the Site are:

- Vegetable gardens and farming on the Site are prohibited;

- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for intended purpose;

- All future activities on the Site that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the SMP;

- The Site may be used for restricted-residential and commercial use only, provided the long-term EC/ ICs included in the SMP are employed;

- The Site may not be used for a higher level of use, such as un-restricted residential use without an amendment or extinguishment of this Environmental Easement;

- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Site at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This annual statement must be certified by an expert that the NYSDEC finds acceptable.

9.2 SITE MANAGEMENT PLAN

Site Management is the last phase of remediation and begins with the approval of the FER and issuance of the Certificate of Completion ("COC") for the Remedial Action. The SMP is submitted as part of the FER but will be written in a manner that allows its removal and use as a complete and independent document. Site Management continues in perpetuity or until released in writing by NYSDEC. The Site owner is responsible to ensure that all Site Management responsibilities defined in the Environmental Easement and the SMP are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the Remedial Action in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

To address these needs, this SMP will include four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated December 2002 (Ref. 8), and the guidelines provided by NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The SMP will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period.

The SMP in the FER will include a monitoring plan for groundwater at the down-gradient Site perimeter to evaluate Site-wide performance of the remedy.

No exclusions for handling of residual contaminated soils will be provided in the SMP. All handling of residual contaminated material will be subject to provisions contained in the SMP.

10.0 FINAL ENGINEERING REPORT (FER)

A FER and SMP will be submitted to NYSDEC following implementation of the Remedial Action defined in this RAWP. The FER provides the documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The FER will provide a comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources. The FER will include as-built drawings for all constructed elements, certifications, manifests, bills of lading as well as the complete SMP (formerly the Operation and Maintenance Plan). The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP and associated design documents. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the Remedial Action. The FER will provide test results demonstrating that all mitigation and remedial systems are functioning properly. The FER will be prepared in conformance with DER-10.

Where determined to be necessary by NYSDEC, a Financial Assurance Plan will be required to ensure the sufficiency of revenue to perform long-term operations, maintenance and monitoring tasks defined in the SMP and Environmental Easement. This determination will be made by NYSDEC in the context of the FER review.

The FER will include written and photographic documentation of all remedial work performed under this remedy.

The FER will include an itemized tabular description of actual costs incurred during all aspects of the Remedial Action.

The FER will provide a thorough summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the Track 1 Unrestricted Use SCO in 6NYCRR Part 375-6. A table that shows exceedances from Track 1

Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action and a map that shows the location and summarizes the data for all soil/fill remaining at the Site after the Remedial Action will be included in the FER.

The FER will provide a thorough summary of all residual contamination that exceeds the SCOs defined for the Site, if any, in the RAWP and must provide an explanation for why the material was not removed as part of the Remedial Action. A table that shows residual contamination in excess of Site SCOs, if any, and a map that shows residual contamination in excess of Site SCOs, if any, will be included in the FER.

The FER will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

Before approval of a FER and issuance of a COC, all project reports must be submitted in digital form on electronic media (PDF).

10.1 CERTIFICATIONS

The following certification will appear in front of the Executive Summary of the FER. The certification will be signed by the RE, Stephen Osmundsen, who is a Professional Engineer registered in New York State This certification will be appropriately signed and stamped. The certification will include the following statements:

I, Stephen Osmundsen, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the Via Verde aka New Housing New York Legacy Site (NYSDEC BCA Index No. W2-1129-08-11 Site No. C203043).

I certify that the Site description presented in this FER is identical to the Site descriptions presented in the Environmental Easement, the SMP, and the BCA for the Site (Via Verde aka New Housing New York Legacy Project) and related amendments.

I certify that the RAWP dated April 2009 approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by qualified environmental professionals under my supervision and that the remediation requirements set forth in the RAWP and any other relevant provisions of ECL 27-1419 have been achieved.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and all operation and maintenance requirements applicable to the Site are contained in an Environmental Easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded. A SMP has been submitted by the Applicant for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by the NYSDEC.

I certify that the export of all contaminated soil, fill, water or other material from the Site was performed in accordance with the RAWP, and were taken to facilities licensed to accept this material in full compliance with all Federal, State and local laws.

I certify that all import of soils from off-Site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the RAWP.

I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology and soil screening methodology defined in the RAWP.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

11.0 SCHEDULE

A schedule of proposed remedial action activities is presented below.

Activity	**Date**
Submission of RAWP	April 27, 2009
Public Comment Period on RAWP	April 29 – June 13, 2009
RAWP is revised based on public, NYSDEC, and NYSDOH comments (if necessary)	June 15-26, 2009
NYSDEC approves RAWP	July 24, 2009
Start of Construction Fact Sheet	September 1, 2009
Selection of waste disposal facilities and collection & analysis of waste characterization samples	September 1, 2009
Begin redevelopment activities, secure Site, and prepare for excavation	September 16, 2009
Regenox™/ORC® Advanced Injection	September 17 and 3, 2009
Excavation of soil/fill, cut and fill, remove USTs and hydraulic lift (if encountered), and collection and analysis of excavation end-point samples	September 21-October 5, 2009
Importation of clean fill to bring Site up to grade	October 6 – Nov.9
Installation and sampling of post-remedial groundwater monitoring wells	November 16 -20, 2009

Second round of Regenox™/ORC® Advanced injection and monitoring (if needed)	December 16 - 30, 2009
Installation of SSDS and vapor barrier, and SSDS pilot test	January 16 – Feb. 16, 2010
Recording of Environmental Easement	January 16, 2010
FER and SMP, and FER Fact Sheet	February 16, 2010
Certificate of Completion and IC/EC Fact Sheet	March 16, 2010

References

1. URS Corporation. Site Characterization and Data Summary Report. New York: Author, September 2006.

2. CA RICH. Supplemental Site Investigation Work Plan. New York: Author, April 2007.

3. Baskerville, Charles A. Geology of the New York Metropolitan Area, Field Trip Guidebook T361, July 20-25, 1989. New York, 28th International Geologic Congress, July 1989.

4. NYSDOH. Guidance for Evaluating Soil Vapor Intrusion in the State of New York. New York, Author, October 2006.

5. Earth Tech, Inc. Phase I Environmental Site Assessment. New York, Author, December 2004.

6. NYSDEC. Technical And Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels. New York, Author, January 24, 1994.

7. NYSDEC. 6 NYCRR Part 375 Environmental Remediation Programs, Environmental Remediation Programs, Subparts 375-1 to 375- 4 & 375-6. New York: Author, December 2006.

8. NYSDEC. Draft DER-10 Technical Guidance for Site Investigation and Remediation. New York: Author, December 2002.

9. CA RICH. Citizen Participation Plan. New York: Author, April 2007.

ATTACHMENTS

1.0 SCG'S FOR SITE CHARACTERIZATION AND REMEDIAL INVESTIGATION

The following standards and criteria typically will apply to Site Characterizations and Remedial Investigations conducted in New York State:

- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 182 - Endangered & Threatened Species of Fish & Wildlife
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands Maps and Classification
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 257 - Air Quality Standards
- 10 NYCRR Part 5 of the State Sanitary Code - Drinking Water Supplies (May 1998)
- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures

The following guidance typically applies to Site Characterizations and Remedial Investigations conducted in New York State:

- TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)

- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (October 1994)
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- Niagara River Biota Contamination Project: Fish Flesh Criteria for Piscivorus Wildlife (July 1987)
- Wildlife Toxicity Assessment for Cadmium in Soils (May 1999)
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- The 10 ppt Health Advisory Guideline for 2,3,7,8-TCDD in Sportfish Flesh
- The 1 ppm Health Advisory Guideline for Cadmium in Sportfish Flesh
- Criteria for the Development of Health Advisories for Sportfish Consumption
- NYSDOH Indoor Air Sampling & Analysis Guidance (August 8, 2001 or subsequent update)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (draft October 2004 or subsequent final draft)
- DER Interim Strategy for Groundwater Remediation at Contaminated Sites in New York State

2.0 SCGS FOR REMEDY SELECTION

The following standards and criteria typically apply to the remedy selection process conducted in New York State:

- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands - Permit Requirements
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)

- 19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources

The following guidance typically applies to the remedy selection process conducted in New York State:

- TAGM 4044 - Accelerated Remedial Actions at Class 2, Non-RCRA Regulated Landfills (March 1992)
- TAGM 4051 - Early Design Strategy (August 1993)
- Citizen Participation in New York's Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Freshwater Wetlands Regulations - Guidelines on Compensatory Mitigation (October 1993)
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.047FS Presumptive Remedies: Policy and Procedures (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.048FS Presumptive Remedies:
- Site Characterization and Technology Selection for CERCLA sites with Volatile Organic Compounds in Soils (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.049FS Presumptive Remedy for CERCLA Municipal Landfills (September 1993)

3.0 SCGS FOR UNDERGROUND STORAGE TANK CLOSURE

The following standards and criteria typically apply to UST closures conducted in New York State:

- 6 NYCRR Part 612 - Registration of Petroleum Storage Facilities (February 1992)

- 6 NYCRR Part 613 - Handling and Storage of Petroleum (February 1992)
- 6 NYCRR Part 614 - Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Subpart 374-2 - Standards for the Management of Used Oil (November 1998)
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 40 CFR Part 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks

The following guidance typically applies to UST closures conducted in New York State:

- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)
- Spill Response Guidance Manual
- Permanent Closure of Petroleum Storage Tanks (July 1988)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- NYSDOH Environmental Health Manual CSFP-530 - “Individual Water Supplies - Activated Carbon Treatment Systems”

4.0 SCGS FOR REMEDIAL ACTION

The following standards and criteria typically apply to Remedial Actions conducted in New York State:

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 - Underground Injection Control Program
- 10 NYCRR Part 67 – Lead
- 12 NYCRR Part 56 - Industrial Code Rule 56 (Asbestos)
- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures
- 6 NYCRR Part 361 - Siting of Industrial Hazardous Waste Facilities
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 373-4 - Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators (November 1998)
- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 - Standards for Universal Waste (November 1998)
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites (as amended January 1998)
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands - Permit Requirements
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)

- 6 NYCRR Part 750 through 758 - Implementation of NPDES Program in NYS (“SPDES Regulations”)
- Technical Guidance for Screening Contaminated Sediments (January 1999)

The following guidance typically applies to Remedial Actions conducted in New York State:

- TAGM 4013 - Emergency Hazardous Waste Drum Removal/ Surficial Cleanup Procedures (March 1996)
- TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- TAGM 4059 - Making Changes To Selected Remedies (May 1998)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Citizen Participation in New York’s Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- TOGS 1.3.8 - New Discharges to Publicly Owned Treatment Works
- TOGS 2.1.2 - Underground Injection/Recirculation (UIR) at Groundwater Remediation Sites
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- State Coastal Management Policies
- OSWER Directive 9200.4-17 - Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (November 1997)
- NYSDOH Environmental Health Manual CSFP-530 - “Individual Water Supplies - Activated Carbon Treatment Systems”

5.0 SCGS FOR SITE MANAGEMENT

The following standards and criteria typically apply to Site Management activities conducted in New York State:

- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures

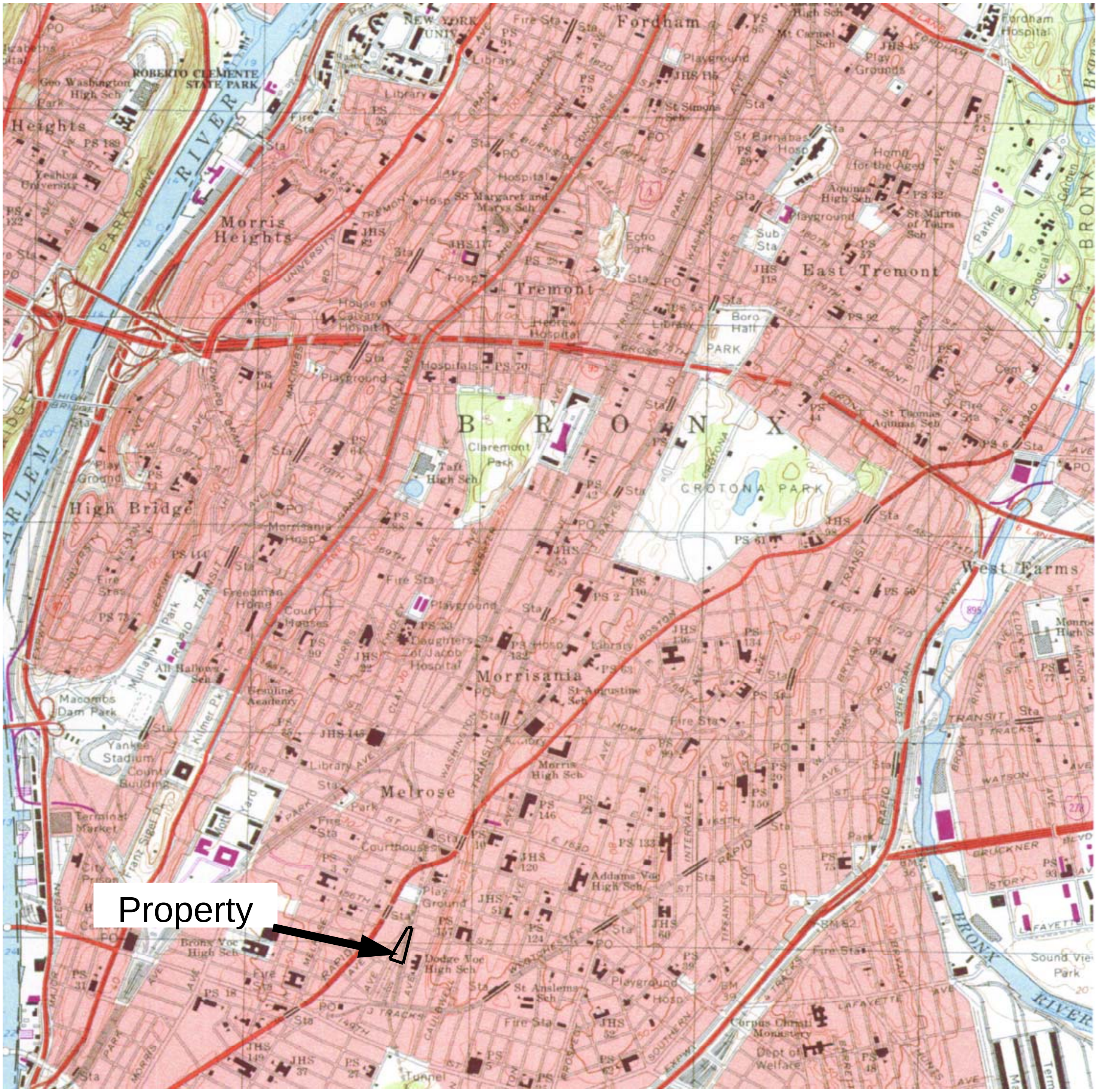
The following guidance typically applies to Site Management activities conducted in New York State:

- Groundwater Monitoring Well Decommissioning Procedures (May 1995)

- The activity is a component of a program selected by a process complying with the public participation requirements of section 1.10, to the extent applicable.

- NYSDOH Environmental Health Manual CSFP-530 - “Individual Water Supplies - Activated Carbon Treatment Systems”

FIGURES



APPROX. SCALE (ft.)

0 1,200 2,400

N

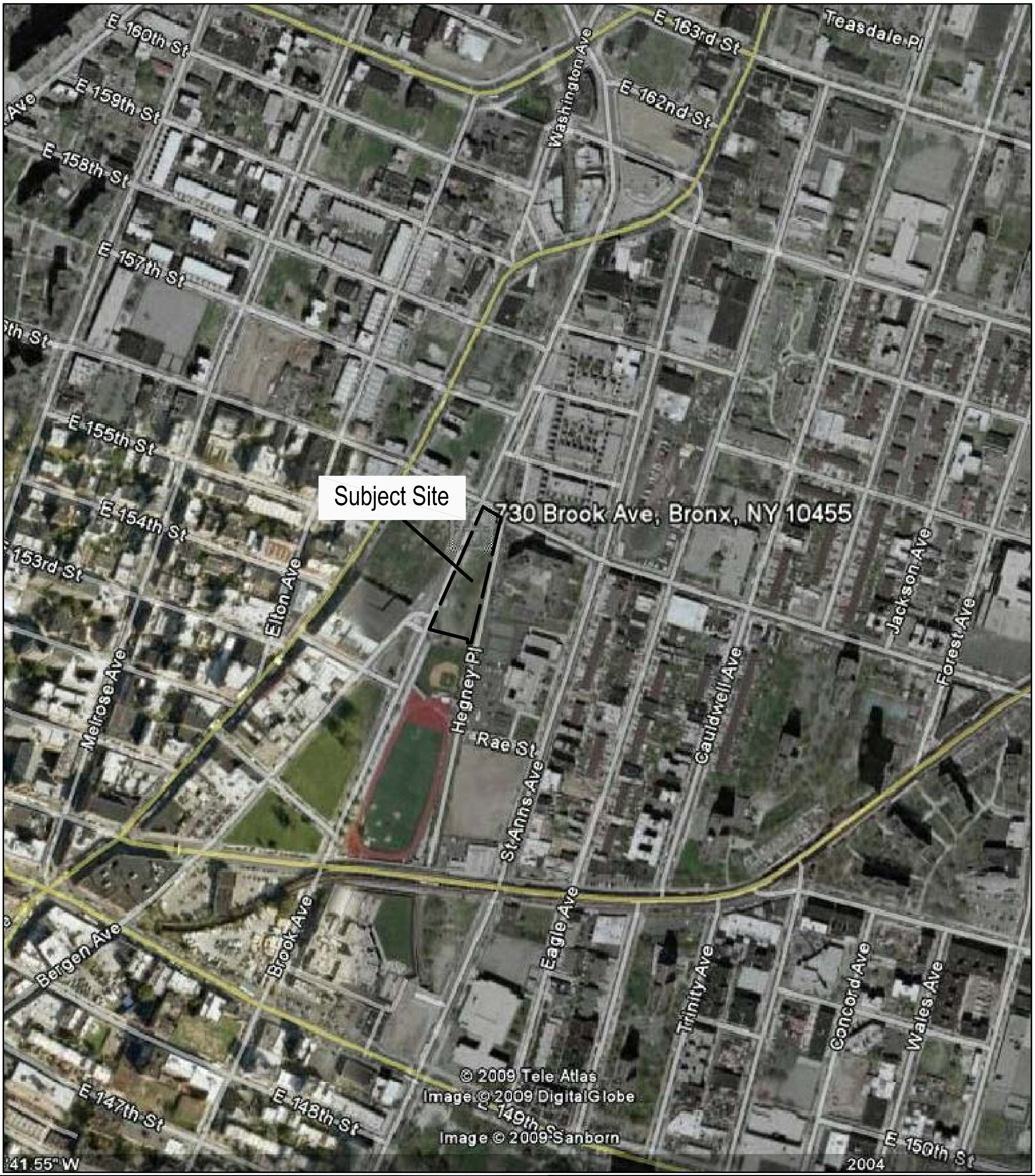
Adapted from USGS 1995 Central Park Quadrangle Map.

CA RICH CONSULTANTS, INC.

Certified Ground Water and Environmental Specialists

17 Dupont Street, Plainview, NY 11803

TITLE:	**SITE LOCATION MAP ON TOPOGRAPHIC QUAD**	DATE: **04/8/09**
		SCALE: **AS SHOWN**
FIGURE: **1A**	**Via Verde aka New Housing New York Legacy 700-730 Brook Avenue Bronx, New York**	DRAWN BY: **D.S.**
DRAWING:		APPR. BY: **RJI**



LEGEND

Approx. Property Boundary

Approx. Scale (Miles)

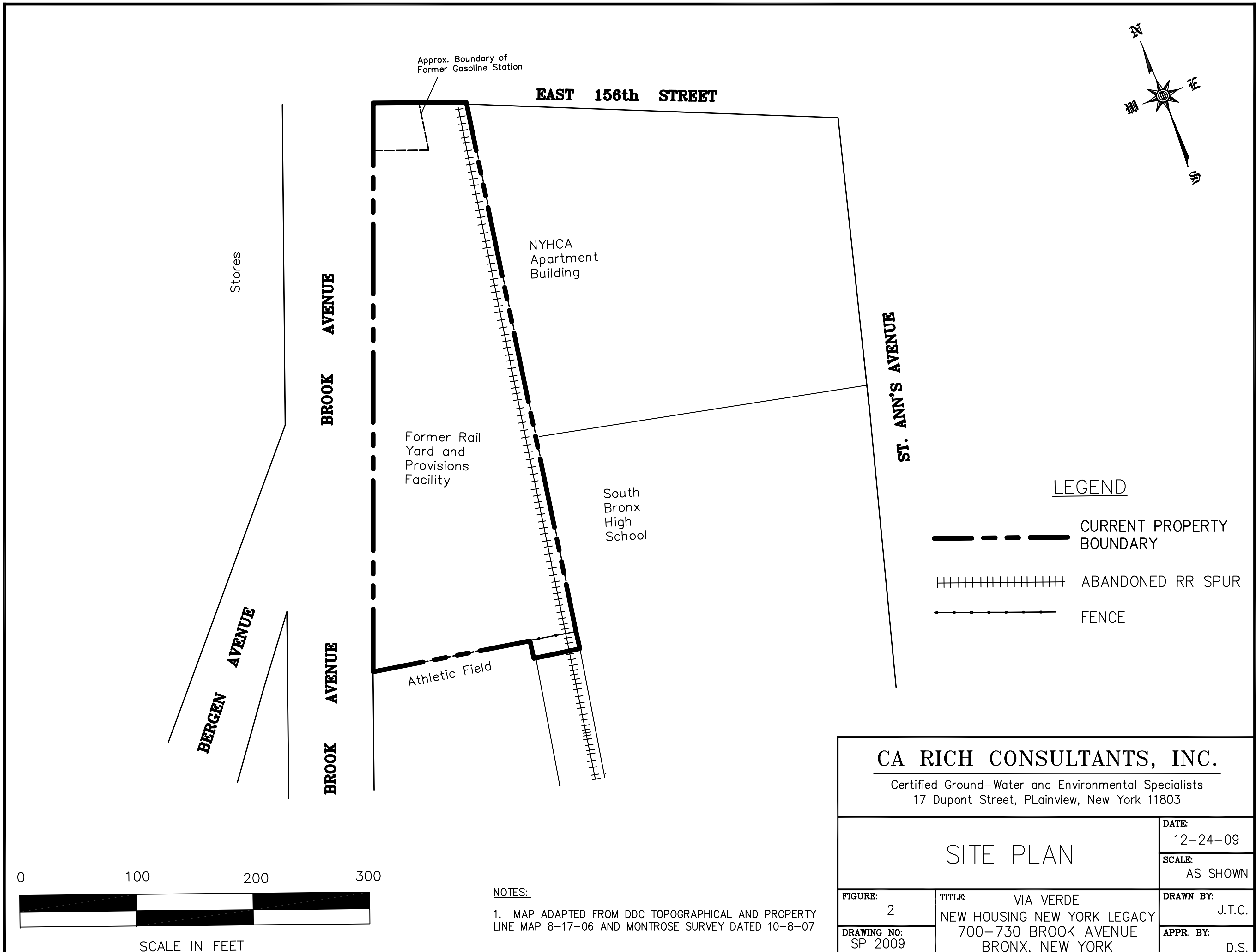
0 0.5 1.0 2.0 3.0

N W E S

CA RICH CONSULTANTS, INC.

Certified Ground-Water and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

TITLE: SITE LOCATION MAP ON AERIAL PHOTOGRAPH		DATE: 4/10/09
		SCALE: As Shown
FIGURE: 1B	Via Verde New Housing New York Legacy 700–730 Brook Avenue Bronx, New York	DRAWN BY: D.S.
DRAWING NO: Site Loc. Map		APPR. BY: R.J.I



NOTES:

1. MAP ADAPTED FROM DDC TOPOGRAPHICAL AND PROPERTY LINE MAP 8-17-06 AND MONTROSE SURVEY DATED 10-8-07

CA RICH CONSULTANTS, INC.

Certified Ground-Water and Environmental Specialists
17 Dupont Street, PLainview, New York 11803

SITE PLAN

DATE: 12-24-09

SCALE: AS SHOWN

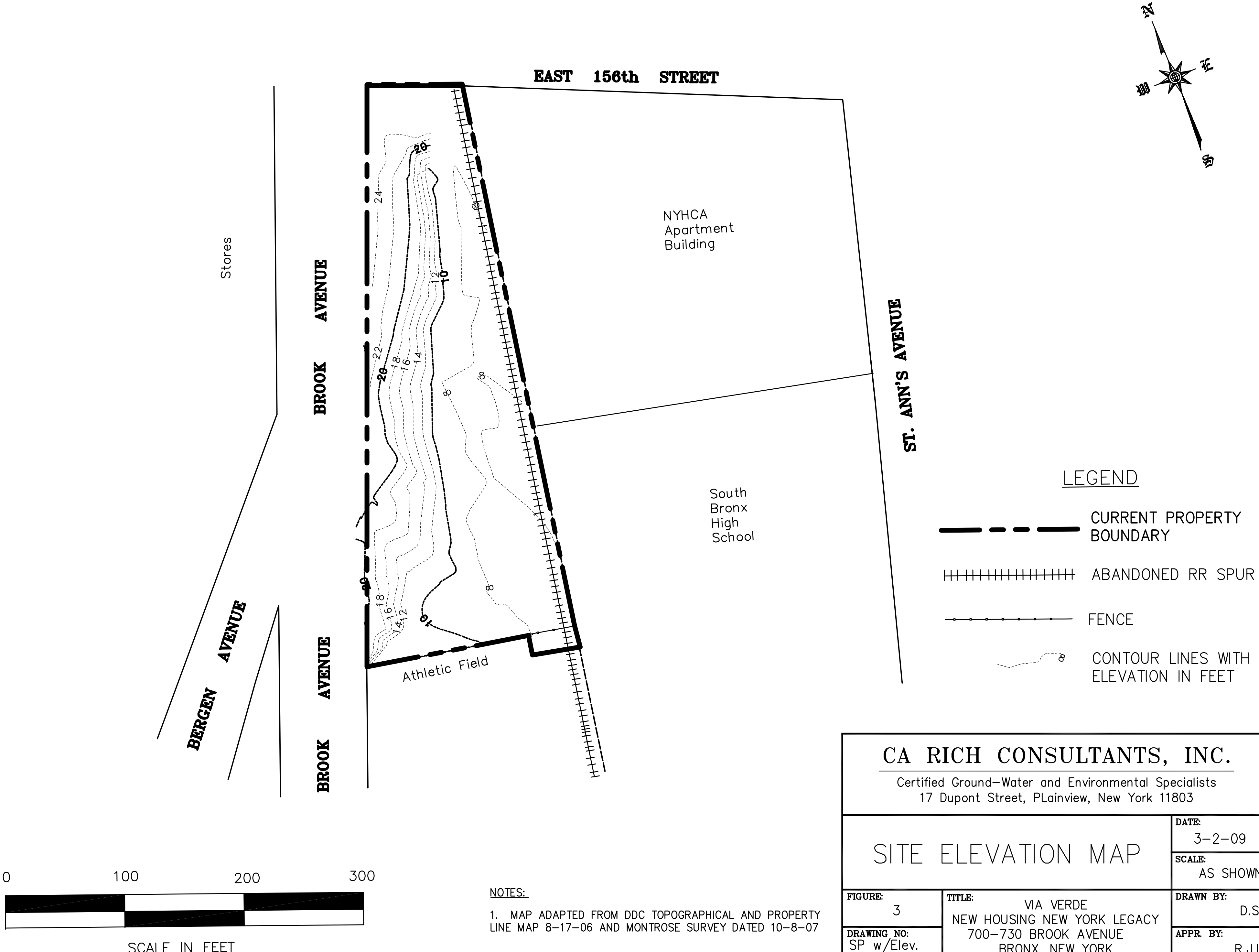
FIGURE: 2

DRAWING NO: SP 2009

TITLE: VIA VERDE
NEW HOUSING NEW YORK LEGACY
700-730 BROOK AVENUE
BRONX, NEW YORK

DRAWN BY: J.T.C.

APPR. BY: D.S.



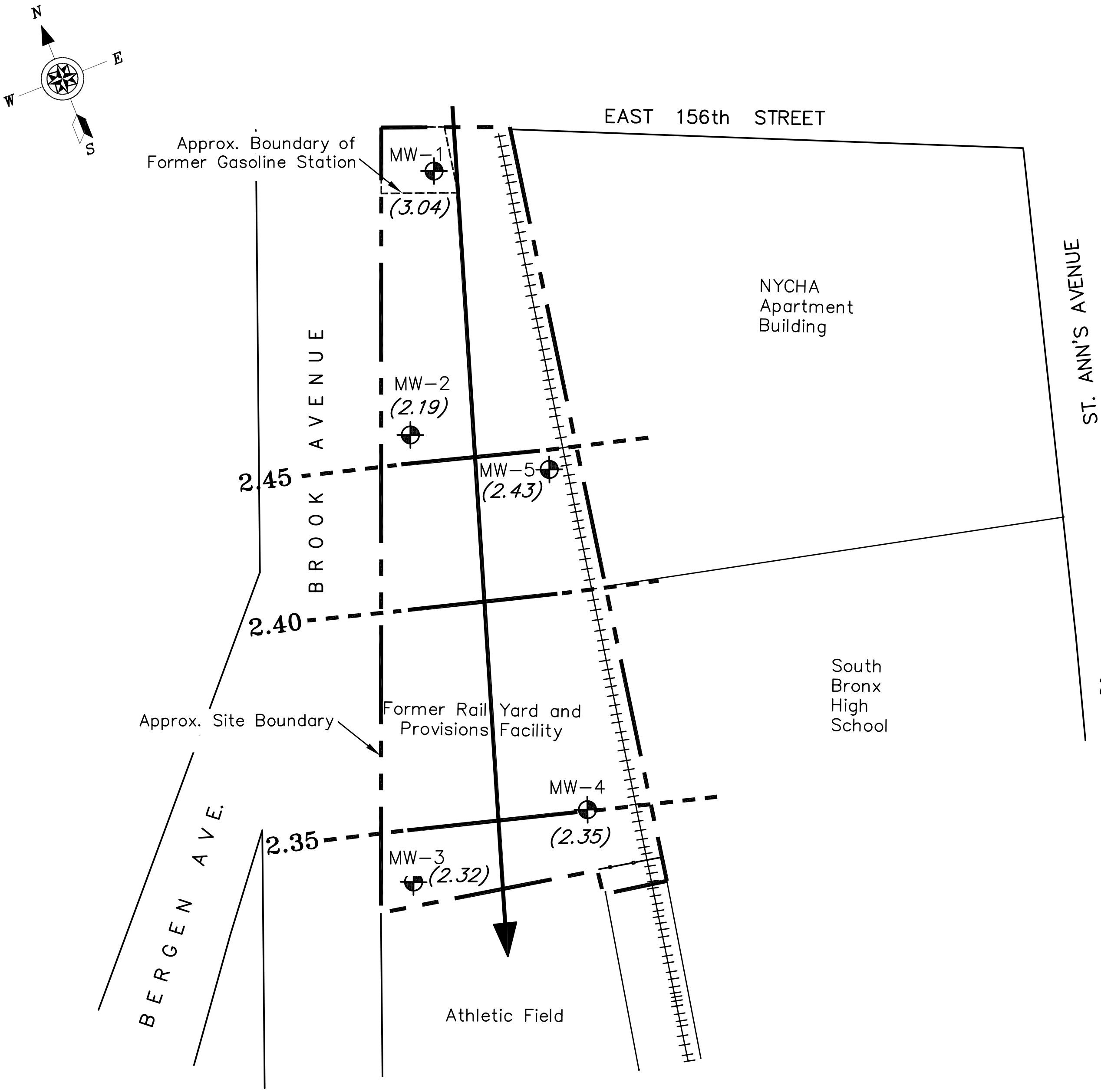
NOTES:

1. MAP ADAPTED FROM DDC TOPOGRAPHICAL AND PROPERTY LINE MAP 8-17-06 AND MONTROSE SURVEY DATED 10-8-07

CA RICH CONSULTANTS, INC.
Certified Ground-Water and Environmental Specialists
17 Dupont Street, PLainview, New York 11803

SITE ELEVATION MAP

DATE: 3-2-09
SCALE: AS SHOWN
FIGURE: 3
DRAWING NO: SP w/Elev.
TITLE: VIA VERDE
NEW HOUSING NEW YORK LEGACY
700-730 BROOK AVENUE
BRONX, NEW YORK
DRAWN BY: D.S.
APPR. BY: R.J.I.



WELL ID	Depth to Water	Top Of Casing Elevation	Well Elevation
MW-1	21.73	24.77	3.04
MW-2	19.79	21.98	2.19
MW-3	9.32	11.64	2.32
MW-4	4.89	7.24	2.35
MW-5	4.88	7.31	2.43

LEGEND

MW-1 — GROUNDWATER MONITORING WELL LOCATION and DESIGNATION

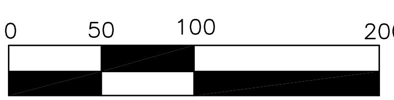
(2.19) — GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL

2.45 — GROUNDWATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL (DASHED WHERE INFERRED)

GENERAL DIRECTION OF GROUNDWATER FLOW

ABANDONED RR SPUR

FENCE



GRAPHIC SCALE IN FEET

Contour Interval 0.05 Feet

NOTES:

1. MAP ADAPTED FROM DDC TOPOGRAPHICAL AND PROPERTY LINE MAP 8-17-06 AND MONTROSE SURVEY DATED 10-8-07

2. MW-2 DATA NOT USED IN GENERATING CONTOUR MAP.

CA RICH CONSULTANTS, INC.

Certified Groundwater and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

Groundwater Elevation Contour Map
February 12, 2009

DATE: 3/25/2009

SCALE: AS SHOWN

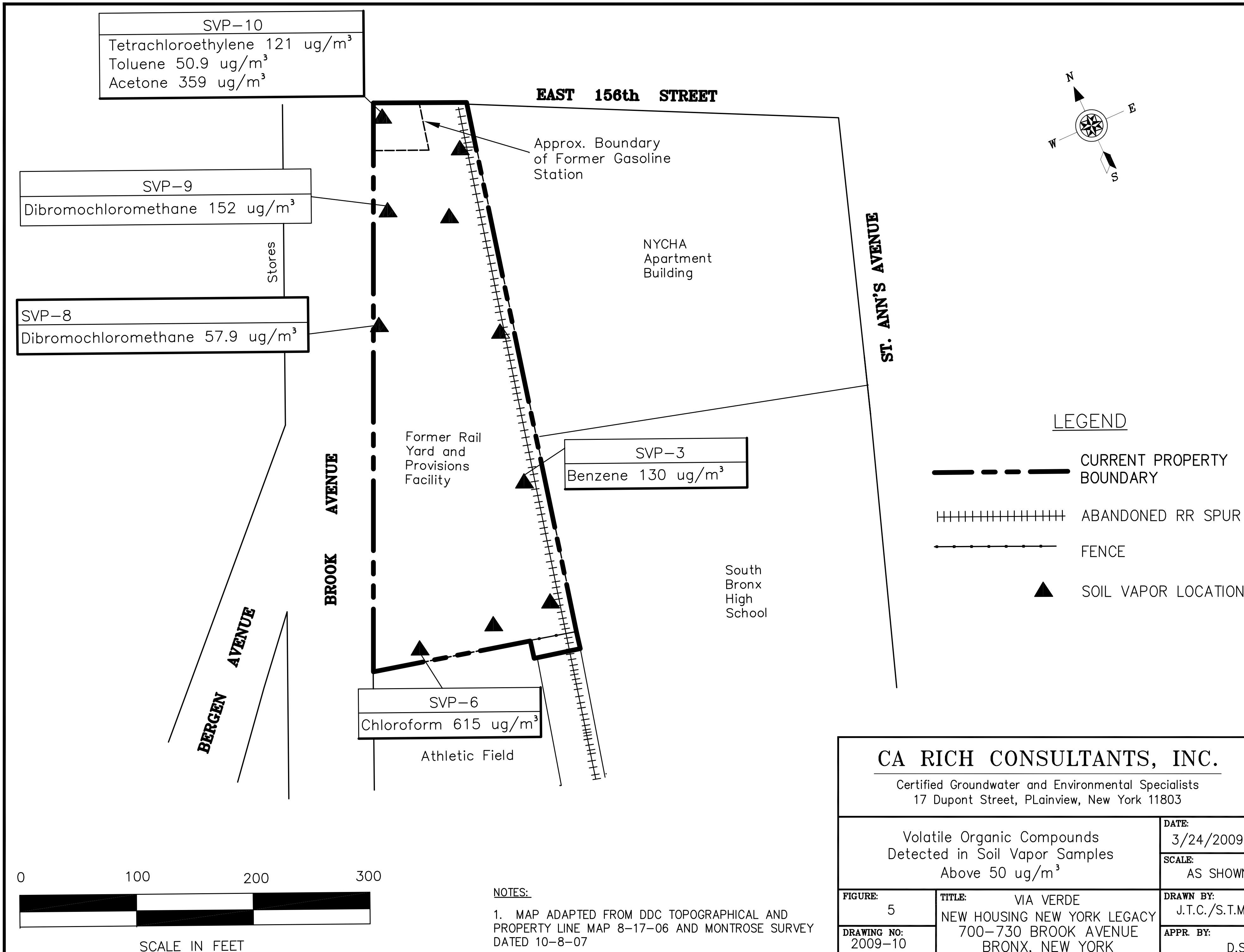
FIGURE: 4

DRAWING NO: 2009-9

TITLE: VIA VERDE
NEW HOUSING NEW YORK LEGACY
700-730 BROOK AVENUE
BRONX, NEW YORK

DRAWN BY: J.T.C./S.T.M.

APPR. BY: D.S.



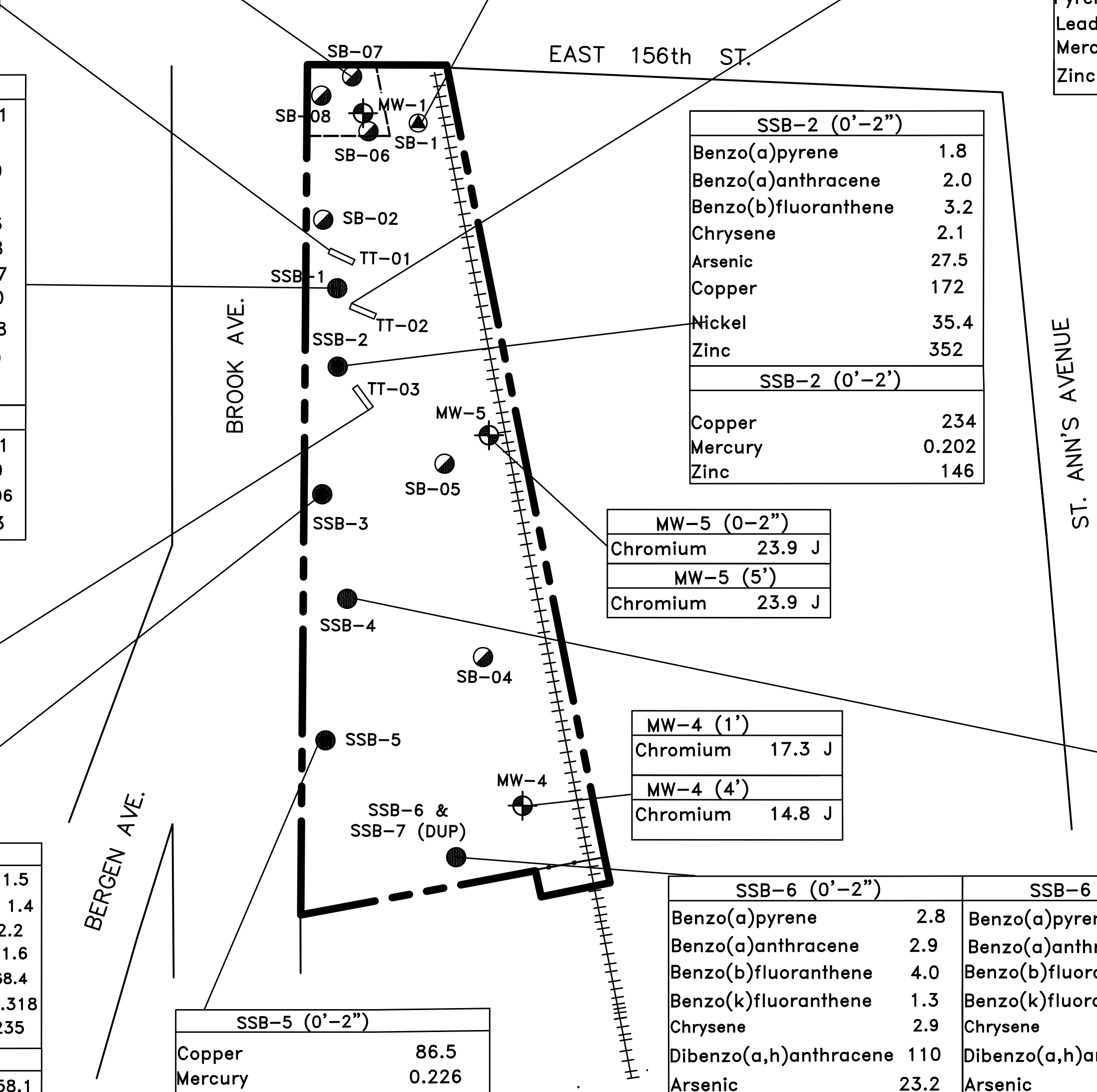
NOTES:

1. MAP ADAPTED FROM DDC TOPOGRAPHICAL AND PROPERTY LINE MAP 8-17-06 AND MONTROSE SURVEY DATED 10-8-07

CA RICH CONSULTANTS, INC.
Certified Groundwater and Environmental Specialists
17 Dupont Street, PLainview, New York 11803

Volatile Organic Compounds Detected in Soil Vapor Samples Above 50 ug/m³

DATE: 3/24/2009
SCALE: AS SHOWN
FIGURE: 5
DRAWING NO: 2009-10
TITLE: VIA VERDE NEW HOUSING NEW YORK LEGACY 700-730 BROOK AVENUE BRONX, NEW YORK
DRAWN BY: J.T.C./S.T.M.
APPR. BY: D.S.



TT-01	
Benzo(a)pyrene	45
Benzo(a)anthracene	53
Benzo(b)fluoranthene	59
Benzo(k)fluoranthene	20
Chrysene	45
Dibenzo(a,h)anthracene	6.9
Fluoranthene	110
Indeno(1,2,3-cd)pyrene	22
Barium	740
Mercury	0.53
Zinc	570

SB-07 (19'-21')	
Acetone	1
Zinc	120
SB-07 (23'-25')	
Dibenz(a,h)anthracene	0.046

SB-1 (1')	
Chromium	15.2 J
SB-1 (2-4')	
Chromium	23.5 J

TT-02	
Benzo(a)pyrene	92
Benzo(a)anthracene	120
Benzo(b)fluoranthene	120
Benzo(k)fluoranthene	39
Chrysene	97
Dibenzo(a,h)anthracene	14
Fluoranthene	240
Indeno(1,2,3-cd)pyrene	42
Naphthalene	14
Phenanthrene	210
Pyrene	210
Lead	590
Mercury	0.33
Zinc	500

SSB-1 (0'-2")	
Benzo(a)pyrene	1.1
Benzo(a)anthracene	1.1
Benzo(b)fluoranthene	1.9
Benzo(k)fluoranthene	20
Chrysene	1.3
Arsenic	24.8
Copper	167
Lead	6,290
Mercury	0.248
Nickel	43.9
Zinc	465
SSB-1 (0'-2')	
Benzo(a)pyrene	1.1
Benzo(b)fluoranthene	1.9
Copper	106
Zinc	113

SSB-2 (0'-2")	
Benzo(a)pyrene	1.8
Benzo(a)anthracene	2.0
Benzo(b)fluoranthene	3.2
Chrysene	2.1
Arsenic	27.5
Copper	172
Nickel	35.4
Zinc	352
SSB-2 (0'-2')	
Copper	234
Mercury	0.202
Zinc	146

MW-5 (0-2")	
Chromium	23.9 J
MW-5 (5')	
Chromium	23.9 J

TT-03	
Benzo(a)pyrene	49
Benzo(a)anthracene	55
Benzo(b)fluoranthene	60
Benzo(k)fluoranthene	25
Chrysene	50
Dibenzo(a,h)anthracene	7.8
Fluoranthene	110
Indeno(1,2,3-cd)pyrene	24
Barium	660
Mercury	0.51
Zinc	590

SSB-4 (0'-2")	
Benzo(b)fluoranthene	1.6
Chrysene	1.1
Copper	55.6
Mercury	0.247
Zinc	232
SSB-04 (0'-2')	
Zinc	198

MW-4 (1')	
Chromium	17.3 J
MW-4 (4')	
Chromium	14.8 J

SSB-3 (0'-2")	
Benzo(a)pyrene	1.5
Benzo(a)anthracene	1.4
Benzo(b)fluoranthene	2.2
Chrysene	1.6
Copper	68.4
Mercury	0.318
Zinc	235
SSB-3 (0'-2')	
Copper	58.1
Zinc	166

SSB-5 (0'-2")	
Copper	86.5
Mercury	0.226
Zinc	296
SSB-5 (0'-2')	
Benzo(a)pyrene	1.9
Benzo(a)anthracene	1.9
Benzo(b)fluoranthene	2.5
Chrysene	1.8
Copper	90.9
Mercury	0.223
Zinc	353.0

SSB-6 (0'-2")		SSB-6 & 7 (0'-2')	
Benzo(a)pyrene	2.8	Benzo(a)pyrene	5.0
Benzo(a)anthracene	2.9	Benzo(a)anthracene	6.0
Benzo(b)fluoranthene	4.0	Benzo(b)fluoranthene	6.6
Benzo(k)fluoranthene	1.3	Benzo(k)fluoranthene	2.8
Chrysene	2.9	Chrysene	5.6
Dibenzo(a,h)anthracene	110	Dibenzo(a,h)anthracene	63
Arsenic	23.2	Arsenic	15.4
Chromium	54.6	Chromium	66.7
Copper	125	Copper	112
Mercury	0.226	Mercury	0.478
Zinc	396	Zinc	313

LEGEND

CURRENT PROPERTY BOUNDARY

ABANDONED RR SPUR

FENCE

SSB-5 SOIL BORING FROM SUPPLEMENTAL SITE INVESTIGATION (APRIL 2007)

SB-1 SOIL BORING FROM SITE CHARACTERIZATION (SEPT. 2006)

SOIL BORING FROM REMEDIAL INVESTIGATION (APRIL 2009)

TEST PIT (SEPT. 2006)

GROUNDWATER MONITORING WELL LOCATION (APRIL 2009)

ALL CONCENTRATIONS ARE SHOWN IN PARTS PER MILLION

0 50 100 200

GRAPHIC SCALE IN FEET

NOTES:

1. ALL CONCENTRATIONS ARE REPORTED IN PARTS PER MILLION
2. MAP ADAPTED FROM DDC TOPOGRAPHICAL AND PROPERTY LINE MAP 8-17-06 AND MONTROSE SURVEY DATED 10-8-07
3. ONLY COMPOUNDS ABOVE 6 NYCRR PART 375 UNRESTRICTED USE SCOs OR EASTERN USA BACKGROUND LEVELS ARE SHOWN.

CA RICH CONSULTANTS, INC.

Certified Groundwater and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

Soil Concentrations Above 6 NYCRR Part 375 Unrestricted Use SCOS

DATE: 4/16/09

SCALE: AS SHOWN

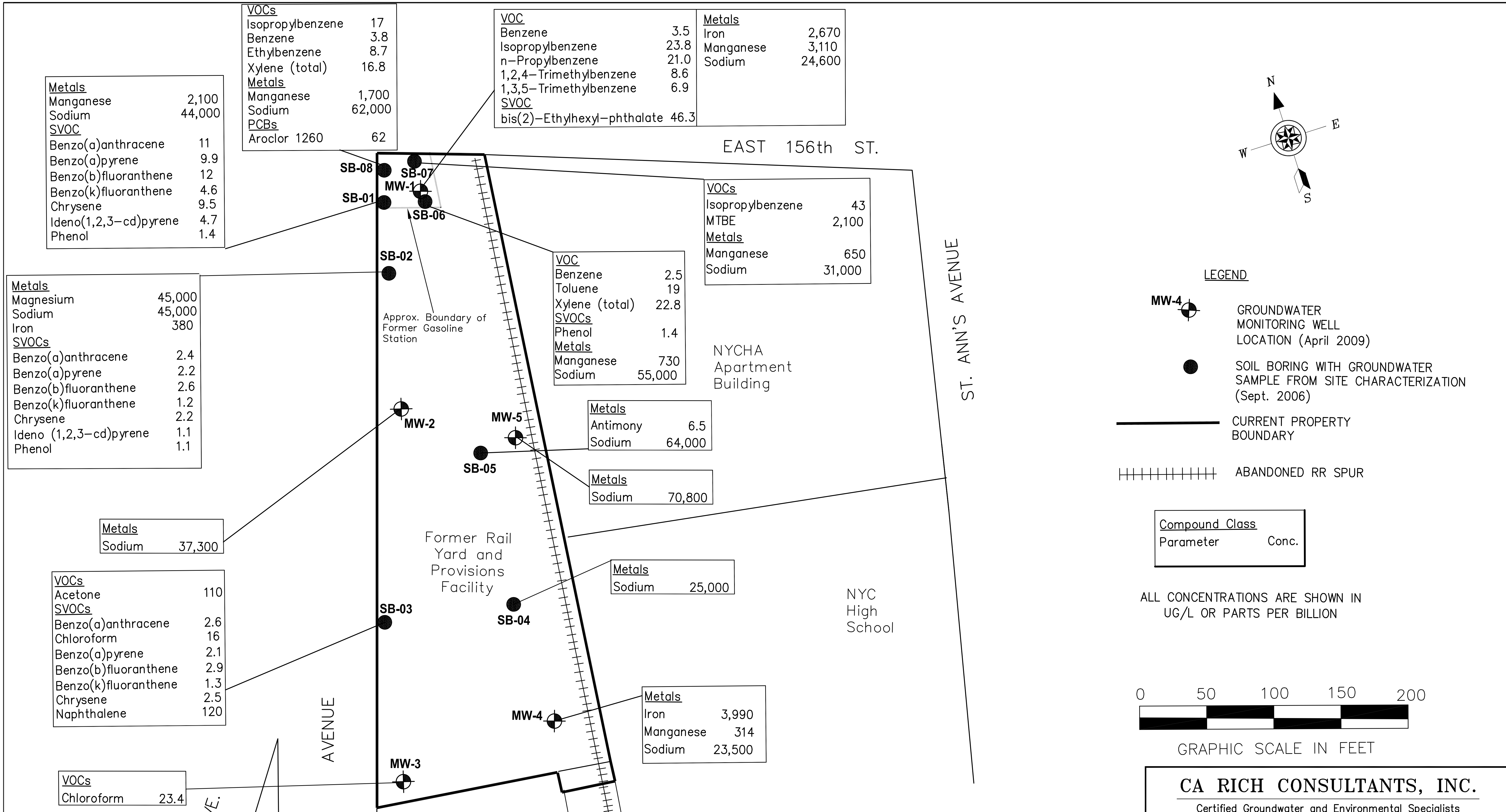
FIGURE: 6

DRAWING NO: 2009-22

TITLE: VIA VERDE NEW HOUSING NEW YORK LEGACY 700-730 BROOK AVENUE BRONX, NEW YORK

DRAWN BY: J.T.C./S.T.M.

APPR. BY: D.S.

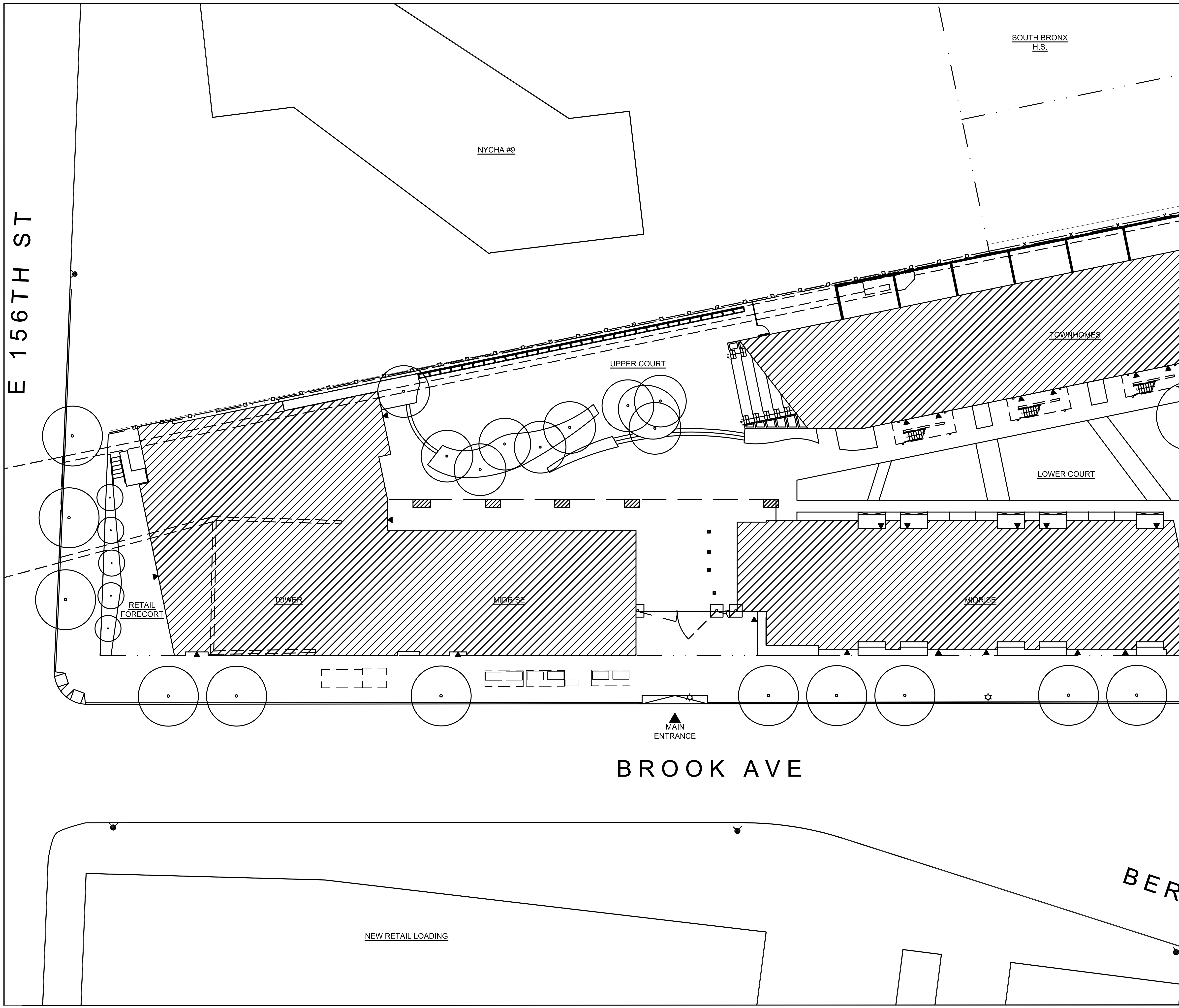


NOTES:

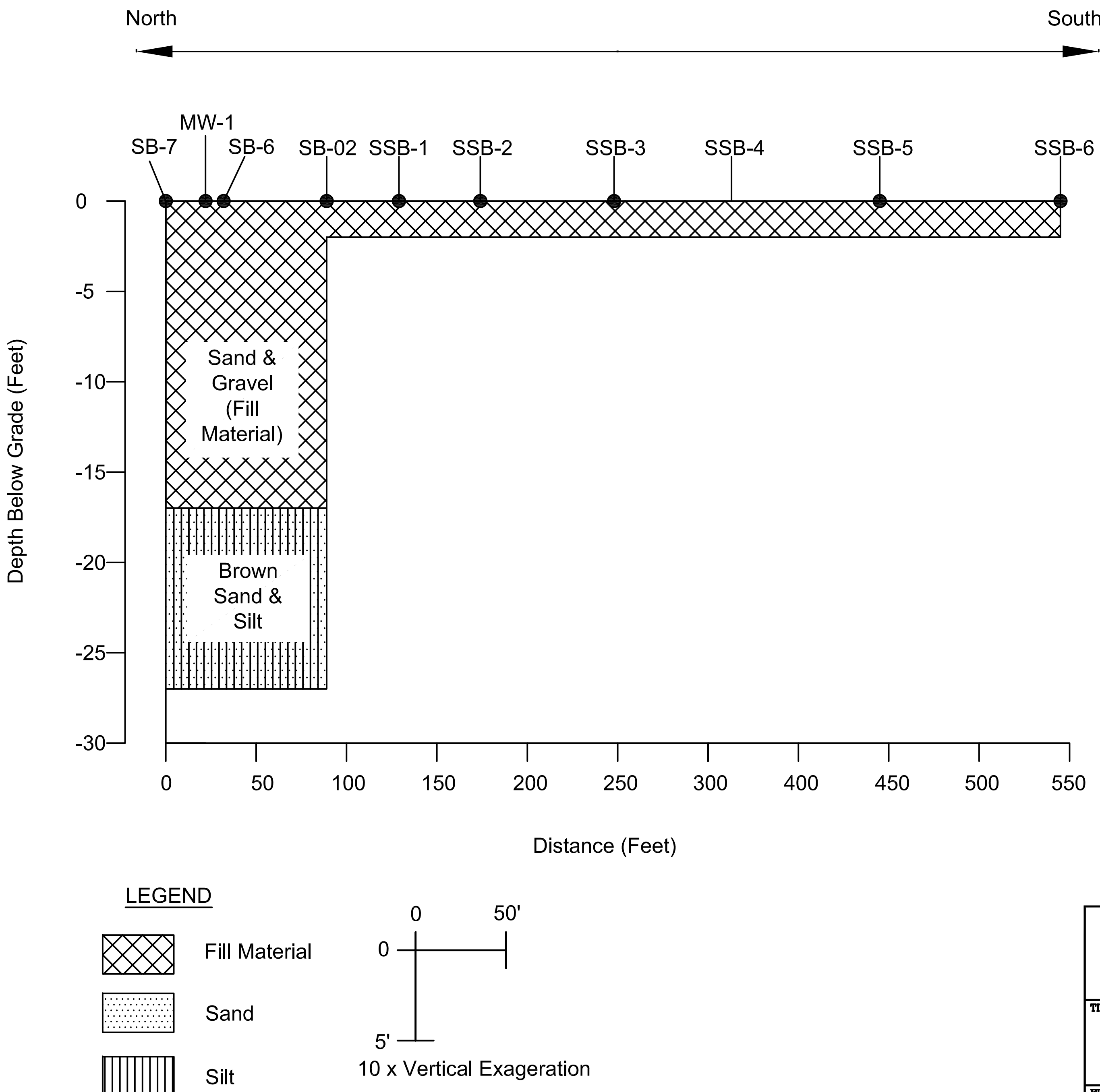
1. MAP ADAPTED FROM DDC TOPOGRAPHICAL AND PROPERTY LINE MAP 8-17-06 AND MONTROSE SURVEY DATED 10-8-07, AND FIGURE 4 FROM URS CHARACTERIZATION AND DATA SUMMARY REPORT DATED SEPTEMBER 2006.
2. ALL CONCENTRATIONS IN ug/L.
3. A DUPLICATE SAMPLE OF MW-1, MW-X, WAS ANALYZED AS WELL. THE HIGHER CONCENTRATION FROM MW-1 AND MW-X WAS USED.

CA RICH CONSULTANTS, INC.
Certified Groundwater and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

TITLE: Groundwater Concentrations Above NYSDEC TOGS		DATE: 3/26/2009
		SCALE: AS SHOWN
FIGURE: 7	Via Verde New Housing New York Legacy 700-730 Brook Avenue Bronx, New York	DRAWN BY: J.T.C./S.T.M.
DRAWING NO: 2009-11		APPR. BY: D.S.



CA RICH CONSULTANTS, INC. Certified Ground-Water and Environmental Specialists 17 Dupont Street, Plainview, New York 11803	
TITLE: Architectural Site Plan	DATE: 6/25/2009 SCALE: AS SHOWN
FIGURE: 8 DRAWING NO: 2009-33 — Via Verde New Housing New York Legacy 700-730 Brook Avenue Bronx, New York	DRAWN BY: J.T.C. APPR. BY: D.S.



Note:

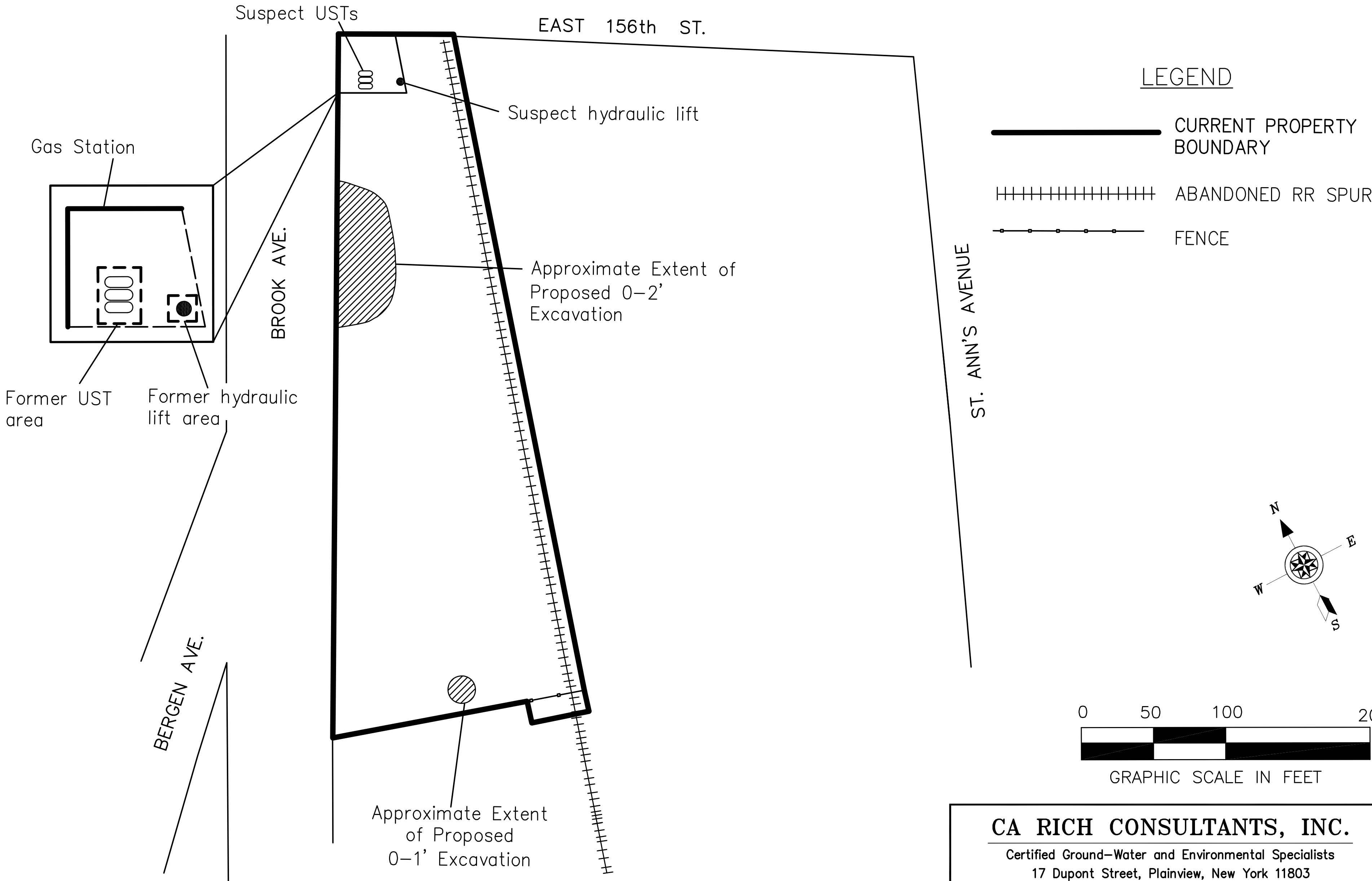
Geologic section data obtained from CA Rich and URS Reports (2009 & 2007).

According to Pillori Associates Geothechnical Borings (2007) the depth to bedrock ranges from 23 to 40 feet below grade (depending on elevation of sloping sidewalk).

CA RICH CONSULTANTS, INC.

Certified Ground–Water and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

TITLE: Geologic Cross–Section		DATE: 6/11/2009
		SCALE: As Shown
FIGURE: 9	Via Verde New Housing New York Legacy 700–730 Brook Avenue Bronx, New York	DRAWN BY: J.T.C.
DRAWING NO: 2009–32		APPR. BY: D.S.

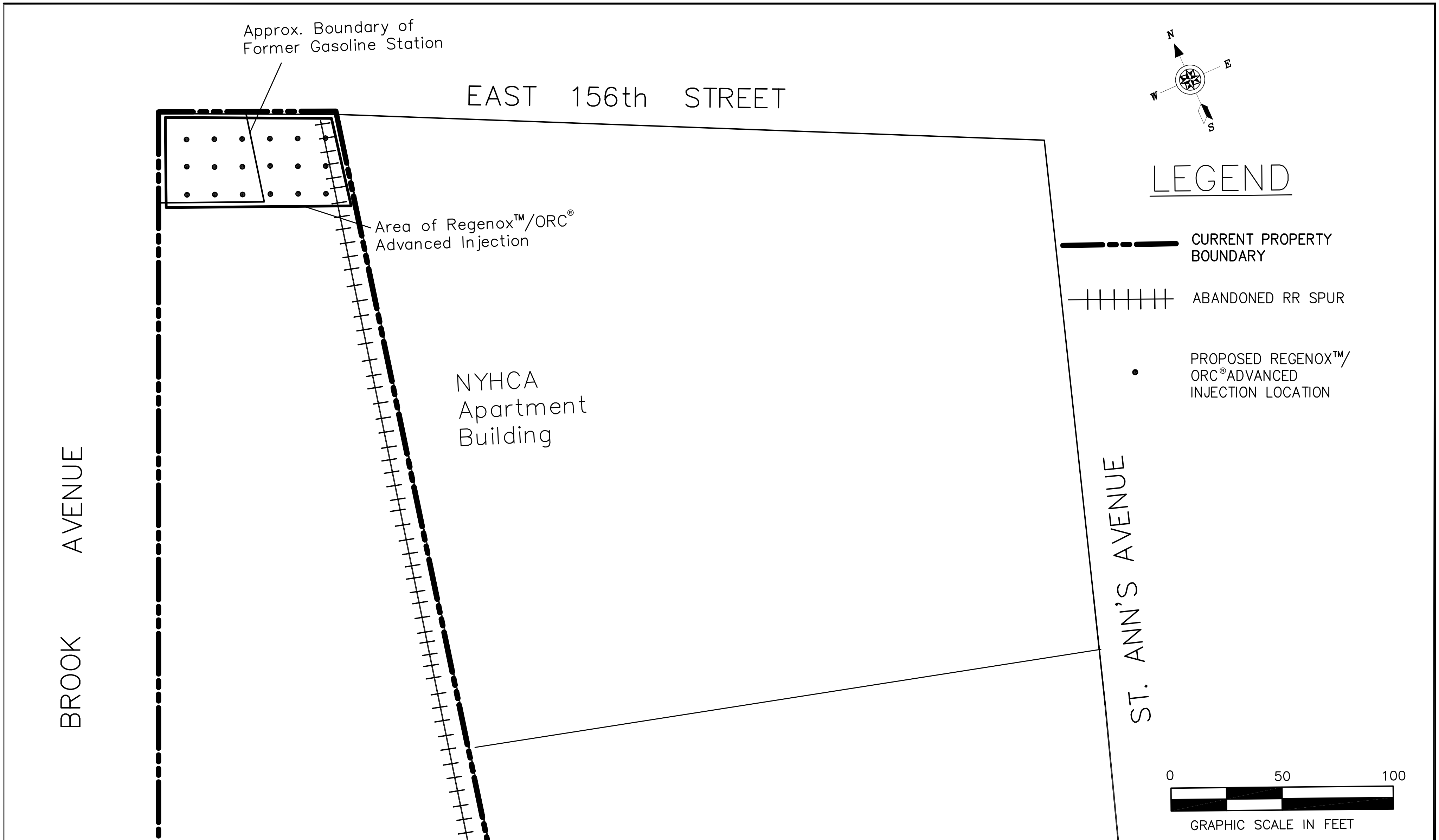


CA RICH CONSULTANTS, INC.
Certified Ground-Water and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

TITLE: Proposed Soil Excavation		DATE: 4/16/2009
		SCALE: As Shown
FIGURE: 10	VIA VERDE NEW HOUSING NEW YORK LEGACY 700–730 BROOK AVENUE BRONX, NEW YORK	DRAWN BY: J.T.C.
DRAWING NO: 2009-23		APPR. BY: D.S.

NOTES:

1. MAP ADAPTED FROM DDC TOPOGRAPHICAL AND PROPERTY LINE MAP 8-17-06 AND MONTROSE SURVEY DATED 10-8-07



NOTES:

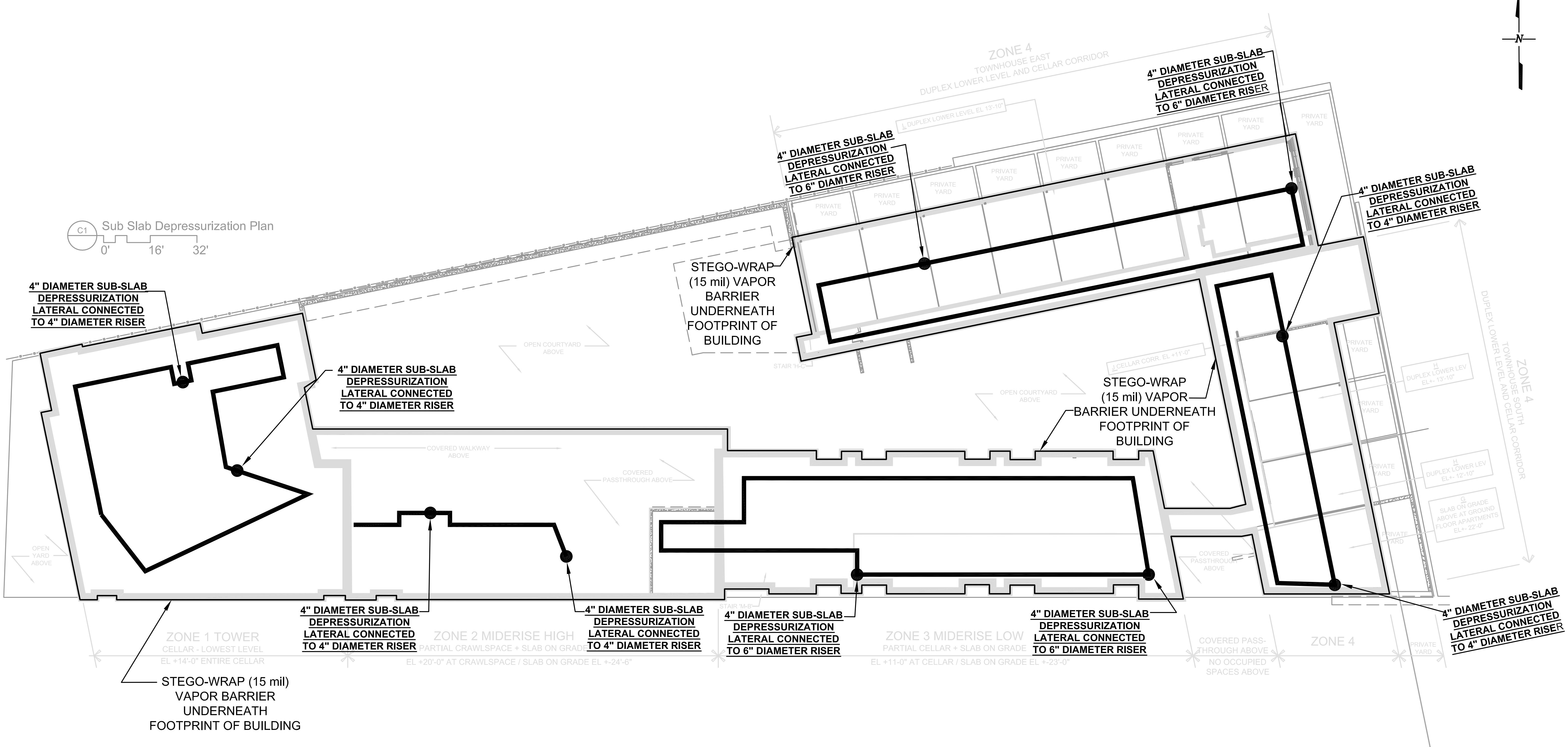
1. MAP ADAPTED FROM DDC TOPOGRAPHICAL AND PROPERTY LINE MAP 8-17-06 AND MONTROSE SURVEY DATED 10-8-07

CA RICH CONSULTANTS, INC.

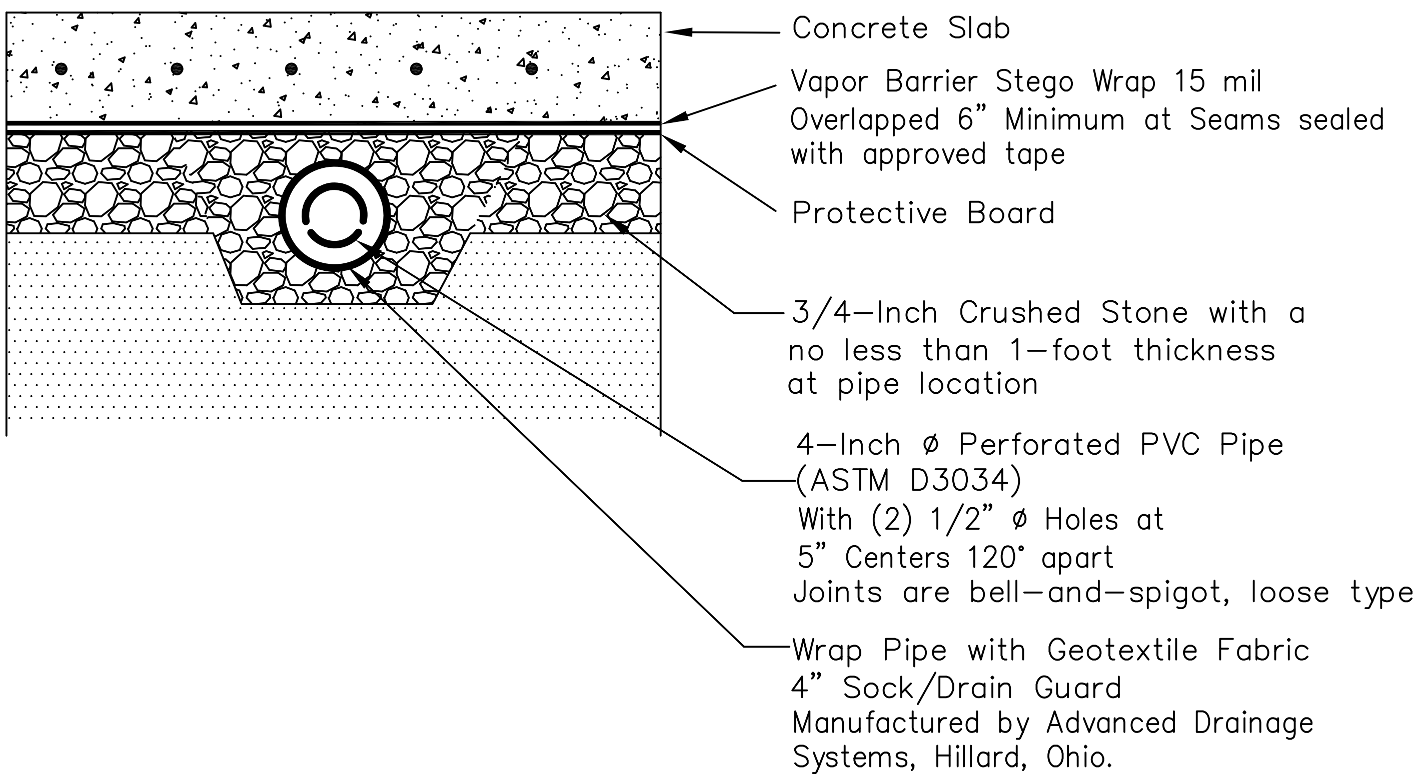
Certified Groundwater and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

TITLE: Proposed Regenox™/ORC® Advanced Injection Locations	DATE: 4/10/2009
	SCALE: As Shown
FIGURE: 11	DRAWN BY: J.T.C./S.T.M.
DRAWING NO: 2009-25	APPR. BY: D.S.

VIA VERDE
NEW HOUSING NEW YORK LEGACY
700-730 BROOK AVENUE
BRONX, NEW YORK



CA RICH CONSULTANTS, INC. Certified Ground-Water and Environmental Specialists 17 Dupont Street, Plainview, New York 11803	
TITLE: Sub-Slab Depressurization System and Vapor Barrier Layout	**DATE:** 5/1/2009 **SCALE:** AS SHOWN
FIGURE: 12 **DRAWING NO:** 2009-30 — Via Verde New Housing New York Legacy 700-730 Brook Avenue Bronx, New York	**DRAWN BY:** J.T.C. **APPR. BY:** D.S.



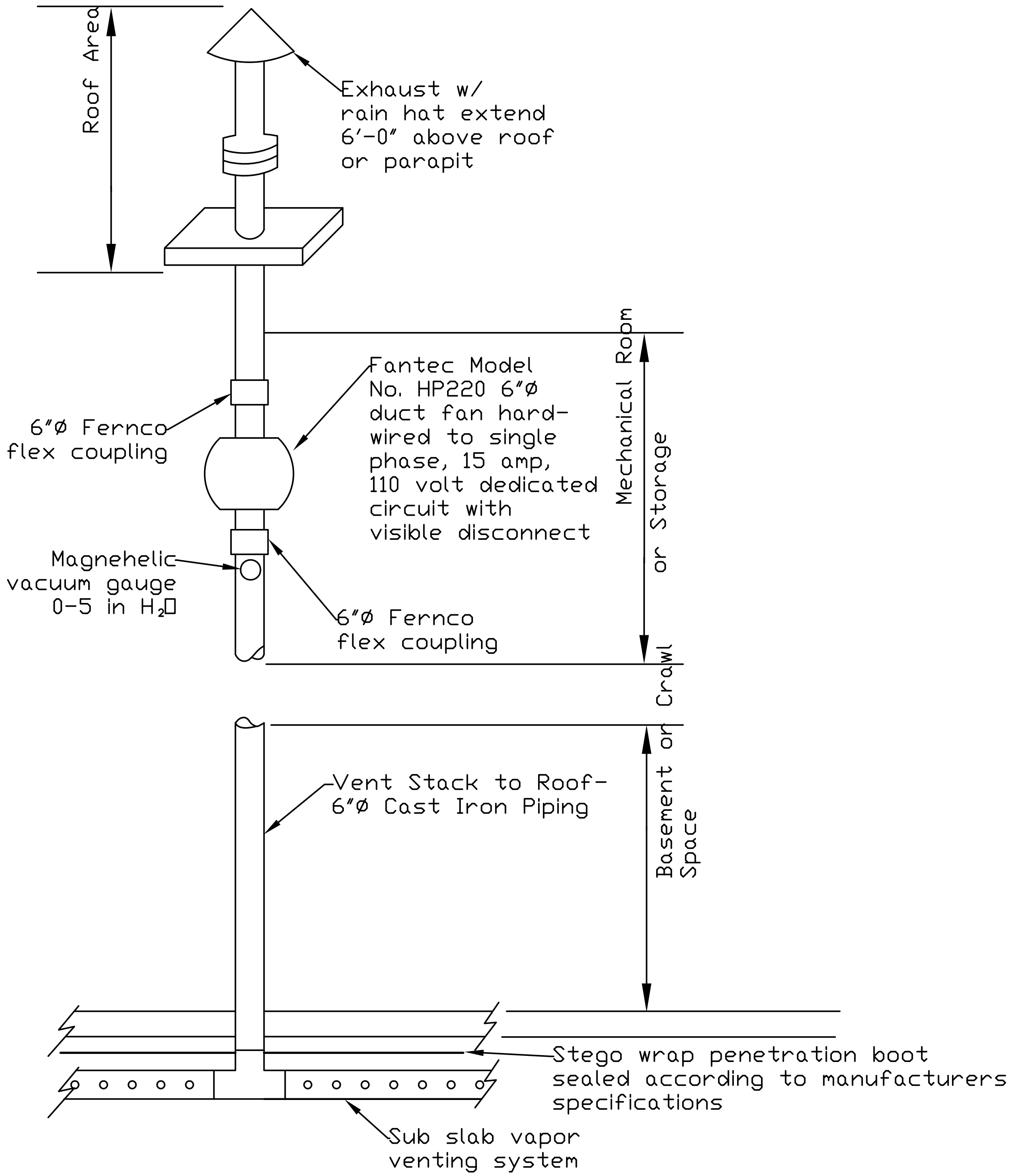
CA RICH CONSULTANTS, INC.

Certified Ground-Water and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

Stephen J. Osmundsen, P.E.

Consulting Engineer
514 Pantigo Road #16, East Hampton, New York 11937

TITLE: Typical Vent Pipe Cross-Section		DATE: 10/26/09
		SCALE: Not to Scale
FIGURE: 13	Via Verde New Housing New York Legacy 700-730 Brook Avenue Bronx, New York	DRAWN BY: J.T.C.
DRAWING NO: 2009-28A		APPR. BY: S.J.O.



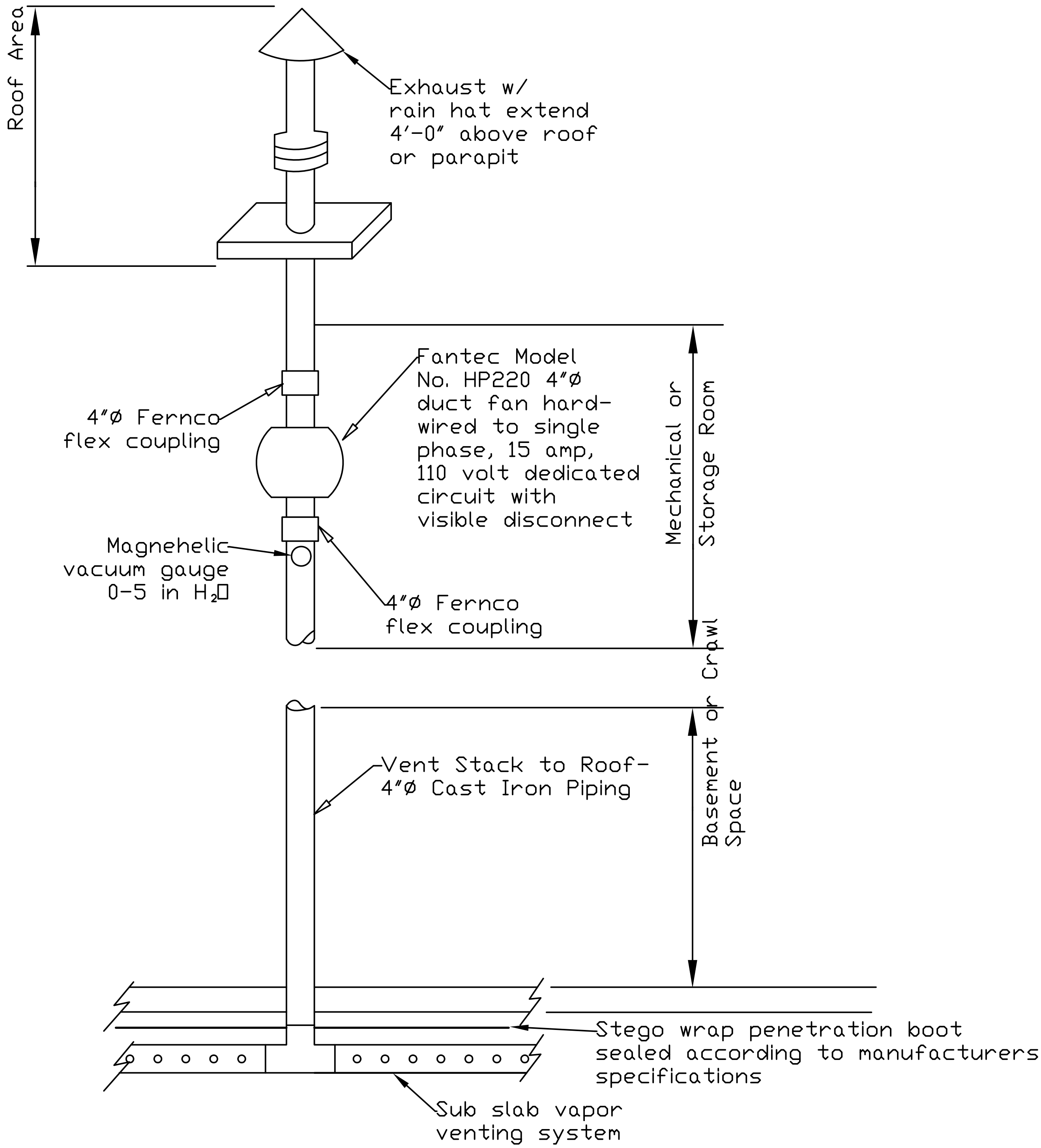
CA RICH CONSULTANTS, INC.

Certified Ground-Water and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

Stephen J. Osmundsen

Consulting Engineer
514 Pantigo Road # 16 East Hampton, New York 11937

TITLE: Piping Details of SSD Fan and Vent With 6" Diameter Riser		DATE: 5/29/2009
		SCALE: N.T.S.
FIGURE: 13A	Via Verde New Housing New York Legacy 700-730 Brook Avenue Bronx, New York	DRAWN BY: J.T.C.
DRAWING NO: 2009-31		APPR. BY: S.J.O.



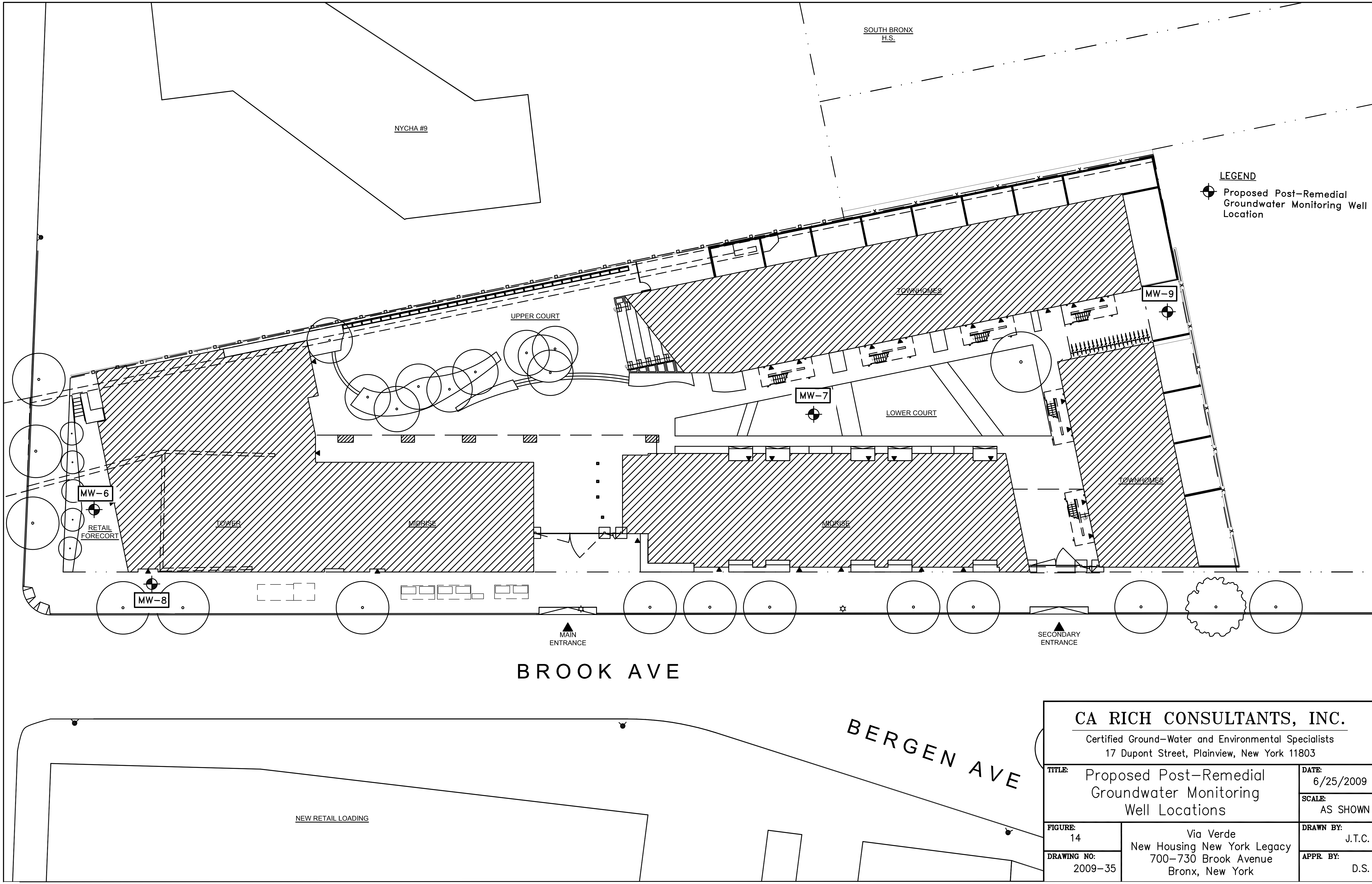
CA RICH CONSULTANTS, INC.

Certified Ground-Water and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

Stephen J. Osmundsen

Consulting Engineer
514 Pantigo Road # 16 East Hampton, New York 11937

TITLE: Piping Details of SSD Fan and Vent with 4" Diameter Riser		DATE: 5/29/2009
		SCALE: N.T.S.
FIGURE: 13B	Via Verde New Housing New York Legacy 700-730 Brook Avenue Bronx, New York	DRAWN BY: J.T.C.
DRAWING NO: 2009-31B		APPR. BY: S.J.O.



CA RICH CONSULTANTS, INC. Certified Ground-Water and Environmental Specialists 17 Dupont Street, Plainview, New York 11803		
TITLE: Proposed Post-Remedial Groundwater Monitoring Well Locations		DATE: 6/25/2009
		SCALE: AS SHOWN
FIGURE: 14	Via Verde New Housing New York Legacy 700-730 Brook Avenue Bronx, New York	DRAWN BY: J.T.C.
DRAWING NO: 2009-35		APPR. BY: D.S.

ORGANIZATIONAL CHART FOR VIA VERDE
AKA NEW HOUSING NEW YORK LEGACY PROJECT
700 — 730 BROOK AVENUE
BRONX, NEW YORK

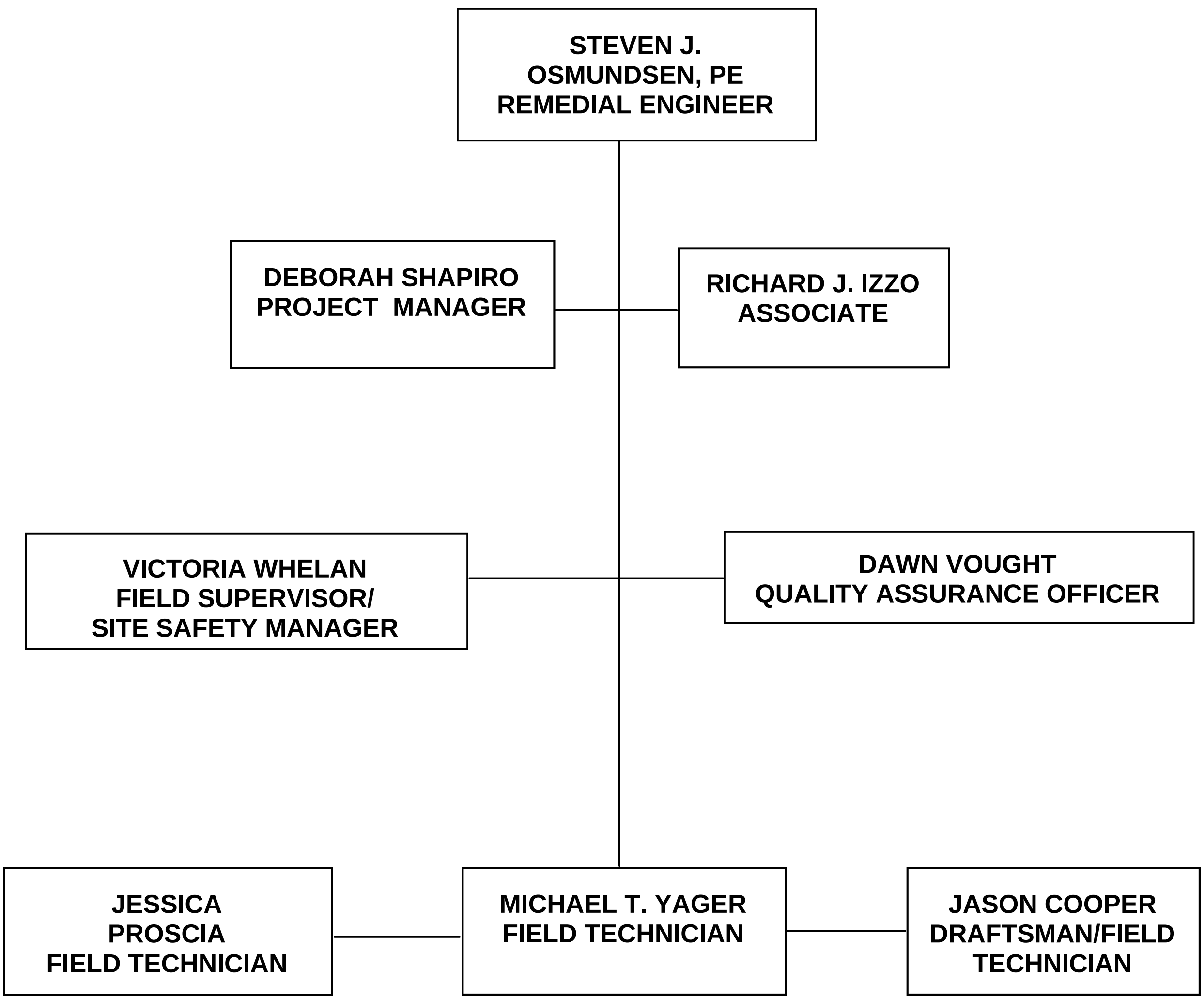
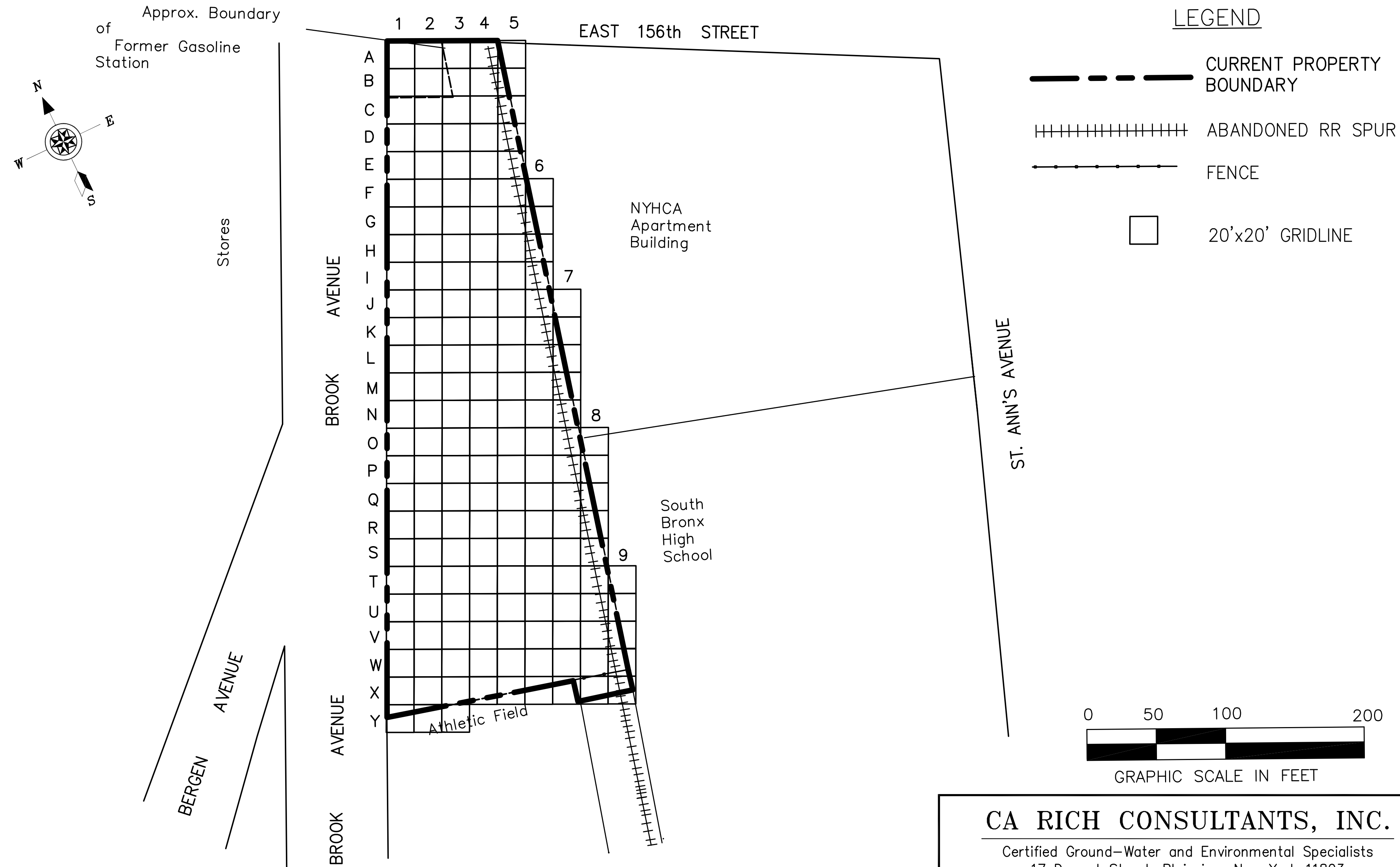


Figure 15



NOTES:

1. MAP ADAPTED FROM DDC TOPOGRAPHICAL AND PROPERTY LINE MAP 8-17-06 AND MONTROSE SURVEY DATED 10-8-07

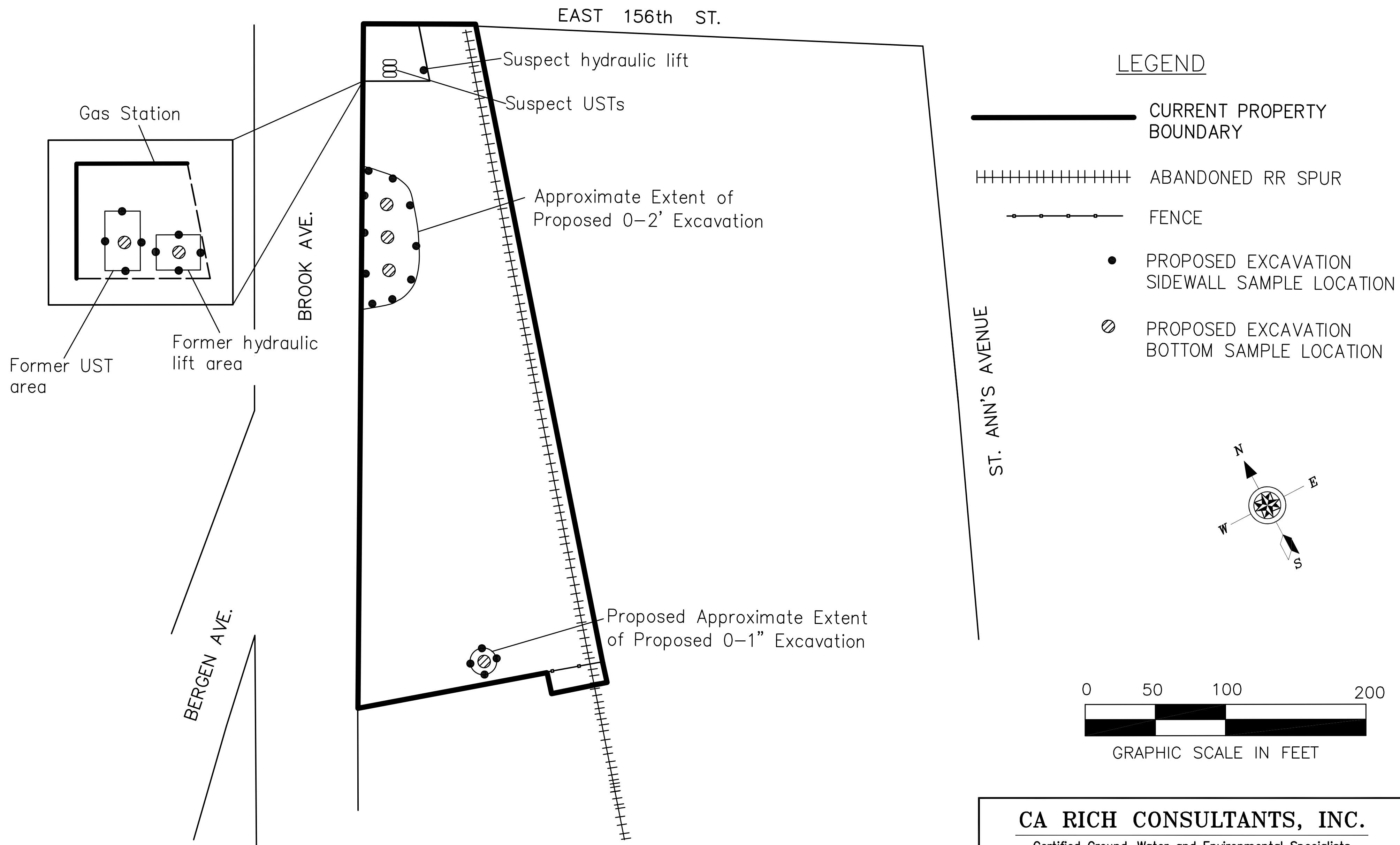
2. ALL GRIDLINES ARE 20'x20' SQUARES; HOWEVER, PART OF THE SQUARES LIE OUTSIDE THE PROPERTY BOUNDARY

CA RICH CONSULTANTS, INC.

Certified Ground-Water and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

Site Plan with Alpha Numeric Grid

FIGURE: 16	TITLE: VIA VERDE NEW HOUSING NEW YORK LEGACY 700-730 BROOK AVENUE BRONX, NEW YORK	DATE: 4/16/09
DRAWING NO: 2009-24		SCALE: AS SHOWN
		DRAWN BY: J.T.C./S.T.M.
		APPR. BY: D.S.

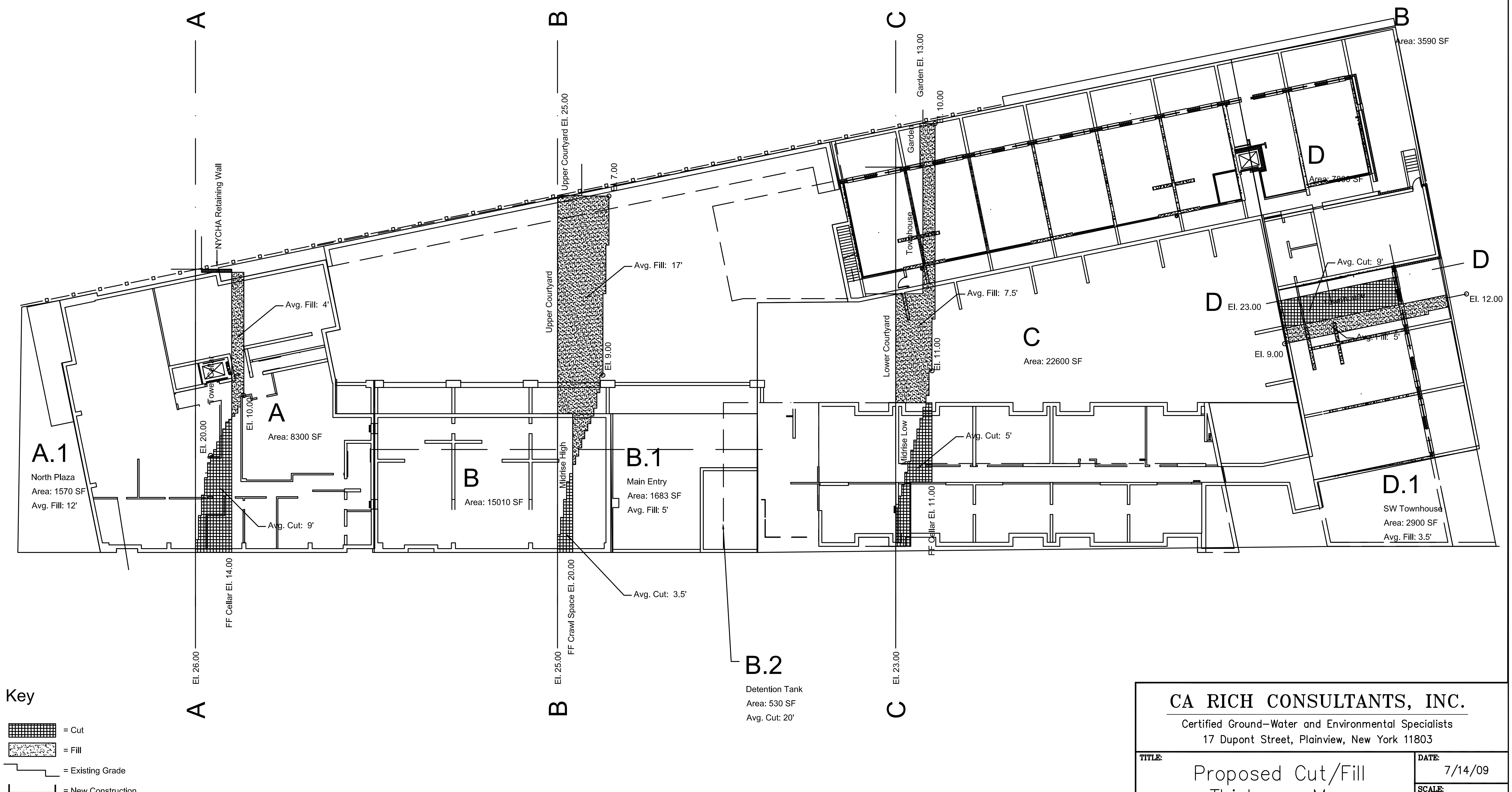


NOTES:

1. MAP ADAPTED FROM DDC TOPOGRAPHICAL AND PROPERTY LINE MAP 8-17-06 AND MONTROSE SURVEY DATED 10-8-07

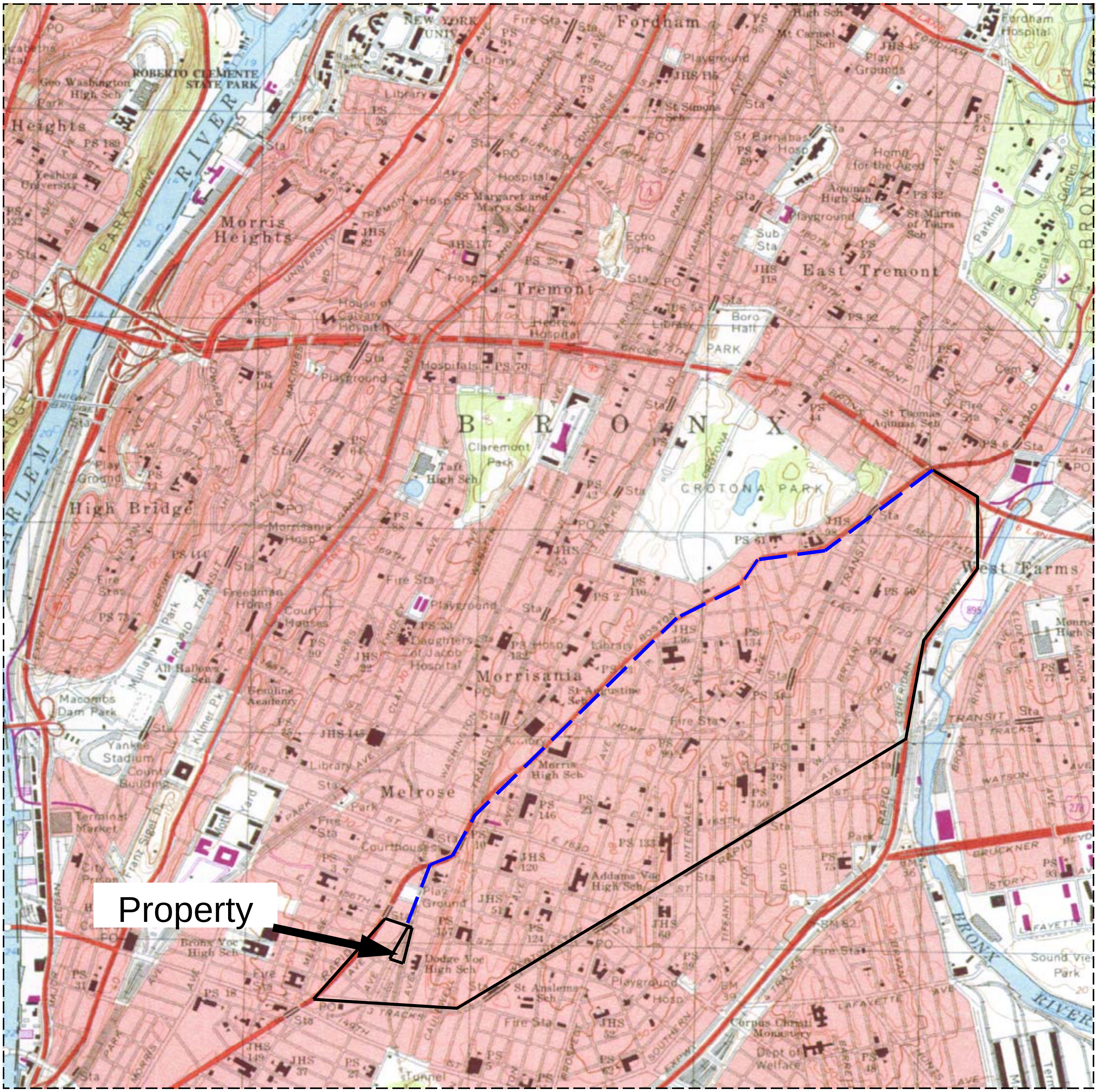
CA RICH CONSULTANTS, INC.
Certified Ground-Water and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

TITLE: Proposed Excavation Endpoint Sample Locations		DATE: 6/25/2009
		SCALE: As Shown
FIGURE: 17	VIA VERDE NEW HOUSING NEW YORK LEGACY 700-730 BROOK AVENUE BRONX, NEW YORK	DRAWN BY: J.T.C.
DRAWING NO: 2009-26		APPR. BY: D.S.



CA RICH CONSULTANTS, INC.
Certified Ground-Water and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

TITLE:	Proposed Cut/Fill Thickness Map	DATE: 7/14/09
		SCALE: AS SHOWN
FIGURE: 18	Via Verde New Housing New York Legacy 700-730 Brook Avenue Bronx, New York	DRAWN BY: J.T.C.
DRAWING NO: 2009-37A		APPR. BY: D.S.



ALTERNATE TRUCK ROUTE 1

ALTERNATE TRUCK ROUTE 2

APPROX. SCALE (ft.)

0 1,200 2,400

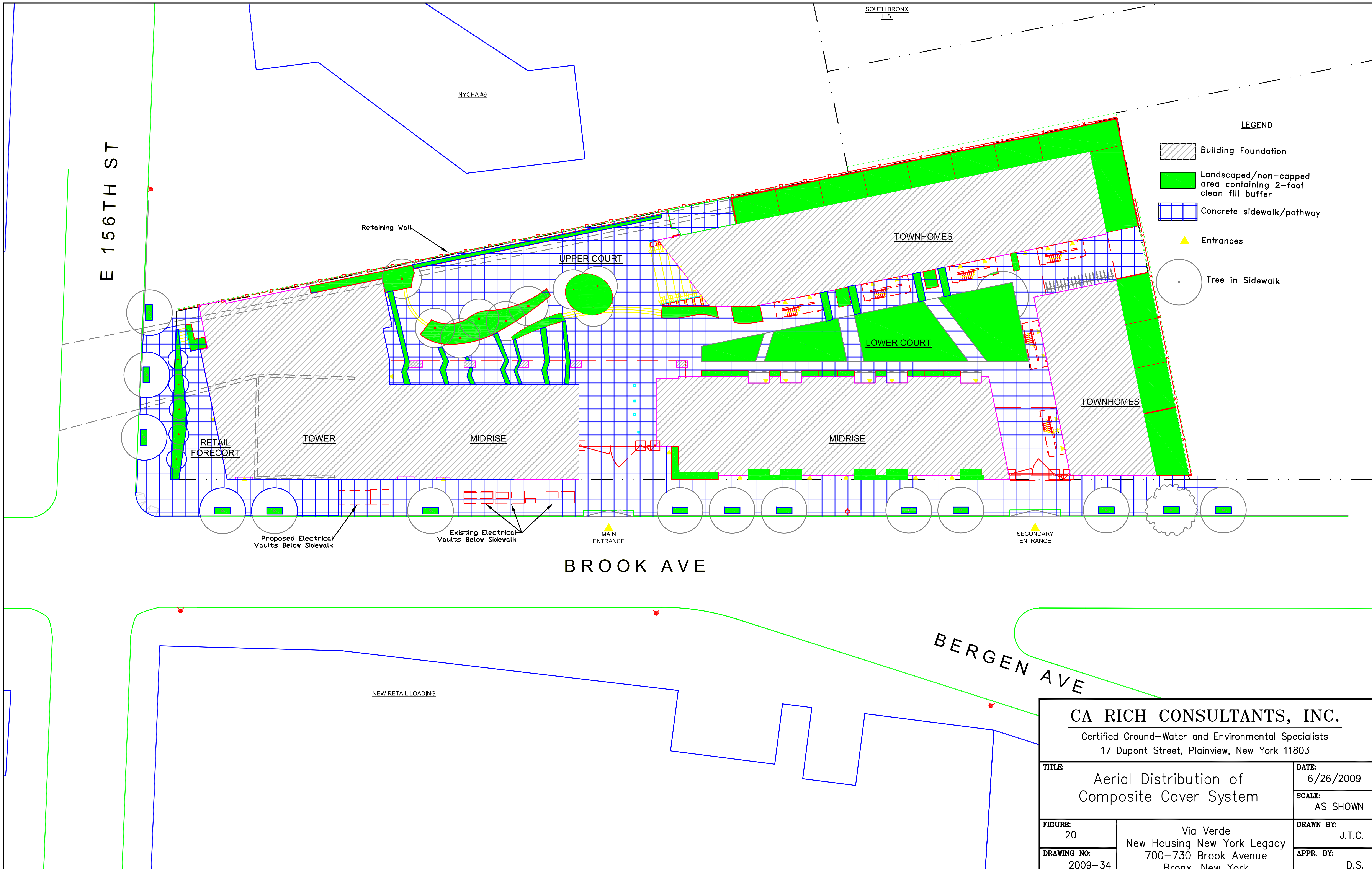
N

Adapted from USGS 1995 Central Park Quadrangle Map.

CA RICH CONSULTANTS, INC.

Certified Ground Water and Environmental Specialists
17 Dupont Street, Plainview, NY 11803

TITLE: **TRUCK ROUTE MAP**		DATE: 06/15/09 SCALE: AS SHOWN
FIGURE: 19 DRAWING:	Via Verde New Housing New York Legacy 700-730 Brook Avenue Bronx, New York	DRAWN BY: D.S. APPR. BY: RJI



CA RICH CONSULTANTS, INC.

Certified Ground-Water and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

TITLE: Aerial Distribution of Composite Cover System	DATE: 6/26/2009
	SCALE: AS SHOWN
FIGURE: 20	DRAWN BY: J.T.C.
DRAWING NO: 2009-34	APPR. BY: D.S.

Via Verde
New Housing New York Legacy
700-730 Brook Avenue
Bronx, New York

TABLES

Table 1 (page 1 of 2)

Validated Analytical Results of Volatile Organic Compounds In Soil Vapor Samples

Via Verde aka New Housing New York Legacy Project
700-730 Brook Avenue, Bronx, New York
BCP # C203043

Sample ID	SVP-1	SVP-2	SVP-3	SVP-4	SVP-5
Matrix	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor
Date Sampled	2/10/2009	2/10/2009	2/25/2009	2/10/2009	2/10/2009
Volatile Organic Compounds via EPA Method TO-15					
Units	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3
Acetone	4.0	8.1	34.1	12	28.7
1,3-Butadiene	ND	ND	ND	ND	ND
Benzene	ND	1.5 J	130	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND
Bromoethene	ND	ND	ND	ND	ND
Benzyl Chloride	ND	ND	ND	ND	ND
Carbon Disulfide	ND	4.4	2.2	4.0	3.4
Chlorobenzene	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND
3-Chloropropene	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND
Carbon tetrachloride	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	ND	ND
1,1 - Dichloroethane	ND	ND	ND	ND	ND
1,1 - Dichloroethylene	ND	ND	ND	ND	ND
1,2 - Dibromoethane	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND
1,4-Dioxane	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND
trans- 1,2-Dichloroethylene	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND
m-Dichlorobenzene	ND	ND	ND	ND	ND
o-Dichlorobenzene	ND	ND	ND	ND	ND
p-Dichlorobenzene	ND	ND	ND	3.5 J	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND
Ethanol	6.8	7.0	40.5	3.0 J	2.4 J
Ethyl Benzene	ND	1.7 J	ND	ND	ND
Ethyl Acetate	ND	ND	ND	ND	ND
4-Ethyltoluene	ND	ND	ND	ND	ND
Freon 113	ND	ND	ND	ND	ND
Freon 114	ND	ND	ND	ND	ND
Heptane	ND	ND	0.68	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND
Hexane	ND	ND	ND	ND	2.2 J
2-Hexanone	ND	ND	1.8	ND	ND
Isopropyl Alcohol	ND	ND	3.2	ND	ND
Methylene chloride	ND	ND	ND	ND	2.4 J
Methyl ethyl ketone	ND	ND	5.6	ND	ND
Methyl Isobutyl Ketone	ND	ND	ND	ND	ND
Methyl Tert Butyl Ether	ND	ND	ND	ND	ND
Propylene	ND	ND	10.8	ND	ND
Styrene	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND
2,2,4-Trimethipentane	7.0	8.9	ND	5.1	4.5
Tertiary Butyl Alcohol	ND	ND	1.4	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND
Tetrahydrofuran	ND	ND	3.5	ND	ND
Toluene	17	18	ND	22	4.5
Trichloroethylene	ND	2.3 J	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	3.4 J	ND
Vinyl Chloride	ND	ND	ND	ND	ND
Vinyl Acetate	ND	ND	ND	ND	ND
m,p-Xylene	4.0	4.2	ND	3.7	ND
o-Xylene	ND	ND	ND	ND	ND
Xylenes (total)	4.0	4.2	ND	3.7	ND

Notes:
All concentrations are shown in ug/m^3-micrograms per cubic meter
All samples collected over 2 hour period
J - Indicates an etimated value
ND - Not detected at or above reporting limits

Table 1 (page 2 of 2)

Validated Analytical Results of Volatile Organic Compounds In Soil Vapor Samples

Via Verde aka New Housing New York Legacy Project
700-730 Brook Avenue, Bronx, New York
BCP # C203043

Sample ID	SVP-6	SVP-7	SVP-8	SVP-9	SVP-10
Matrix	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor
Date Sampled	2/10/2009	2/10/2009	2/10/2009	2/10/2009	2/10/2009
Volatile Organic Compounds via EPA Method TO-15					
Units	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3
Acetone	5.2	16	6.9	5.7	359
1,3-Butadiene	ND	ND	ND	ND	ND
Benzene	1.6 J	3.1	ND	ND	11
Bromodichloromethane	12	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND
Bromoethene	ND	ND	ND	ND	ND
Benzyl Chloride	ND	ND	ND	ND	ND
Carbon Disulfide	4.7	11	ND	ND	42.7
Chlorobenzene	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND
Chloroform	615	ND	8.3	5.4	ND
Chloromethane	ND	ND	ND	ND	ND
3-Chloropropene	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND
Carbon tetrachloride	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	ND	5.9
1,1 - Dichloroethane	ND	ND	ND	ND	ND
1,1 - Dichloroethylene	ND	ND	ND	ND	ND
1,2 - Dibromoethane	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND
1,4-Dioxane	ND	ND	ND	ND	ND
Dichlorodifluoromethane	5.9	5.4	ND	ND	ND
Dibromochloromethane	ND	ND	57.9	152	ND
trans- 1,2-Dichloroethylene	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND
m-Dichlorobenzene	ND	ND	ND	ND	ND
o-Dichlorobenzene	ND	ND	ND	ND	ND
p-Dichlorobenzene	ND	2.3 J	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND
Ethanol	4.9	4.5	15	5.8	12
Ethyl Benzene	ND	ND	ND	ND	3.8
Ethyl Acetate	ND	ND	ND	ND	ND
4-Ethyltoluene	ND	ND	ND	ND	ND
Freon 113	ND	ND	ND	ND	ND
Freon 114	ND	ND	ND	ND	ND
Heptane	ND	7.8	ND	ND	18
Hexachlorobutadiene	ND	ND	ND	ND	ND
Hexane	ND	9.9	2.2 J	ND	15
2-Hexanone	ND	ND	ND	ND	ND
Isopropyl Alcohol	ND	ND	ND	ND	ND
Methylene chloride	7.6	2.5 J	3.2	3.0	ND
Methyl ethyl ketone	ND	ND	ND	ND	32.1
Methyl Isobutyl Ketone	ND	3.4	ND	2.8 J	ND
Methyl Tert Butyl Ether	ND	ND	ND	ND	ND
Propylene	ND	5.7	ND	ND	ND
Styrene	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND
2,2,4-Trimethlpentane	7.0	4.3	ND	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND	2.4 J
Tetrachloroethylene	8.1	22	5.4	5.3 J	121
Tetrahydrofuran	ND	ND	ND	ND	ND
Toluene	11	22	12	17	50.9
Trichloroethylene	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	5.0	ND
Vinyl Chloride	ND	ND	ND	ND	ND
Vinyl Acetate	ND	ND	ND	ND	ND
m,p-Xylene	ND	3.3 J	ND	ND	10
o-Xylene	ND	ND	ND	ND	2.5 J
Xylenes (total)	ND	3.3 J	ND	ND	12

Notes:
All concentrations are shown in ug/m^3-micrograms per cubic meter
All samples collected over 2 hour period
J - Indicates an etimated value
ND - Not detected at or above reporting limits

Table 2

Validated Analytical Results for Volatile Organic Compounds In Soil Samples

Via Verde aka New Housing New York Legacy Project

700-730 Brook Avenue, Bronx, New York

BCP # C203043

Sample ID	SB-1 (1 FT)	SB-1 (2-4 FT)	MW-4 (1 FT)	MW-4 (4 FT)	MW-X (4 FT)*	MW-5 (0-2 In)	MW-5 (5 Ft)	FB 2/9	Part 375 Soil Cleanup Objectives**
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Liquid	
Date Sampled	2/6/2009	2/6/2009	2/6/2009	2/6/2009	2/6/2009	2/6/2009	2/6/2009	2/9/2009	
Volatile Organic Compounds									
Units	ug/kg	ug/Kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/kg
Acetone	ND R	ND R	ND R	ND R	ND R	ND R	ND R	ND U J	50
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	60
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	NVG
n-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	12,000
sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	11,000
tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	5,900
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	760
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	1,100
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	370
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
o-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
p-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,2-Dibromo-3-Chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	1,100
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	2,400
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	1,800
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	270
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	20
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	330
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	250
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	190
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Ethyl Benzene	ND	ND	1.4	ND	ND	0.77 J	ND	ND	1,000
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
p-Isopropyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Methyl Tert Butyl Ether	ND	ND	ND	ND	ND	ND	ND	ND	930
4-Methyl-2-Pentanone	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Methylene bromide	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	50
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	12,000
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	3,900
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Tetrachloroethene	ND	ND	0.82 J	ND	ND	ND	ND	ND	1,300
Toluene	ND	ND	4.2	ND	ND	9.7	4.3	ND	700
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	470
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	3,600
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	8,400
m,p-Xylene	ND	ND	ND	ND	ND	1.9 J	1.3 J	ND	260
o-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	260
Xylenes (total)	ND	ND	ND	ND	ND	2.2 J	1.3 J	ND	260
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	200

Notes:
ug/Kg - micrograms per kilogram or parts per billion
ND - Not detected at or above laboratory detection limits
NVG - No Value Given
U- The analyte was analyzed for, but was not detected above the reported sample quanitation limit.
J - Estimated Value
R - The sample result is unreliable/unusable. The presence or absence of the analyte can not be verified.
FB - Field Blank

*MW-X (4ft) is a duplicate of MW-4 (4ft)
**6 NYCRR Part 375; Subparts 375-1 to 375-4 & 375-6; Table 375-6.8(a):Unrestricted Use Soil Cleanup Objectives*

Table 3

Validated Analytical Results for Semi-Volatile Organic Compounds in Soil Samples

Via Verde aka New Housing New York Legacy Project
700-730 Brook Avenue, Bronx, New York
BCP # C203043

Sample ID	SB-1 (1 FT)	SB-1 (2-4 FT)	MW-4 (1 FT)	MW-4 (4 FT)	MW-X (4 FT)*	MW-5 (0-2 in)	MW-5 (5 Ft)	FB 2/9	Part 375
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Liquid	Soil Cleanup
Date Sampled	2/6/2009	2/6/2009	2/6/2009	2/6/2009	2/6/2009	2/6/2009	2/6/2009	2/9/2009	Objectives
Semi-Volatile Organic Compounds									
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	NVG
4-Chloro-3-methyl phenol	ND	ND	ND	ND	ND	ND	ND	ND	NVG
2,4-Dichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	NVG
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	NVG
2,4-Dinitrophenol	ND	ND	ND	ND	ND	ND	ND	ND	NVG
4,6-Dinitro-o-cresol	ND	ND	ND	ND	ND	ND	ND	ND	NVG
2-Methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	NVG
3+4-Methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	NVG
2-Nitrophenol	ND	ND	ND	ND	ND	ND	ND	ND	NVG
4-Nitrophenol	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	800
Phenol	ND	ND	ND	ND	ND	ND	ND	ND	330
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	NVG
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Acenaphthene	ND	ND	ND	ND	ND	26.5 J	ND	ND	20,000
Acenaphthylene	37.7	ND	ND	ND	ND	31.0 J	ND	ND	100,000
Acetophenone	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Anthracene	27.4 J	ND	ND	ND	ND	44.9	ND	ND	100,000
Atrazine	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Benzo(a)anthracene	105	45.1	37.7	ND	ND	94.4	ND	ND	1,000
Benzo(a)pyrene	120	48.6	41.2	ND	ND	107	19.6 J	ND	1,000
Benzo(b)fluoranthene	135	66.8	60.1	ND	21.9 J	151	25.2 J	ND	1,000
Benzo(g,h,i)perylene	111	58.7	43.1	ND	ND	106	23.7 J	ND	100,000
Benzo(k)fluoranthene	130	53.1	40.4	ND	ND	81.5	19.0 J	ND	800
4-Bromophenyl-phenyl ether	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Butyl benzyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,1'-Biphenyl	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Benzaldehyde	ND	ND	ND	ND	ND	ND	ND	ND	NVG
2-Chloronaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
4-Chloroaniline	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Carbazole	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Caprolactam	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Chrysene	110	47.5	44.2	ND	ND	109	23.7 J	ND	1,000
bis(2-Chloroethoxy)methane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
bis(2-Chloroethyl)ether	ND	ND	ND	ND	ND	ND	ND	ND	NVG
bis(2-Chloroisopropyl)ether	ND	ND	ND	ND	ND	ND	ND	ND	NVG
4-Chlorophenyl-phenyl ether	ND	ND	ND	ND	ND	ND	ND	ND	NVG
2,4-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
3,3-Dichlorobenzidine	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Dibenzo(a,h)anthracene	25.8 J	ND	ND	ND	ND	32.9 J	ND	ND	330
Dibenzofuran	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Di-n-butyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Di-n-octyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Diethyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Dimethyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	NVG
bis(2-Ethylhexyl)phthalate	77.2	193	ND	ND	53.9 J	ND	ND	ND	NVG
Fluoranthene	152	54.0	59.8	ND	ND	120	27.7 J	ND	100,000
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND	30,000
Hexachlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Hexachlorocyclopentadiene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Hexachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Indeno(1,2,3-cd)pyrene	95.6	43.1	40.1	ND	14.8 J	95.4	17.9 J	ND	500
Isophorone	ND	ND	ND	ND	ND	ND	ND	ND	NVG
2-Methylnaphthalene	ND	ND	ND	ND	ND	71.2 J	ND	ND	NVG
2-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	ND	NVG
3-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	ND	NVG
4-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Naphthalene	ND	ND	ND	ND	ND	33.8 J	ND	ND	12,000
Nitrobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NVG
N-Nitroso-di-n-propylamine	ND	ND	ND	ND	ND	ND	ND	ND	NVG
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Phenanthrene	30.9 J	ND	31.7 J	ND	ND	122	44.2 J	ND	100,000
Pyrene	145	53.3	47.8	ND	17.2 J	153	33.0 J	ND	100,000

Notes:
ug/Kg - micrograms per kilogram or parts per billion
ND - Not detected at or above laboratory detection limits
NVG - No Value Given
J - Estimated Value
FB - Field Blank

*MW-X (4ft) is a duplicate of MW-4 (4ft)
**6 NYCRR Part 375; Subparts 375-1 to 375-4 & 375-6;*
Table 375-6.8(a):Unrestricted Use Soil Cleanup Objectives

TABLE 4

Validated Analytical Results for Pesticides In Soil Samples

Via Verde aka New Housing New York Legacy Project
700-730 Brook Avenue, Bronx, New York
BCP # C203043

Sample ID Matrix Date Sampled	SB-1 (1 FT) Soil 2/6/2009	SB-1 (2-4 FT) Soil 2/6/2009	MW-4 (1 FT) Soil 2/6/2009	MW-4 (4 FT) Soil 2/6/2009	MW-X (4 FT)* Soil 2/6/2009	MW-5 (0-2 in) Soil 2/6/2009	MW-5 (5 Ft) Soil 2/6/2009	FB 2/9 Liquid 2/9/2009	Part 375** Soil Cleanup Objectives
Pesticides									
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Aldrin	ND	ND	ND	ND	ND	ND	ND	ND	5
alpha-BHC	ND	ND	ND	ND	ND	ND	ND	ND	20
beta-BHC	ND	ND	ND	ND	ND	ND	ND	ND	36
delta-BHC	ND	ND	ND	ND	ND	ND	ND	ND	40
gamma-BHC	ND	ND	ND	ND	ND	ND	ND	ND	NVG
alpha-Chlordane	ND	ND	ND	ND	ND	ND	ND	ND	94
gamma-Chlordane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Dieldrin	ND	ND	ND	ND	ND	ND	ND	ND	5
4,4'-DDD	ND	ND	ND	ND	ND	ND	ND	ND	3.3
4,4'-DDE	ND	ND	ND	ND	ND	ND	ND	ND	3.3
4,4'-DDT	ND	ND	ND	ND	ND	ND	ND	ND	3.3
Endrin	ND	ND	ND	ND	ND	ND	ND	ND	14
Endosulfan Sulfate	ND	ND	ND	ND	ND	ND	ND	ND	2,400
Endrin aldehyde	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Endosulfan I	ND	ND	ND	ND	ND	ND	ND	ND	2,400
Endosulfan II	ND	ND	ND	ND	ND	ND	ND	ND	2,400
Heptachlor	ND	ND	ND	ND	ND	ND	ND	ND	42
Heptachlor epoxide	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Methoxychlor	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Endrin ketone	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Toxaphene	ND	ND	ND	ND	ND	ND	ND	ND	NVG

Notes:

ug/Kg - micrograms per kilogram or parts per billion

ND - Not detected at or above laboratory detection limits

NVG - No Value Given

J - Estimated Value

FB - Field Blank

*MW-X (4ft) is a duplicate of MW-4 (4ft)

**6 NYCRR Part 375; Subparts 375-1 to 375-4 & 375-6;*

Table 375-6.8(a):Unrestricted Use Soil Cleanup Objectives

Table 5

Validated Analytical Results for PCBs In Soil Samples

Via Verde aka New Housing New York Legacy Project

700-730 Brook Avenue, Bronx New York

BCP # C203043

Sample ID	MW-1 (1-2 FT)	MW-1 (13 FT)	SB-1 (1 FT)	SB-1 (2-4 FT)	MW-4 (1 FT)	MW-4 (4 FT)	MW-X (4 FT)*	MW-5 (0-2 in)	MW-5 (5 FT)	FB 2/9	Part 375**
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Liquid	Soil Cleanup
Date Samples	2/9/2009	2/9/2009	2/6/2009	2/6/2009	2/6/2009	2/6/2009	2/6/2009	2/6/2009	2/6/2009	2/9/2009	Objectives
PCBs											
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Aroclor-1016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
Aroclor-1221	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
Aroclor-1232	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
Aroclor-1242	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
Aroclor-1248	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
Aroclor-1254	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
Aroclor-1260	67.4	72.7	ND	ND	ND	ND	ND	ND	ND	ND	100

Notes:

ug/Kg - micrograms per kilogram or parts per billion

ND - Not detected at or above laboratory detection limits

NVG - No Value Given

J - Estimated Value

FB - Field Blank

*MW-X (4ft) is a duplicate of MW-4 (4ft)

***6 NYCRR Part 375; Subparts 375-1 to 375-4 & 375-6;*

Table 375-6.8(a):Unrestricted Use Soil Cleanup Objectives

TABLE 6

Validated Analytical Results for Metals In Soil

Via Verde aka New Housing New York Legacy Project
700-730 Brook Avenue, Bronx, New York
BCP # C203043

Sample ID Matrix Date Sampled	SB-1 (1 FT) Soil 2/6/2009	SB-1 (2-4 FT) Soil 2/6/2009	MW-4 (1 FT) Soil 2/6/2009	MW-4 (4 FT) Soil 2/6/2009	MW-X (4 FT)* Soil 2/6/2009	MW-5 (0-2 in) Soil 2/6/2009	MW-5 (5 FT) Soil 2/6/2009	FB 2/9 Liquid 2/9/2009	Part 375** Soil Cleanup Objectives
Metals									
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	7,120	8,470	7,140	5,820	6,860	10,200	9,360	ND	NVG
Antimony	ND U J	ND U J	ND U J	ND U J	ND U J	ND U J	ND U J	ND U J	NVG
Arsenic	2.2	ND	ND	ND	ND	2.4	ND	ND U J	13
Barium	35.2 J	51.3 J	43.7 J	53.9 J	60.9 J	70.8 J	66.2 J	ND	350
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	7.2
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	2.5
Calcium	2,990 J	3,540 J	3,380 J	23,200 J	31,800 J	5,660 J	2,540 J	ND	NVG
Chromium	**15.2 J**	**23.5 J**	**17.3 J**	**14.8 J**	**14.9 J**	**23.9 J**	**23.9 J**	ND	1
Cobalt	6.3	7.7	6.5	ND	5.7	8.5	7.2	ND	NVG
Copper	32.6	26.2	23.2	16.9	16.7	20.3	20.3	ND	50
Iron	15,300 J	16,000 J	13,400 J	10,900 J	11,200 J	20,900 J	21,000 J	ND U J	NVG
Lead	15.3 J	13.5 J	9.1 J	9.2 J	4.5 J	19.9 J	7.5 J	ND	63
Magnesium	2,920 J	4,300 J	4,130 J	13,100 J	18,900 J	5,350 J	3,500 J	ND	NVG
Manganese	252 J	276 J	270 J	373 J	354 J	235 J	312 J	ND	1,600
Mercury	ND U J	ND U J	ND J	ND U J	ND U J	0.058 J	ND U J	ND	0.18
Nickel	10.7	14.8	14.6	12.7	13.8	13.5	14.6	ND	30
Potassium	1,660 J	2,140 J	1,730 J	1,710 J	1,890 J	1,490 J	1,470 J	ND	NVG
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	3.9
Silver	ND	ND	ND	ND	ND	ND	ND	ND	2
Sodium	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Thallium	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Vanadium	43.2 J	27.9 J	22.5 J	18.8 J	20.6 J	28.1 J	32.5 J	ND	NVG
Zinc	35.8	48.0 J	38.1 J	39.1 J	37.7 J	43.3	33.0	ND U J	109

Notes:

mg/kg - milligrams per kilogram or parts per million
ND - Not detected at or above laboratory detection limits
NVG - No Value Given
J - Estimated Value
U - The analyte was analyzed for, but was not detected above the reported sample quantitation limits.
FB - Field Blank

*MW-X (4ft) is a duplicate of MW-4 (4ft)
***6 NYCRR Part 375; Subparts 375-1 to 375-4 & 375-6; Table 375-6.8(a):Unrestricted Use Soil Cleanup Objectives*

Boxed and bold indicates exceedance of Soil Cleanup Objectives

Table 7

Validated Analytical Results for Volatile Organic Compounds In Groundwater

Via Verde aka New Housing New York Legacy Project

700-730 Brook Avenue, Bronx, New York

BCP # C203043

Sample ID	MW-1	MW-2	MW-3	MW-4	MW-5	MW-X**	Field Blank 2/25	Trip Blank	NYSDEC TOGs*
Matrix	groundwater	groundwater	groundwater	groundwater	groundwater	groundwater	liquid	liquid	
Date Sampled	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	
Volatile Organic Compounds									
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Acetone	11.2	3.5 J	ND	ND	ND	9.8 J	ND	ND	50
Benzene	**3.3**	ND	ND	ND	ND	**3.5**	ND	ND	1
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	5
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	5
Bromodichloromethane	ND	ND	1.7	ND	ND	ND	ND	ND	50
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	50
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	5
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	50
n-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	5
sec-Butylbenzene	2.7 J	1.1 J	ND	ND	ND	2.9 J	ND	ND	5
tert-Butylbenzene	2.0 J	ND	ND	ND	ND	2.0 J	ND	ND	5
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	5
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	5
Chloroethane	1.4	ND	ND	ND	ND	1.7	ND	ND	5
Chloroform	0.33 J	ND	**23.4**	ND	1.1	0.31 J	ND	ND	7
Chloromethane	1.2	ND	ND	ND	ND	1.3	ND	ND	NVG
o-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	5
p-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	5
1,2-Dibromo-3-Chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	0.04
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	50
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	ND	NVG
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	3
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	3
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	3
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	5
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	0.6
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	5
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	5
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	5
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	1
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	5
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	5
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	5
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	0.4
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	0.4
Ethylbenzene	4.1	ND	ND	ND	ND	4.3	ND	ND	5
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	0.5
Isopropylbenzene	**22.5**	0.43 J	ND	ND	ND	**23.8**	ND	ND	5
p-Isopropyltoluene	0.63 J	0.58 J	ND	ND	ND	0.66 J	ND	ND	5
Methyl Tert Butyl Ether	0.41 J	ND	ND	ND	ND	0.44 J	ND	ND	10
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Methylene bromide	ND	ND	ND	ND	ND	ND	ND	ND	NVG
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	5
Naphthalene	6.7	ND	ND	ND	ND	6.8	ND	ND	10
n-Propylbenzene	**20.1**	0.33 J	ND	ND	ND	**21.0**	ND	ND	5
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	5
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	5
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	5
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	5
Toluene	1.1	ND	ND	ND	ND	1.2	ND	ND	5
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	5
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	5
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	5
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	1
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	5
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	5
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	0.04
1,2,4-Trimethylbenzene	**8.3**	ND	ND	ND	ND	**8.6**	ND	ND	5
1,3,5-Trimethylbenzene	**6.4**	ND	ND	ND	ND	**6.9**	ND	ND	5
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	2
m,p-Xylene	2.0	ND	ND	ND	ND	2.1	ND	ND	5
o-Xylene	1.2	ND	ND	ND	ND	1.2	ND	ND	5
Xylene (total)	3.2	ND	ND	ND	ND	3.3	ND	ND	5

Notes:

ug/L - micrograms per liter or parts per billion
ND - Not detected at or above laboratory detection limits
NVG - No Value Given
J - Estimated Value

**NYSDEC Technical and Operational Guidance Series (1.1.1)*
Ambient Water Quality Standards and Guidance Values
and Groundwater Effluent Limitations; June 1998
*** MW-X is a duplicate of MW-1*

Boxed and bold indicates exceedance groundwater standards or guidance values

Table 8

Validated Analytical Results for Semi-Volatile Organic Compounds In Groundwater

Via Verde aka New Housing New York Legacy Project
700-730 Brook Avenue, Bronx, New York
BCP # C203043

Sample ID	MW-1	MW-2	MW-3	MW-4	MW-5	MW-X**	Field Blank 2/25	NYSDEC TOGS*
Matrix	groundwater	groundwater	groundwater	groundwater	groundwater	groundwater	liquid	
Date Sampled	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	
Semi-Volatile Organic Compounds								
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	NVG
4-Chloro-3-methyl phenol	ND	ND	ND	ND	ND	ND	ND	NVG
2,4-Dichlorophenol	ND	ND	ND	ND	ND	ND	ND	5
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	50
2,4-Dinitrophenol	ND	ND	ND	ND	ND	ND	ND	10
4,6-Dinitro-2-methylphenol	ND	ND	ND	ND	ND	ND	ND	NVG
2-Methylphenol	ND	ND	ND	ND	ND	ND	ND	1
3+4-Methylphenols	ND	ND	ND	ND	ND	ND	ND	1
2-Nitrophenol	ND	ND	ND	ND	ND	ND	ND	NVG
4-Nitrophenol	ND	ND	ND	ND	ND	ND	ND	NVG
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	NVG
Phenol	ND	ND	ND	ND	ND	ND	ND	1
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	NVG
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	NVG
Acenaphthene	0.58 J	0.87 J	ND	ND	ND	0.50 J	ND	20
Acenaphthylene	ND	ND	ND	ND	ND	ND	ND	NVG
Acetophenone	ND	ND	ND	ND	ND	ND	ND	NVG
Anthracene	ND	ND	ND	ND	ND	ND	ND	50
Atrazine	ND	ND	ND	ND	ND	ND	ND	7.5
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	0.002
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	ND	0.002
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	ND	ND	NVG
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	0.002
4-Bromophenyl-phenylether	ND	ND	ND	ND	ND	ND	ND	NVG
Butylbenzylphthalate	ND	ND	ND	ND	ND	ND	ND	50
1,1' -Biphenyl	ND	1.0 J	ND	ND	ND	ND	ND	5
Benzaldehyde	ND	ND	ND	ND	ND	ND	ND	NVG
2-Chloronaphthalene	ND	ND	ND	ND	ND	ND	ND	10
4-Chloroaniline	ND	ND	ND	ND	ND	ND	ND	5
Carbazole	ND	ND	ND	ND	ND	ND	ND	NVG
Caprolactam	ND	ND	ND	ND	ND	ND	ND	NVG
Chrysene	ND	ND	ND	ND	ND	ND	ND	0.002
bis(2-Chloroethoxy)methane	ND	ND	ND	ND	ND	ND	ND	5
bis(2-Chloroethyl)ether	ND	ND	ND	ND	ND	ND	ND	1
bis(2-Chloroisopropyl)ether	ND	ND	ND	ND	ND	ND	ND	NVG
4-Chlorophenyl-phenylether	ND	ND	ND	ND	ND	ND	ND	NVG
2,4-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	5
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	5
3,3-Dichlorobenzidine	ND	ND	ND	ND	ND	ND	ND	5
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	NVG
Dibenzofuran	0.61 J	0.64 J	ND	ND	ND	0.60 J	ND	NVG
Di-n-butylphthalate	ND	ND	ND	ND	ND	1.2 J	ND	50
Di-n-octyl phthalate	ND	ND	ND	ND	ND	ND	ND	50
Diethylphthalate	ND	ND	ND	ND	ND	ND	ND	50
Dimethylphthalate	ND	ND	ND	ND	ND	ND	ND	50
bis(2-Ethylhexyl)phthalate	**43.8**	ND	ND	ND	ND	**46.3**	ND	5
Fluoranthene	ND	0.48 J	0.47 J	ND	ND	ND	ND	50
Fluorene	0.96 J	1.2	ND	ND	ND	0.91 J	ND	50
Hexachlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.04
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	0.5
Hexachlorocyclopentadiene	ND	ND	ND	ND	ND	ND	ND	5
Hexachloroethane	ND	ND	ND	ND	ND	ND	ND	5
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND	ND	ND	0.002
Isophorone	ND	ND	ND	ND	ND	ND	ND	50
2-Methylnaphthalene	6.8	ND	ND	ND	ND	10.2	ND	NGV
2-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	5
3-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	5
4-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	5
Naphthalene	2.4	ND	ND	ND	ND	3.2	ND	10
Nitrobenzene	ND	ND	ND	ND	ND	ND	ND	0.4
N-Nitroso-di-n-propylamine	ND	ND	ND	ND	ND	ND	ND	NVG
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	ND	ND	50
Phenanthrene	0.75 J	1.3	ND	ND	ND	0.73 J	ND	50
Pyrene	ND	ND	ND	ND	ND	ND	ND	50

Notes:
ug/L - micrograms per liter or parts per billion
ND - Not detected at or above laboratory detection limits
NVG - No Value Given
J - Estimated Value
B - Analyte found in associated method blank

**NYSDEC Technical and Operational Guidance Series (1.1.1)*
Ambient Water Quality Standards and Guidance Values
and Groundwater Effluent Limitations; June 1998
** MW-X is a duplicate of MW-1

Boxed and bold indicates exceedance of groundwater standards or guidance values

Table 9

Validated Analytical Results for Pesticides In Groundwater

Via Verde aka New Housing New York Legacy Project

700-730 Brook Avenue, Bronx, New York

BCP # C203043

Sample ID	MW-1	MW-2	MW-3	MW-4	MW-5	MW-X**	Field Blank 2/25	NYSDEC TOGS*
Matrix	groundwater	groundwater	groundwater	groundwater	groundwater	groundwater	liquid	
Date Sampled	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	
Pesticides								
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Aldrin	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	ND	ND	ND	ND	ND	ND	ND	0.01
beta-BHC	ND	ND	ND	ND	ND	ND	ND	0.04
delta-BHC	ND	ND	ND	ND	ND	ND	ND	0.04
gamma-BHC	ND	ND	ND	ND	ND	ND	ND	0.05
alpha-Chlordane	ND	ND	ND	ND	ND	ND	ND	0.05
gamma-Chlordane	ND	ND	ND	ND	ND	ND	ND	0.05
Dieldrin	ND	ND	ND	ND	ND	ND	ND	0.004
4,4-DDD	ND	ND	ND	ND	ND	ND	ND	0.3
4,4-DDE	ND	ND	ND	ND	ND	ND	ND	0.2
4,4-DDT	ND	ND	ND	ND	ND	ND	ND	0.2
Endrin	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	ND	ND	ND	ND	ND	ND	ND	NVG
Endrin aldehyde	ND	ND	ND	ND	ND	ND	ND	5
Endosulfan I	ND	ND	ND	ND	ND	ND	ND	NVG
Endosulfan II	ND	ND	ND	ND	ND	ND	ND	NVG
Heptachlor	ND	ND	ND	ND	ND	ND	ND	0.04
Heptachlor epoxide	ND	ND	ND	ND	ND	ND	ND	0.03
Methoxychlor	ND	ND	ND	ND	ND	ND	ND	35
Endrin ketone	ND	ND	ND	ND	ND	ND	ND	5
Toxaphene	ND	ND	ND	ND	ND	ND	ND	0.06

Notes:
ug/L - micrograms per liter or parts per billion
ND - Not detected at or above laboratory detection limits
NVG - No Value Given
J - Estimated Value

**NYSDEC Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations; June 1998*
** MW-X is a duplicate of MW-1

Table 10

Validated Analytical Results for PCBs In Groundwater

Via Verde aka New Housing New York Legacy Project
700-730 Brook Avenue, Bronx, New York
BCP # C203043

Sample ID	MW-1	MW-2	MW-3	MW-4	MW-5	MW-X***	Field Blank 2/25	NYSDEC TOGS**
Matrix	groundwater	groundwater	groundwater	groundwater	groundwater	groundwater	liquid	
Date Sampled	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	
PCBs								
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Aroclor-1016	ND	ND	ND	ND	ND	ND	ND	0.09 *
Aroclor-1221	ND	ND	ND	ND	ND	ND	ND	0.09 *
Aroclor-1232	ND	ND	ND	ND	ND	ND	ND	0.09 *
Aroclor-1242	ND	ND	ND	ND	ND	ND	ND	0.09 *
Aroclor-1248	ND	ND	ND	ND	ND	ND	ND	0.09 *
Aroclor-1254	ND	ND	ND	ND	ND	ND	ND	0.09 *
Aroclor-1260	ND	ND	ND	ND	ND	ND	ND	0.09 *

Notes:
ug/L - micrograms per liter or parts per billion
ND - Not detected at or above laboratory detection limits
NVG - No Value Given
J - Estimated Value
** Applies to the sum of these compounds*

***NYSDEC Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations; June 1998*
**** MW-X is a duplicate of MW-1*

Table 11

Validated Analytical Results for Total and Dissolved Metals in Groundwater

Via Verde aka New Housing New York Legacy Project

700-730 Brook Avenue, Bronx, New York

BCP # C203043

Sample ID	MW-1	MW-2	MW-3	MW-4	MW-5	MW-X**	Field Blank 2/25	NYSDEC TOGS*
Matrix	groundwater	groundwater	groundwater	groundwater	groundwater	groundwater	liquid	
Date Sampled	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009	
Total Metals								
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Aluminum	67,900 J	651 J	2,920 J	5,370 J	4,970 J	40,900 J	ND	NVG
Antimony	ND	ND	ND	ND	ND	ND	ND	3
Arsenic	18.2 J	ND UJ	ND UJ	ND UJ	ND UJ	10.7 J	ND UJ	25
Barium	790	ND	ND	ND	ND	462	ND	1,000
Berylium	1.4	ND	ND	ND	ND	ND UJ	ND	3
Cadmium	ND	ND	ND	ND	ND	ND	ND	5
Calcium	188,000	130,000	17600	65,200	103,000	123,000	ND	NVG
Chromium	**147**	ND	ND	10.8	12.4	**89.4**	ND	50
Cobalt	67.4	ND	ND	ND	ND	ND	ND	NVG
Copper	**263 J**	ND UJ	46.5 J	70.9 J	68.8 J	167 J	ND UJ	200
Iron	**138,000**	**1,130**	**5,240**	**9,220**	**9,180**	**81,200**	ND	300
Lead	**278 J**	ND	12.3	5.5	8.0	**157 J**	ND	25
Magnesium	**95,400**	25,200	ND	22,300	29,800	**54,600**	ND	35,000
Manganese	**5,460**	83.3	115	**748**	**381**	**4,010**	ND	300
Mercury	ND	ND	ND	ND	ND	ND	ND	0.7
Nickel	**141**	ND	ND	14.9	13.3	80.5	ND	100
Potassium	29,300	ND	ND	ND	ND	21,200	ND	NVG
Selenium	ND	ND	ND	ND	ND	ND	ND	10
Silver	ND	ND	ND	ND	ND	ND	ND	50
Sodium	**23,400**	**38,000**	ND	**27,500**	**69,800**	**21,600**	ND	20,000
Thallium	ND	ND	ND	ND	ND	ND	ND	0.5
Vanadium	183	ND	ND	ND	ND	109	ND	NVG
Zinc	457 J	ND UJ	ND UJ	40.4 J	46.6 J	265 J	ND UJ	2,000
Dissolved Metals								
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Aluminum	ND	ND	ND	2,250	ND	ND	ND	NVG
Antimony	ND	ND	ND	ND	ND	ND	ND	3
Arsenic	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	25
Barium	ND	ND	ND	ND	ND	ND	ND	1,000
Berylium	ND	ND	ND	ND	ND	ND	ND	3
Cadmium	ND	ND	ND	ND	ND	ND	ND	5
Calcium	93,000	130,000	19300	55,500	100,000	92,500	ND	NVG
Chromium	ND	ND	ND	ND	ND	ND	ND	50
Cobalt	ND	ND	ND	ND	ND	ND	ND	NVG
Copper	ND	ND	ND	50.7	ND	ND	ND	200
Iron	**2,350**	ND	ND	**3,990**	120	**2,670**	ND	300
Lead	11.8	ND	ND	ND	ND	11.7	ND	25
Magnesium	20,500	25,000	ND	16,500	24,800	20,400	ND	35,000
Manganese	**3,030**	59.9	ND	**314**	21.6	**3,110**	ND	300
Mercury	ND	ND	ND	ND	ND	ND	ND	0.7
Nickel	ND	ND	ND	ND	ND	ND	ND	100
Potassium	10,400	ND	ND	ND	ND	10,400	ND	NVG
Selenium	ND	ND	ND	ND	ND	ND	ND	10
Silver	ND	ND	ND	ND	ND	ND	ND	50
Sodium	**24,800**	**37,300**	ND	**23,500**	**70,800**	**24,600**	ND	20,000
Thallium	ND	ND	ND	ND	ND	ND	ND	0.5
Vanadium	ND	ND	ND	ND	ND	ND	ND	NVG
Zinc	ND	ND	ND	ND	ND	ND	ND	2,000

Notes:
ug/L - micrograms per liter or parts per billion
ND - Not detected at or above laboratory detection limits
NVG - No Value Given
J - Estimated Value

**NYSDEC Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations; June 1998*
** MW-X is a duplicate of MW-1

Boxed and bold indicates exceedance of groundwater standards or guidance values

TABLE 12

Ranking of Elevated Benzo(a)Pyrene Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	1	2	3	4	5	6	7	8	9	9	
Sample ID	TT-02	TT-03	TT-01	SSB-6&7	SSB-6	SSB-5	SSB-2	SSB-3	SSB-1	SSB-1	Part 375*
Sample Depth	NA	NA	NA	0-2'	0-2"	0-2'	0-2"	0-2"	0-2"	0-2'	Track 1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Unrestricted Use
Date Sampled	Sept. 06	Sept. 06	Sept. 06	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	SCOs
Compound											
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzo(a)pyrene	92	49	45	5.0	2.8	1.9	1.8	1.5	1.1	1.1	1.0

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 13

Ranking of Elevated Benzo(a)Anthracene Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	1	2	3	4	5	6	7	8	9	
Sample ID	TT-02	TT-03	TT-01	SSB-6&7	SSB-6	SSB-2	SSB-5	SSB-3	SSB-1	Part 375*
Sample Depth	NA	NA	NA	0-2'	0-2"	0-2"	0-2'	0-2"	0-2"	Track 1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Unrestricted Use
Date Sampled	Sept. 06	Sept. 06	Sept. 06	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	SCOs
Compound										
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzo(a)anthracene	120	55	53	6.0	2.9	2.0	1.9	1.4	1.1	1.0

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 14

Ranking of Elevated Benzo(b)Fluoranthene Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	1	2	3	4	5	6	7	8	9	9	10	
Sample ID	TT-02	TT-03	TT-01	SSB-6&7	SSB-6	SSB-2	SSB-5	SSB-3	SSB-1	SSB-1	SSB-4	Part 375*
Sample Depth	NA	NA	NA	0-2'	0-2"	0-2"	0-2'	0-2"	0-2"	0-2'	0-2"	Track 1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Unrestricted Use
Date Sampled	Sept. 06	Sept. 06	Sept. 06	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	SCOs
Compound												
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzo(b)fluoranthene	120	60	59	6.6	4.0	3.2	2.5	2.2	1.9	1.9	1.6	1.0

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 15

Ranking of Elevated Benzo(k)Fluoranthene Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	**1**	**2**	**3**	**3**	**4**	**5**	
Sample ID	**TT-02**	**TT-03**	**TT-01**	**SSB-1**	**SSB-6&7**	**SSB-6**	**Part 375***
Sample Depth	**NA**	**NA**	**NA**	**0-2"**	**0-2'**	**0-2"**	**Track 1**
Matrix	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Unrestricted Use**
Date Sampled	**Sept. 06**	**Sept. 06**	**Sept. 06**	**Apr. 07**	**Apr. 07**	**Apr. 07**	**SCOs**
Compound							
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzo(k)fluoranthene	39	25	20	20	2.8	1.3	0.8

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 16

Ranking of Elevated Chrysene Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	1	2	3	4	5	6	7	8	9	10	
Sample ID	TT-02	TT-03	TT-01	SSB-6&7	SSB-6	SSB-2	SSB-5	SSB-3	SSB-1	SSB-4	Part 375*
Sample Depth	NA	NA	NA	0-2'	0-2"	0-2"	0-2'	0-2"	0-2"	0-2"	Track 1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Unrestricted Use
Date Sampled	Sept. 06	Sept. 06	Sept. 06	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	SCOs
Compound											
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Chrysene	97	50	45	5.6	2.9	2.1	1.8	1.6	1.3	1.1	1.0

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 17

Ranking of Elevated Dibenzo(a,h)Anthracene Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	1	2	3	4	5	
Sample ID	SSB-6	SSB-6&7	TT-02	TT-03	TT-01	Part 375*
Sample Depth	0-2"	0-2'	NA	NA	NA	Track 1
Matrix	Soil	Soil	Soil	Soil	Soil	Unrestricted Use
Date Sampled	Apr. 07	Apr. 07	Sept. 06	Sept. 06	Sept. 06	SCOs
Compound						
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Dibenzo(a,h)anthracene	110	63	14	7.8	6.9	0.330

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted UseSoil Cleanup Objectives, December 2006.*

TABLE 18

Ranking of Elevated Fluoranthene Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	1	2	2	
Sample ID	TT-02	TT-03	TT-01	Part 375*
Sample Depth	NA	NA	NA	Track 1
Matrix	Soil	Soil	Soil	Unrestricted Use
Date Sampled	Sept. 06	Sept. 06	Sept. 06	SCOs
Compound				
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Fluoranthene	240	110	110	100

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 19

Ranking of Elevated Indeno(1,2,3-cd)Pyrene Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	1	2	2	
Sample ID	TT-02	TT-03	TT-01	Part 375*
Sample Depth	NA	NA	NA	Track 1
Matrix	Soil	Soil	Soil	Unrestricted Use
Date Sampled	Sept. 06	Sept. 06	Sept. 06	SCOs
Compound				
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Indeno(1,2,3-cd)Pyrene	42	24	22	0.5

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted UseS oil Cleanup Objectives, December 2006.*

TABLE 20

Ranking of Elevated Pyrene Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	**1**	
Sample ID	**TT-02**	**Part 375***
Sample Depth	**NA**	**Track 1**
Matrix	**Soil**	**Unrestricted Use**
Date Sampled	**Sept. 06**	**SCOs**
Compound		
Units	mg/Kg	mg/Kg
Pyrene	210	100

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 21

Ranking of Elevated Phenanthrene Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	1	
Sample ID	TT-02	Part 375*
Sample Depth	NA	Track 1
Matrix	Soil	Unrestricted Use
Date Sampled	Sept. 06	SCOs
Compound		
Units	mg/Kg	mg/Kg
Phenanthrene	210	100

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 22

Ranking of Elevated Barium Detections In Soil/Fill Samples Via Verde 700-730 Brook Avenue Bronx, New York

Rank	1	2	
Sample ID	TT-01	TT-03	Part 375*
Sample Depth	NA	NA	Track 1
Matrix	Soil	Soil	Unrestricted Use
Date Sampled	Sept. 06	Sept. 06	SCOs
Compound			
Units	mg/Kg	mg/Kg	mg/Kg
Barium	740	660	350

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 23

Ranking of Elevated Mercury Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

	Rank	1	2	3	4	5	6	7	8	9	10	
	Sample ID	TT-01	TT-03	SSB-6&7	TT-03	SSB-3	SSB-1	SSB-4	SSB-6	SSB-5	SSB-2	Part 375*
	Sample Depth	NA	NA	0-2'	NA	0-2"	0-2"	0-2"	0-2"	0-2'	0-2'	Track 1
	Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Unrestricted Use
	Date Sampled	Sept. 06	Sept. 06	Apr. 07	Sept. 06	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	SCOs
Compound												
	Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Mercury		0.53	0.51	0.478	0.33	0.318	0.248	0.247	0.226	0.223	0.202	0.18

Notes:
All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 24

Ranking of Elevated Zinc Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Sample ID	TT-03	TT-01	TT-02	SSB-1	SSB-6	SSB-5	SSB-2	SSB-6&7	SSB-5	SSB-3	SSB-4	SSB-4	SSB-3	SSB-2	SB-07	SSB-1	Part 375*
Sample Depth	NA	NA	NA	0-2"	0-2"	0-2'	0-2"	0-2'	0-2"	0-2"	0-2"	0-2'	0-2'	0-2'	19-21'	0-2'	Track 1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Unrestricted Use
Date Sampled	Sept. 06	Sept. 06	Sept. 06	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Sept. 06	Apr. 07	SCOs
Constituent																	
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Zinc	590	570	500	465	396	353	352	313	296	235	232	198	166	146	120	113	109

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 25

Ranking of Elevated Arsenic Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

	Rank	1	2	3	4	
	Sample ID	SSB-2	SSB-1	SSB-6	SSB-6&7	Part 375*
	Sample Depth	0-2"	0-2"	0-2"	0-2'	Track 1
	Matrix	Soil	Soil	Soil	Soil	Unrestricted Use
	Date Sampled	Apr. 07	Apr. 07	Apr. 07	Apr. 07	SCOs
Compound						
	Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Arsenic		27.5	24.8	23.2	15.4	13

Notes:
All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 26

Ranking of Elevated Copper Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	1	2	3	4	5	6	7	8	9	10	11	
Sample ID	SSB-2	SSB-2	SSB-1	SSB-6	SSB-6&7	SSB-1	SSB-5	SSB-5	SSB-3	SSB-3	SSB-4	Part 375*
Sample Depth	0-2'	0-2"	0-2"	0-2"	0-2'	0-2'	0-2'	0-2"	0-2"	0-2'	0-2"	Track 1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Unrestricted Use
Date Sampled	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	Apr. 07	SCOs
Compound												
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Copper	234	172	167	125	112	106	90.9	86.5	68.4	58.1	55.6	50

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted*
Use Soil Cleanup Objectives, December 2006.

TABLE 27

Ranking of Elevated Lead Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

	Rank	1	2	
	Sample ID	SSB-1	TT-02	Part 375*
	Sample Depth	0-2"	NA	Track 1
	Matrix	Soil	Soil	Unrestricted Use
	Date Sampled	Apr. 07	Sept. 06	SCOs
Compound				
	Units	mg/Kg	mg/Kg	mg/Kg
Lead		6,290	590	63

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 28

Ranking of Elevated Nickel Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	1	2	
Sample ID	SSB-1	SSB-2	Part 375*
Sample Depth	0-2"	0-2"	Track 1
Matrix	Soil	Soil	Unrestricted Use
Date Sampled	Apr. 07	Apr. 07	SCOs
Compound			
Units	mg/Kg	mg/Kg	mg/Kg
Nickel	43.9	35.4	30

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 29

Ranking of Elevated Acetone Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	**1**	
Sample ID	**SB-07**	**Part 375***
Sample Depth	**19-21'**	**Track 1**
Matrix	**Soil**	**Unrestricted Use**
Date Sampled	**Sept. 06**	**SCOs**
Compound		
Units	mg/Kg	mg/Kg
Acetone	1.0	0.05

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 30

Ranking of Elevated Chromium Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	1	2	3	3	4	5	6	7	
Sample ID	SSB-6&7	SSB-6	MW-5	MW-5	SB-1	MW-4	SB-1	MW-4	Part 375*
Sample Depth	0-2'	0-2"	0-2"	5'	2-4'	1'	1'	4'	Track 1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Unrestricted Use
Date Sampled	Apr. 07	Apr. 07	Apr. 09	Apr. 09	Apr. 09	Apr. 09	Apr. 09	Apr. 09	SCOs
Compound									
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Chromium	66.7	54.6	23.9J	23.9J	23.5J	17.3J	15.2J	14.8J	1.0

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

TABLE 31

Ranking of Elevated Naphthalene Detections
In Soil/Fill Samples
Via Verde
700-730 Brook Avenue
Bronx, New York

Rank	1	
Sample ID	TT-02	Part 375*
Sample Depth	NA	Track 1
Matrix	Soil	Unrestricted Use
Date Sampled	Sept. 06	SCOs
Compound		
Units	mg/Kg	mg/Kg
Naphthalene	14	12

Notes:

All concentrations are reported in millograms per kilogram (mg/kg) or parts per million.

**6 NYCRR Part 375, Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives, December 2006.*

Table 32
Track 4 Site Specific Action Levels (SSALs)
Via Verde aka New Housing New York Legacy
700-730 Brook Avenue
Bronx, New York

Compound/Constituent	Track 4 SSALs	Units
Lead	590	mg/kg
Total VOCs	10	mg/kg
Total SVOCs	100	mg/kg

Notes:
mg/kg = milligrams per kilogram
VOC = volatile organic compound
SVOC = semi-volatile organic compound

Table 33
Anticipated Permits and Certifications Required for Redevelopment

Via Verde aka New Housing New York Legacy Project
700 - 730 Brook Avenue
Bronx, NY

Permits/Authorizations/Connections	Agency	Assumed Agency Contact	Agency Phone Number
New Building Permit	NYCDOB	Permit Unit	(718) 579-6906
Fencing/Sidewalk Closure Permit	NYCDOT	Victor Viloria	(212) 442-6770
Site Connections	NYCDEP	Davids Sakly	(718) 579-6988
DOT signoff	NYCDOT	CofO Unit	(212) 442-2772
FDNY signoff	FDNY	Barry Brown	(718) 999-1955
Certificate of Occupancy	NYCDOB	William Hinkley	(718) 579-6923

APPENDIX A

Metes and Bounds

MONTROSE SURVEYING CO., LLP. | **CITY & LAND SURVEYORS**

116-20 METROPOLITAN AVE • RICHMOND HILL, NY 11418-1090
PHONE (718) 849-0600 • FAX (718) 849-0401 • EMAIL INFO @MONTROSESURVEYING.COM

Legal Description
Parcel A
MSC Survey No. 62510-1
Tax Block 2359 Part of Tax Lot 3

ALL that certain plot, piece or parcel of land situate laying and being in the Borough and County of The Bronx, City and State of New York bounded and described as follows:

BEGINNING at the corner formed by the intersection of the southerly side of East 156th Street (70 feet wide) with the easterly side of Brook Avenue (80 feet wide);

RUNNING THENCE easterly, along the southerly side of E. 156th Street, 39.58 feet to a point;

RUNNING THENCE southerly, along a line forming an angle of 103 degrees 44 minutes 26 seconds on the southwest, with the southerly side of East 156th Street, 41.13 feet to a point;

RUNNING THENCE easterly, along a line forming an angle of 256 degrees 24 minutes 04 seconds on the southwest, with the last mentioned course, 3.30 feet to a point;

RUNNING THENCE southerly, along a line forming an angle of 90 degrees 43 minutes 40 seconds on the southwest, with the last mentioned course, 14.40 feet to a point;

RUNNING THENCE southerly, along a line forming an angle of 192 degrees 52 minutes 13 seconds on the west, with the last mentioned course, 415.37 feet to a point;

RUNNING THENCE westerly, along a line forming an angle of 89 degrees 41 minutes 24 seconds on the northwest with the last mentioned course, 137.13 feet to the easterly side of Brook Avenue;

RUNNING THENCE northerly, along the easterly side of Brook Avenue, 490.01 feet to the corner, the point or place of BEGINNING.

MONTROSE
SURVEYING CO., LLP.

CITY & LAND SURVEYORS

116-20 METROPOLITAN AVE • RICHMOND HILL, NY 11418-1090
PHONE (718) 849-0600 • FAX (718) 849-0401 • EMAIL INFO @MONTROSESURVEYING.COM

Legal Description
Parcel B
MSC Survey No. 62510-1
Tax Block 2359 Part of Tax Lot 1

ALL that certain plot, piece or parcel of land situate laying and being in the Borough and County of The Bronx, City and State of New York bounded and described as follows:

BEGINNING at a point on the southerly side of East 156th Street (70 feet wide), distant 39.58 feet easterly from the corner formed by the intersection of the southerly side of East 156th Street with the easterly side of Brook Avenue (80 feet wide);

RUNNING THENCE southerly, along a line forming an angle of 103 degrees 44 minutes 26 seconds on the southwest, with the southerly side of East 156th Street, 41.13 feet to a point;

RUNNING THENCE easterly, along a line forming an angle of 256 degrees 24 minutes 04 seconds on the southwest, with the last mentioned course, 3.30 feet to a point;

RUNNING THENCE southerly, along a line forming an angle of 90 degrees 43 minutes 40 seconds on the southwest, with the last mentioned course, 14.40 feet to a point;

RUNNING THENCE southerly, along a line forming an angle of 192 degrees 52 minutes 13 seconds on the west, with the last mentioned course, 430.37 feet to a point;

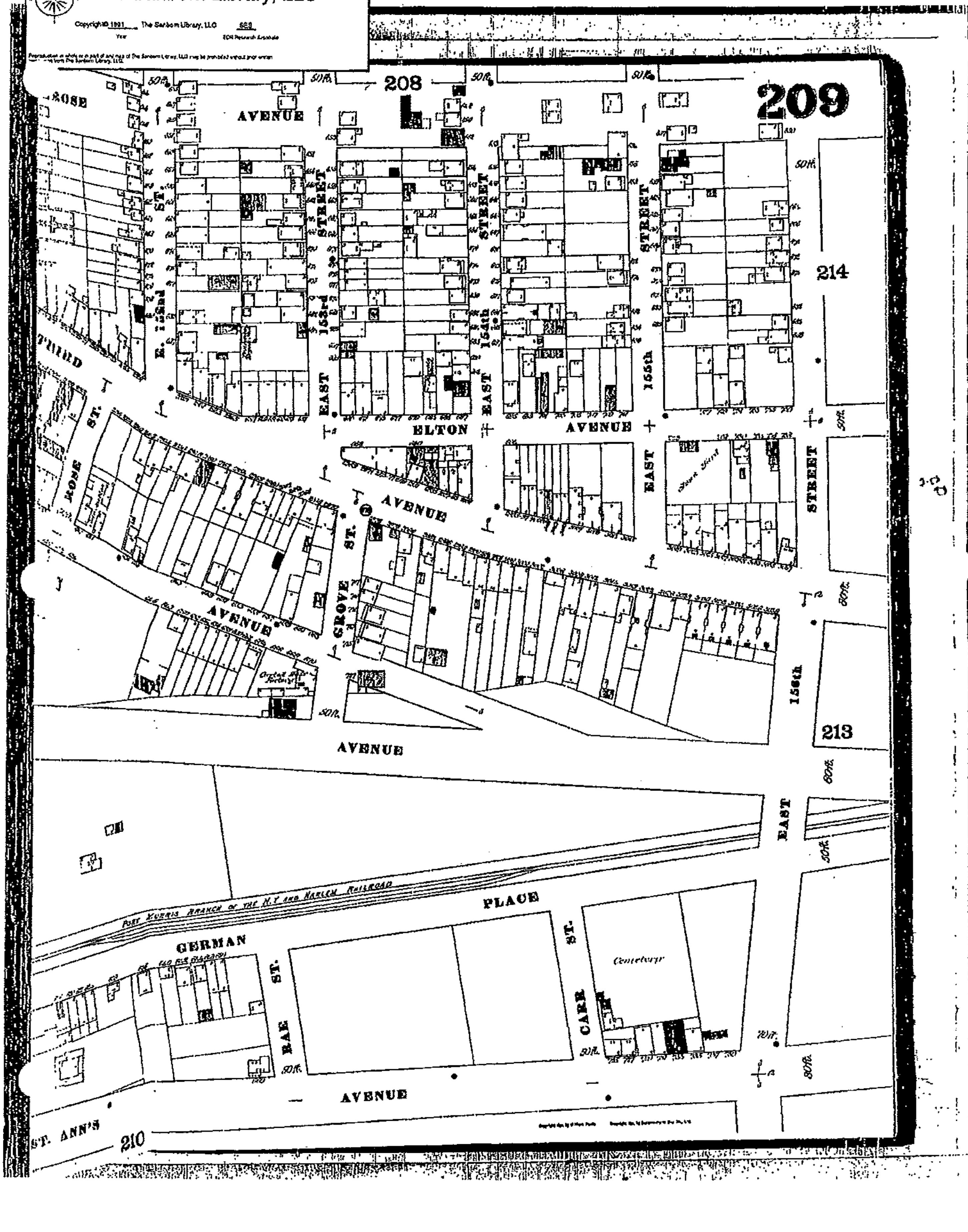
RUNNING THENCE easterly, along a line forming an angle of 90 degrees 18 minutes 36 seconds on the northeast, with the last mentioned course, 40.33 feet to a point;

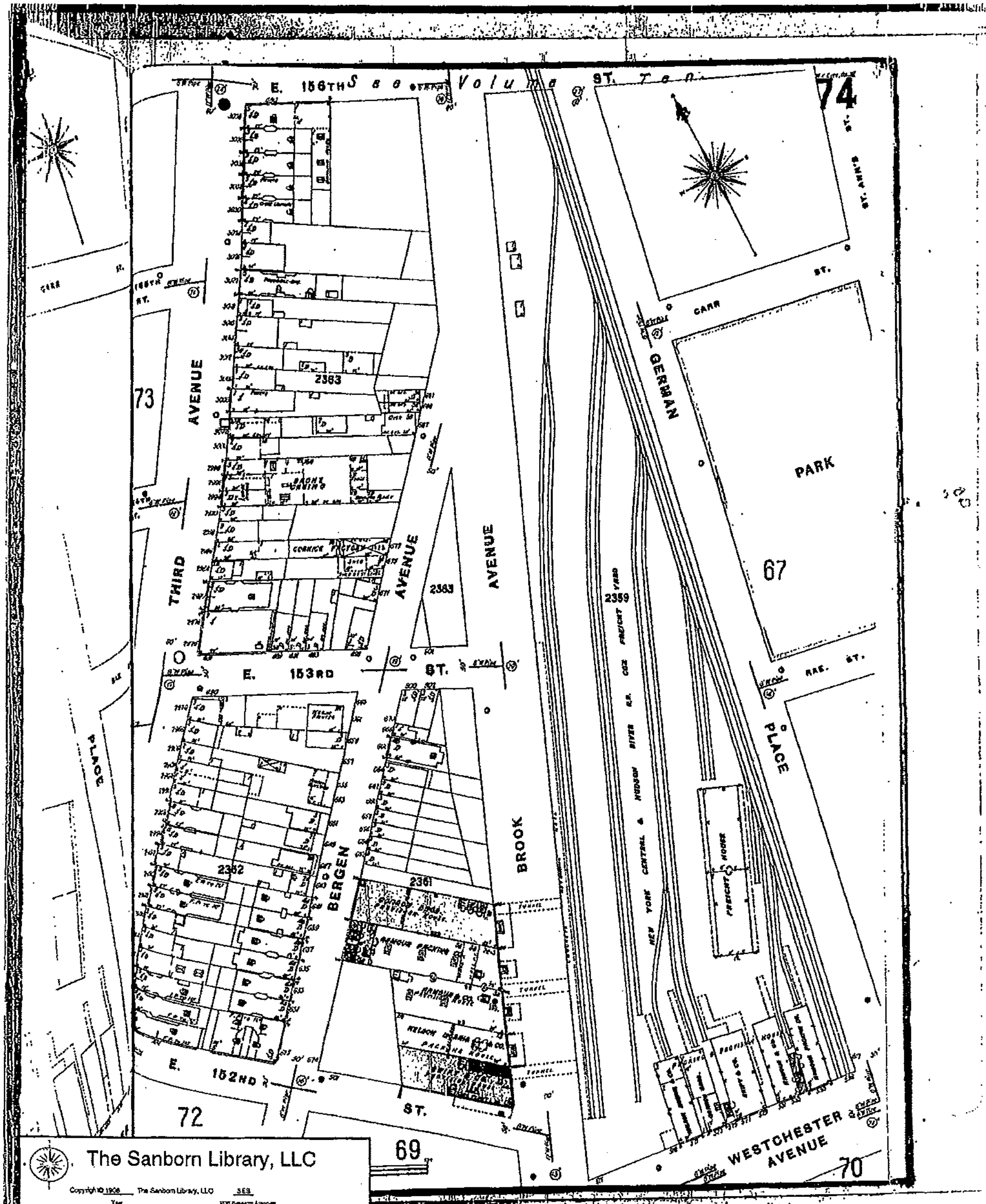
RUNNING THENCE northerly, along a line forming an angle of 89 degrees 41 minutes 26 seconds on the northwest, with the last mentioned course, 476.67 feet to the southerly side of East 156th Street;

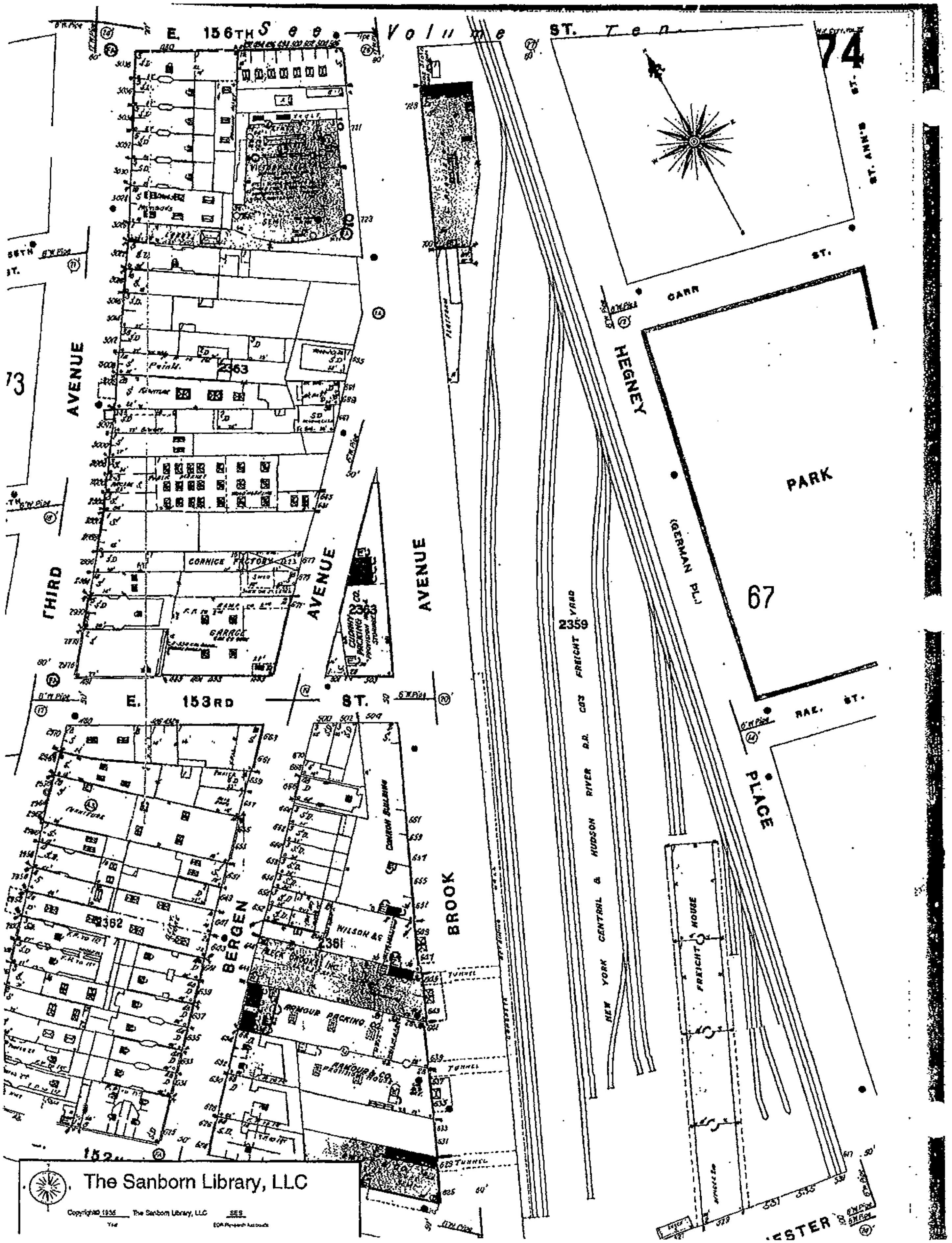
RUNNING THENCE westerly, along the southerly side of East 156th Street, 41.52 feet to the point or place of BEGINNING.

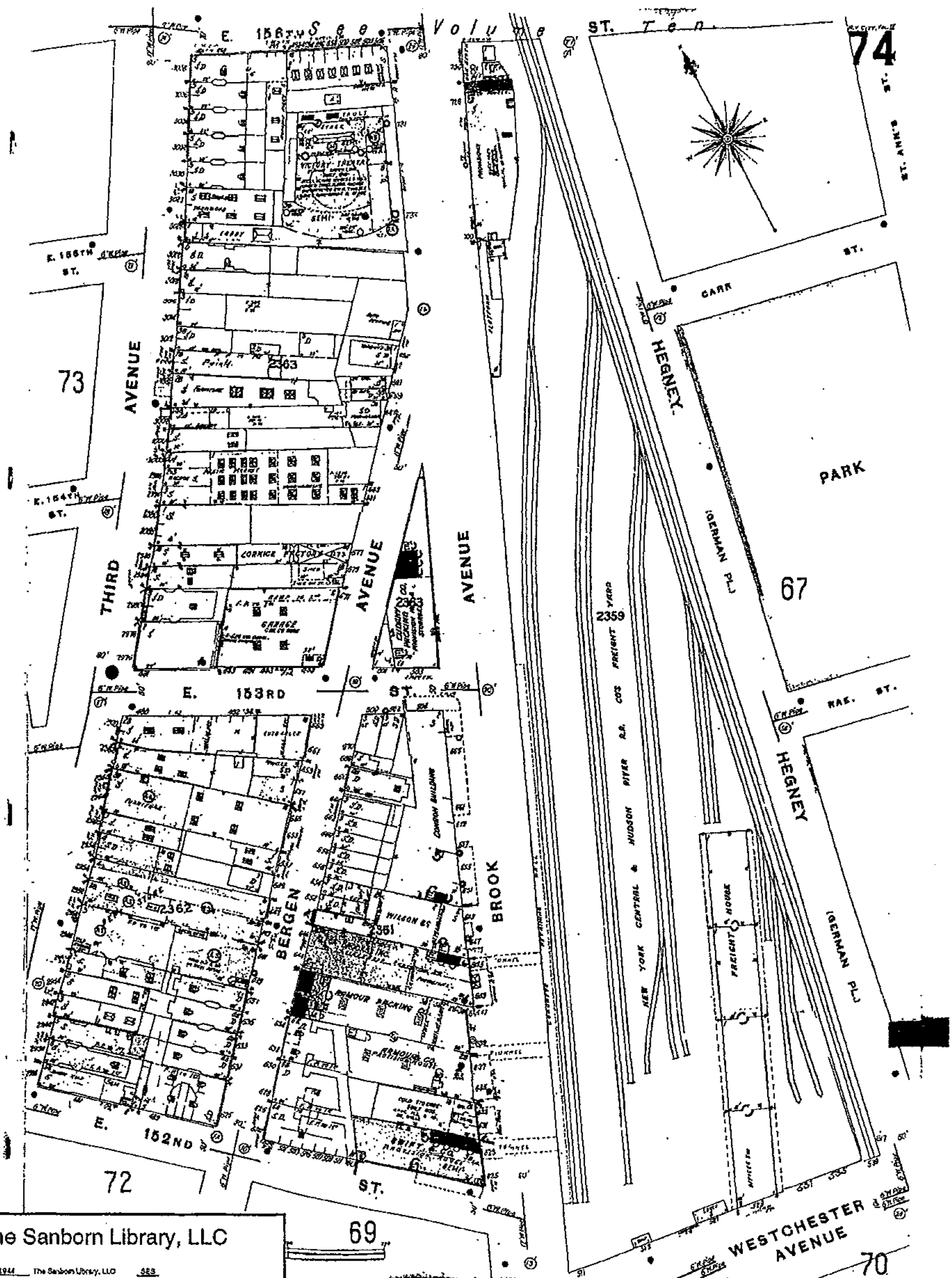
APPENDIX B

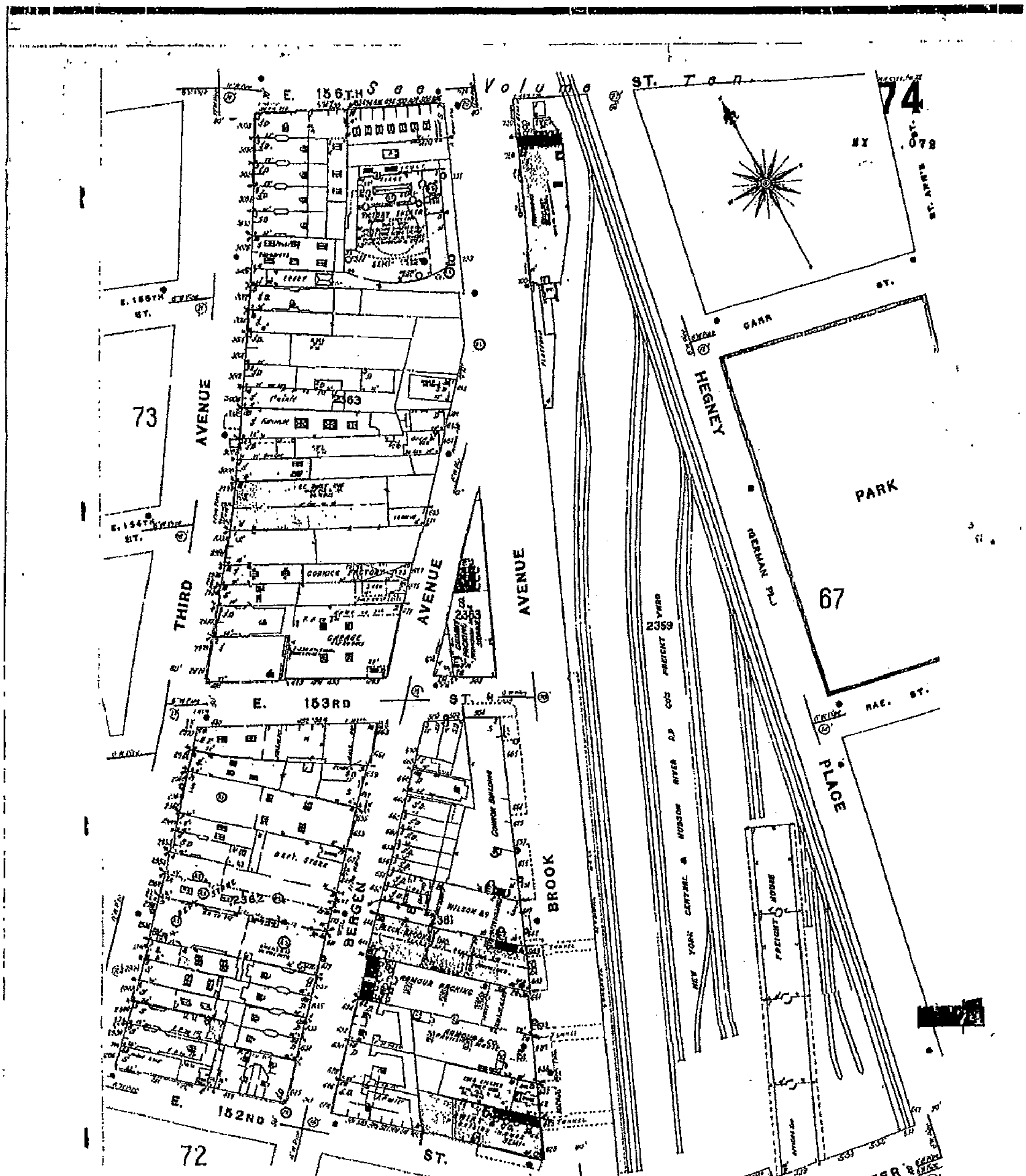
Sanborn® Maps from Phase I ESA


209
208
214
213
210
ROSE
AVENUE
E. 153rd ST.
153rd STREET
EAST 154th STREET
EAST 155th STREET
THIRD AVENUE
ROSE ST.
ELTON AVENUE
AVENUE
GROVE ST.
AVENUE
EAST 156th STREET
AVENUE
EAST
PLACE
GERMAN
Port Morris Branch of the N.Y. and Harlem Railroad
RAE ST.
CARR ST.
Cemetery
AVENUE
ST. ANN'S
50ft.

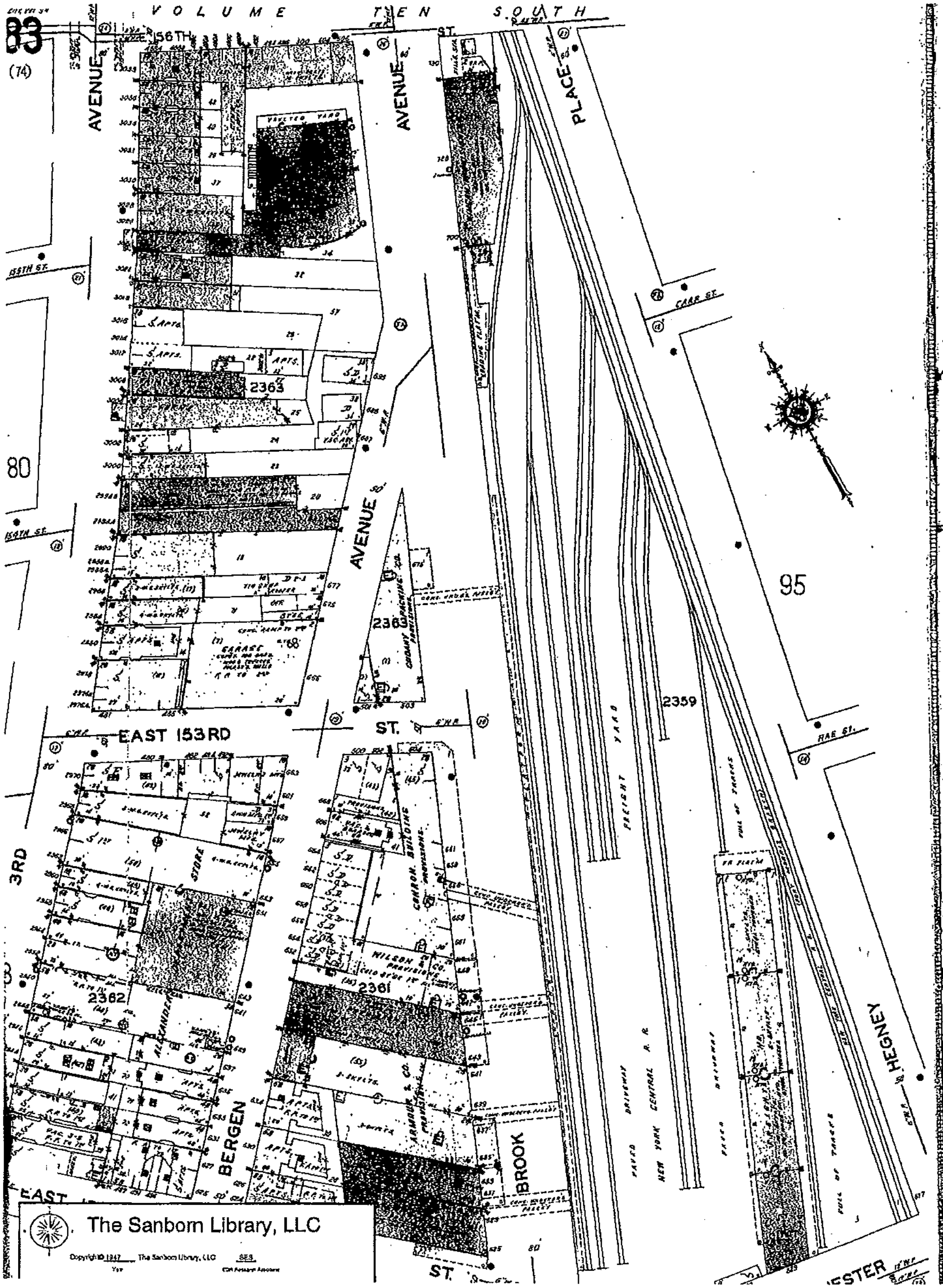

74
E. 156TH ST.
See Volume Ten
THIRD AVENUE
BERGEN AVENUE
BROOK AVENUE
E. 153RD ST.
E. 152ND ST.
GERMAN PLACE
CARR ST.
RAE ST.
ST. ANN'S ST.
PARK
WESTCHESTER AVENUE
NEW YORK CENTRAL & HUDSON RIVER R.R. CO'S FREIGHT YARD
FREIGHT HOUSE
CORNICE FACTORY
PLACE
2363
2362
2361
2359
73
72
69
70
67


E. 156TH
See Volume Ten
ST.
74
ST. ANN'S
ST.
CARR
ST.
HEGNEY
(GERMAN PL.)
PARK
67
RAE ST.
PLACE
THIRD
AVENUE
73
2363
CORNICE FACTORY
GARAGE
AVENUE
CUDAHY PACKING CO.
E. 153RD ST.
BROOK
AVENUE
2359
NEW YORK CENTRAL & HUDSON RIVER R.R. CO'S FREIGHT YARD
BERGEN
2362
2361
WILSON & CO.
ARMOUR PACKING CO.
ARMOUR & CO.
FREIGHT HOUSE
TUNNEL
ESTER

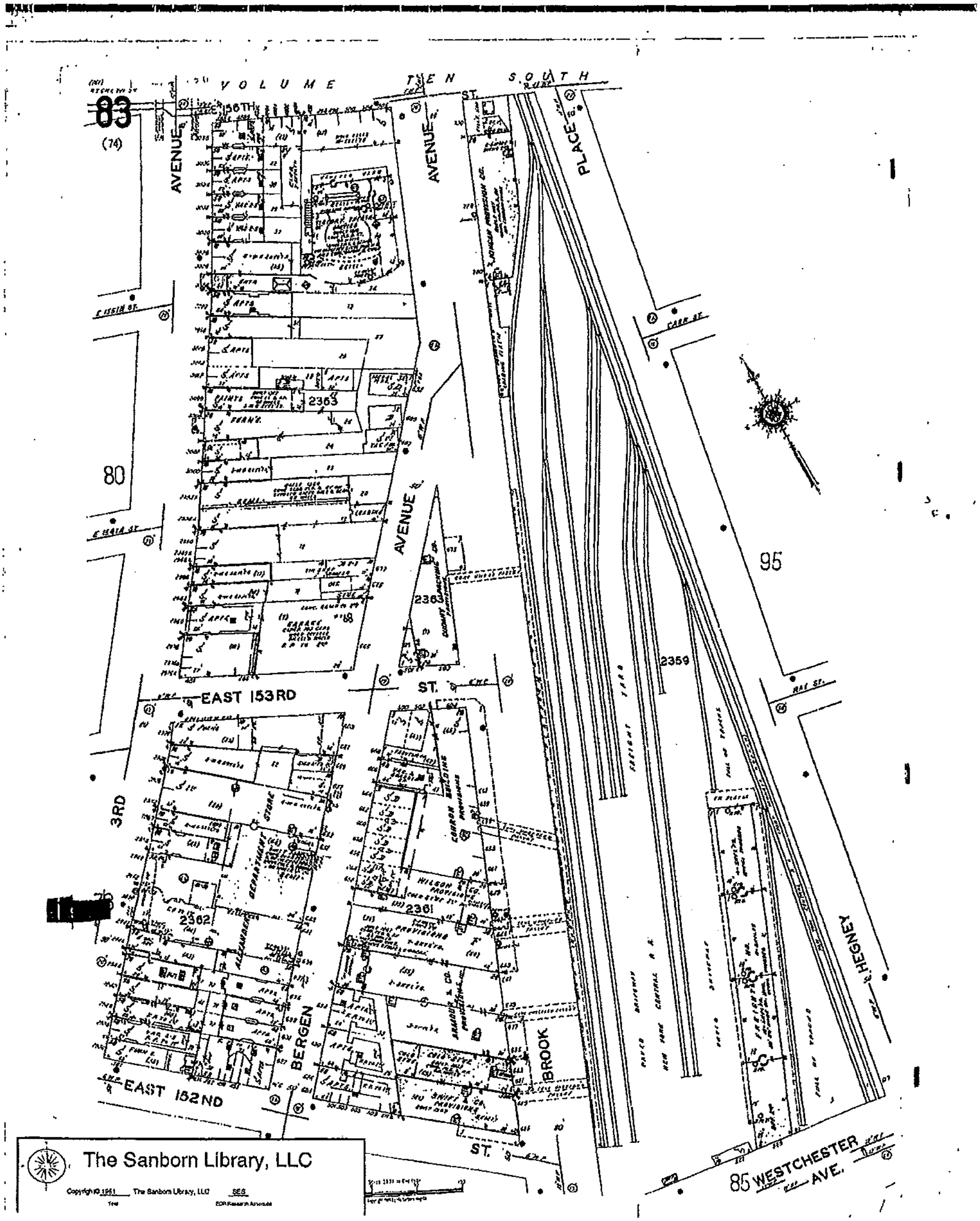

74
73
THIRD AVENUE
E. 155TH ST.
E. 154TH ST.
E. 153RD ST.
E. 152ND ST.
2363
2362
2361
2359
BERGEN AVENUE
AVENUE
BROOK
CORNICE FACTORY
GARAGE
ARMOUR PACKING
CARR ST.
HEGNEY
(GERMAN PL.)
PARK
67
RAE ST.
NEW YORK CENTRAL & HUDSON RIVER R.R. COS FREIGHT YARD
FREIGHT HOUSE
WESTCHESTER AVENUE
72
69
70



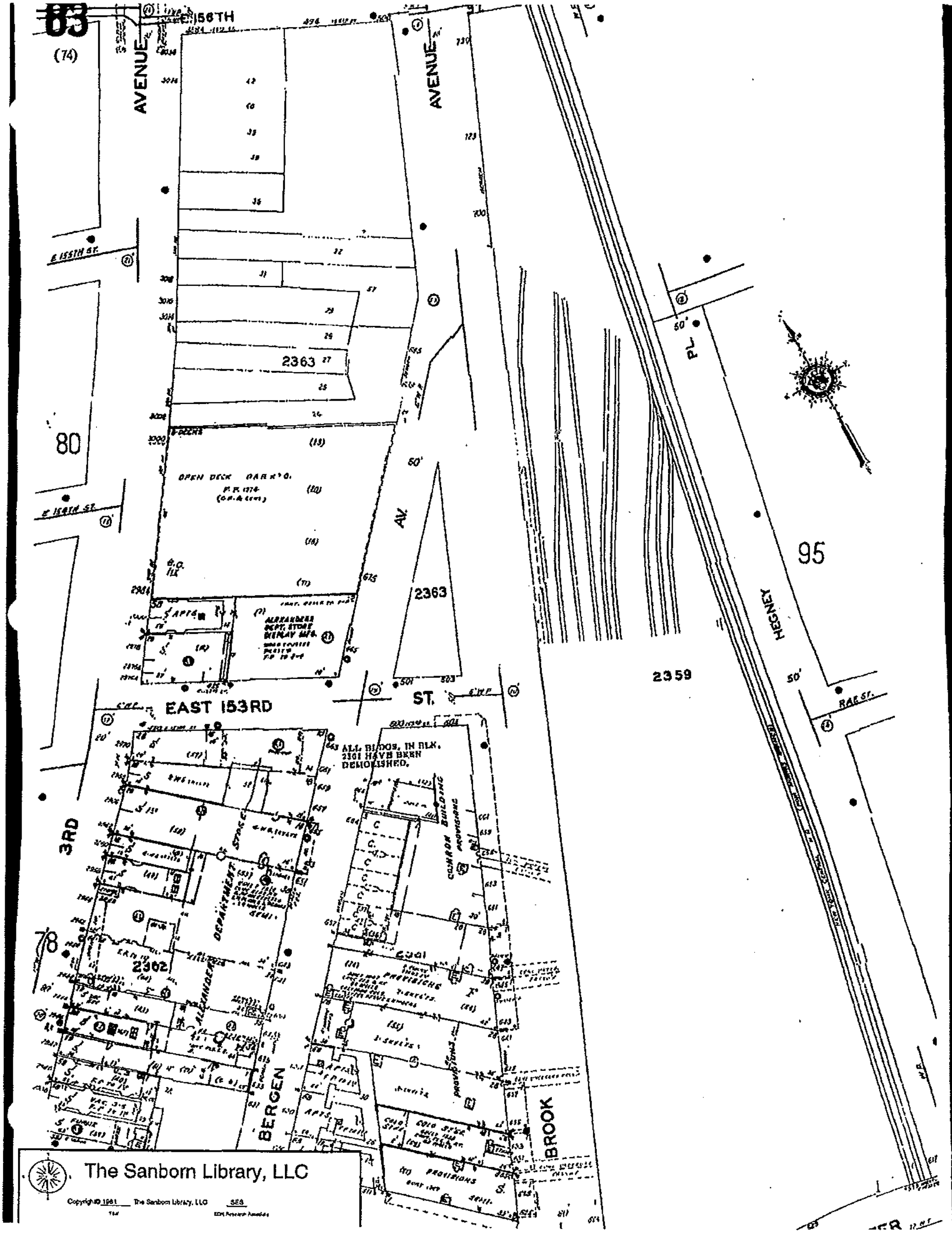
E. 156TH
See Volume Ten
ST.
74
E. 155TH ST.
73
THIRD
AVENUE
E. 154TH ST.
CORNICE FACTORY
GARAGE
AVENUE
2363
AVENUE
E. 153RD ST.
2362
BERGEN
2361
BROOK
ARMOUR PACKING
WILSON & CO
E. 152ND ST.
72
69
CARR ST.
HEGNEY
PLACE
PARK
67
RAC. ST.
2359
NEW YORK CENTRAL & HUDSON RIVER R.R. CO'S FREIGHT YARD
FREIGHT HOUSE
WESTCHESTER AVENUE
70

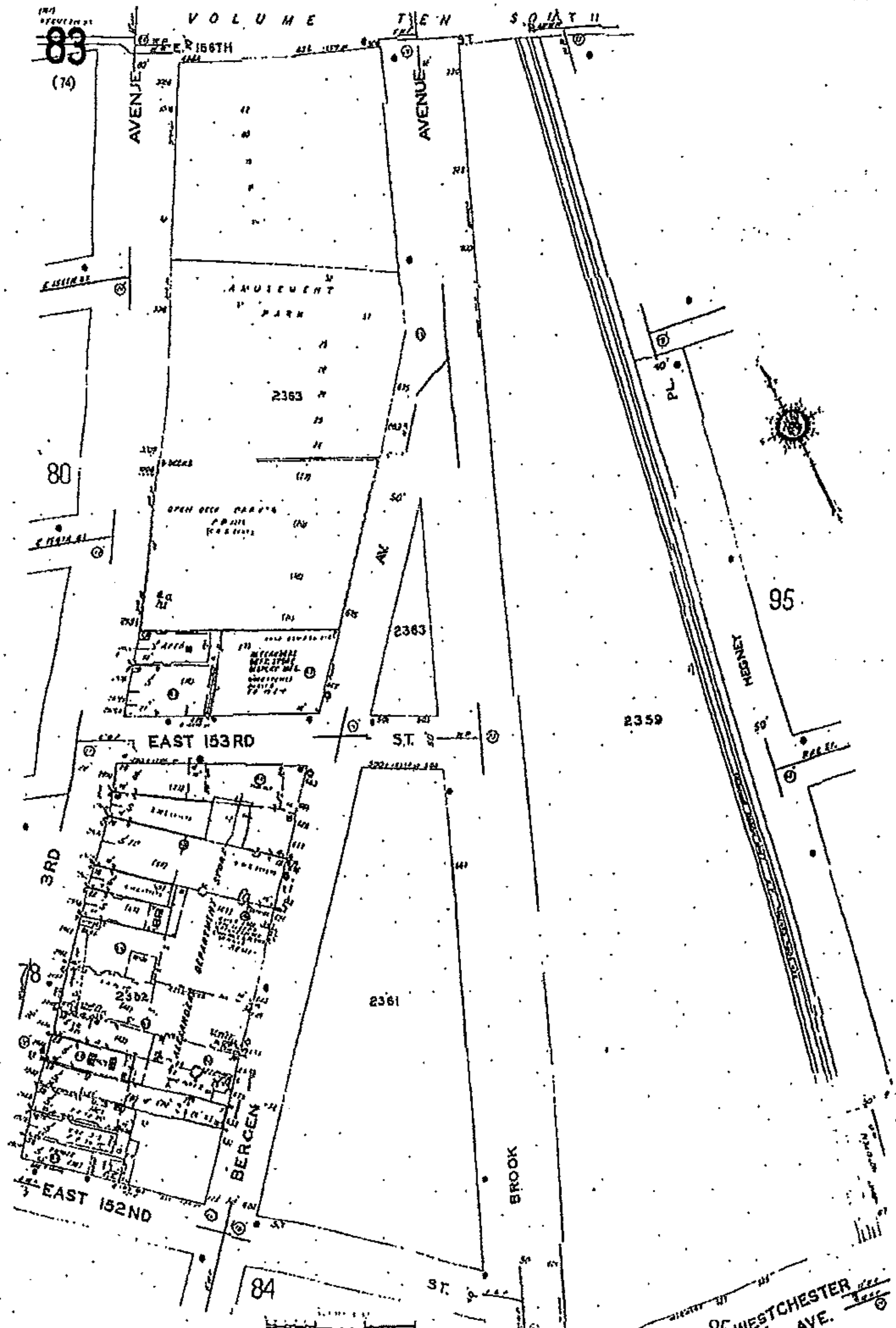


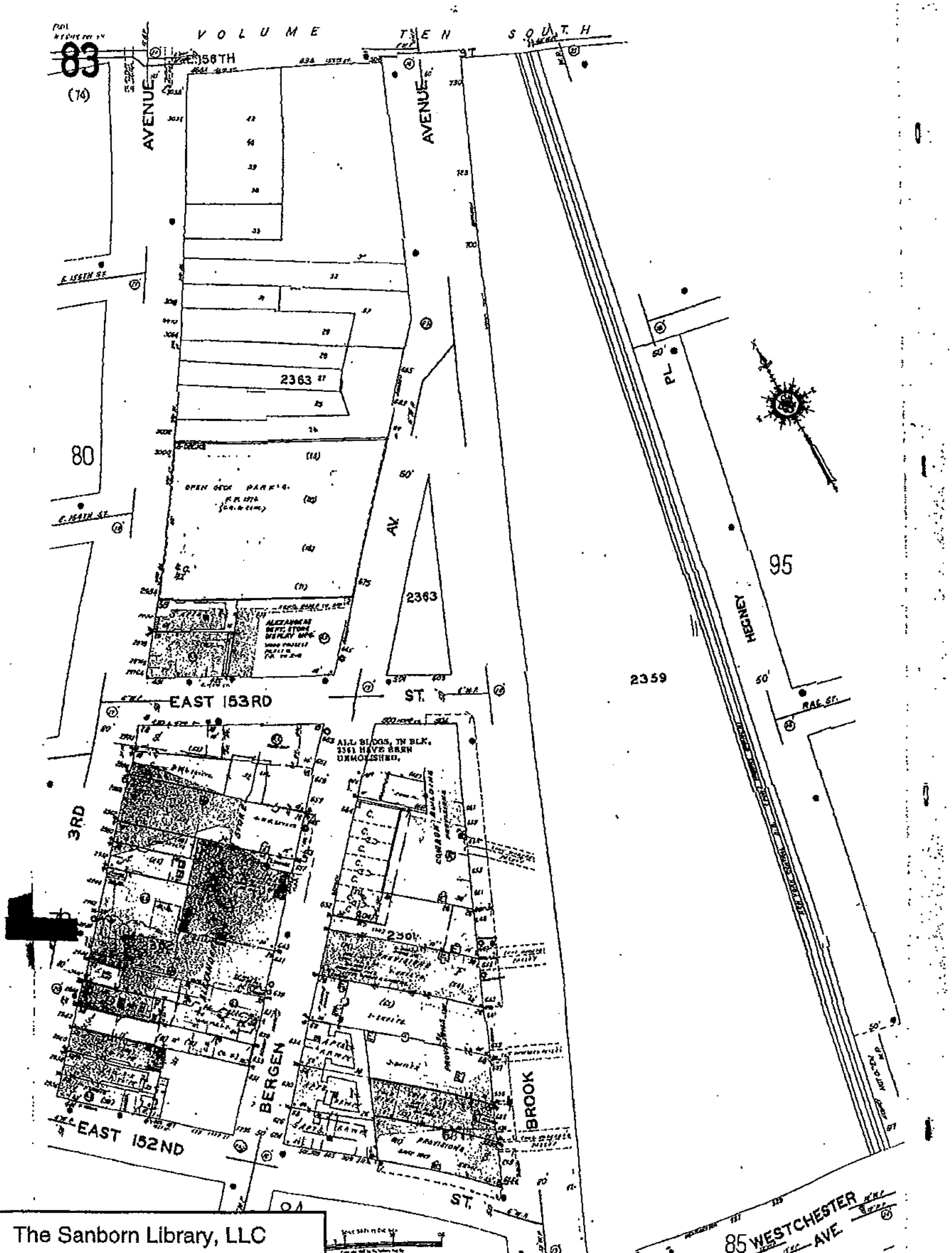
83
(74)
VOLUME TEN SOUTH
E. 156TH ST.
AVENUE
AVENUE
PLACE
CARR ST.
80
2363
AVENUE
95
2363
EAST 153RD ST.
2359
RAE ST.
3RD
GARAGE
STORE
WILSON & CO. PROVISIONS
2361
2362
ALEXANDER
ARMOUR & CO. PROVISIONS
BERGEN
BROOK
NEW YORK CENTRAL R.R.
FREIGHT YARD
HEGNEY
EAST
ST.
CHESTER

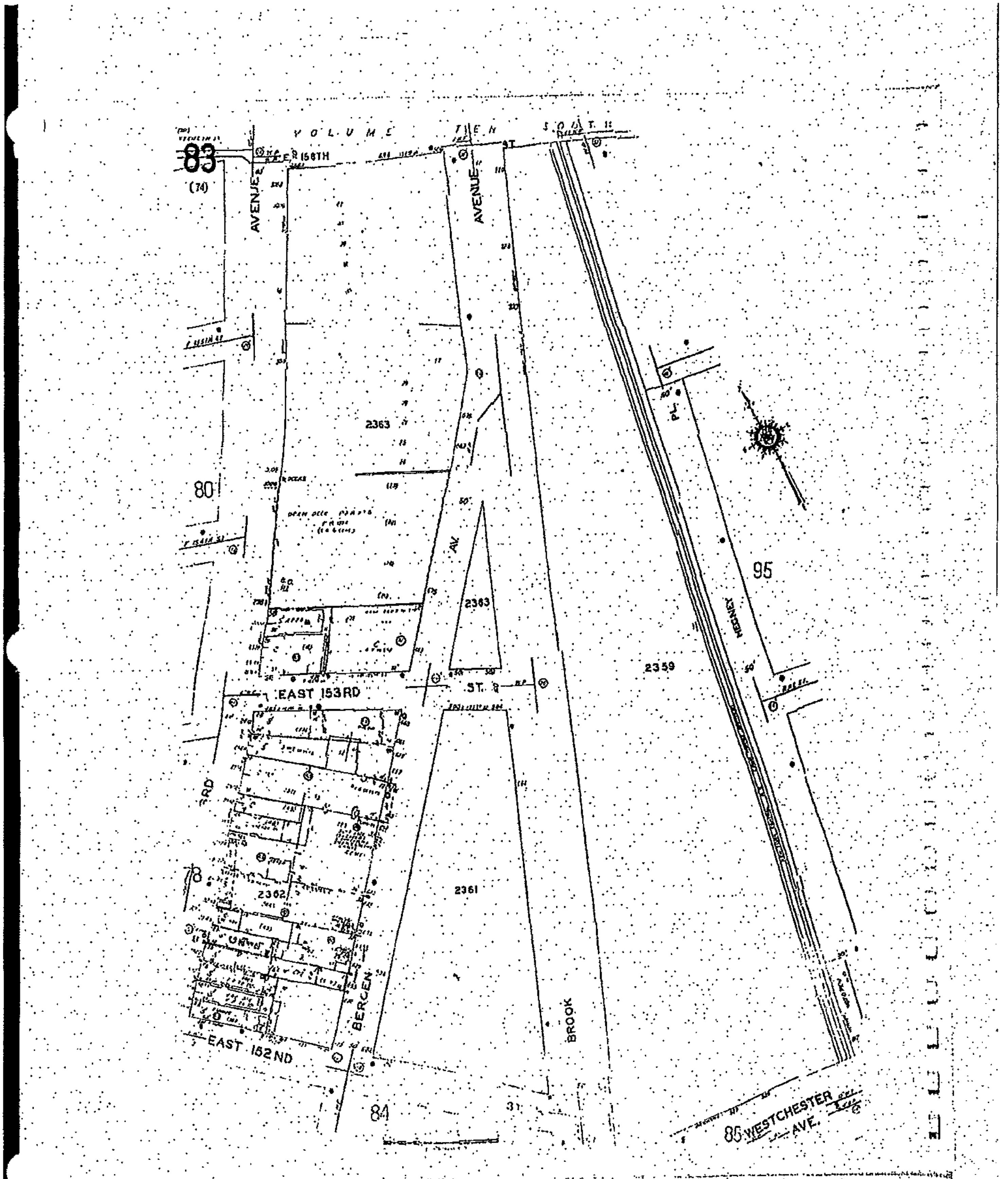


VOLUME TEN SOUTH
83
(74)
E. 156TH ST.
AVENUE
AVENUE
PLACE
CARR ST.
80
95
2363
2363
2359
AVENUE
EAST 153RD ST.
RAE ST.
3RD
DEPARTMENT STORE
2362
2361
BERGEN
BROOK
HEGNEY
EAST 152ND ST.
85 WESTCHESTER AVE.


83
(74)
E. 156TH
AVENUE
AVENUE
2363
80
E 155TH ST.
E 154TH ST.
OPEN DECK PARK'G.
AV.
50'
2363
EAST 153RD
ST.
ALL BLDGS. IN BLK. 2361 HAVE BEEN DEMOLISHED.
3RD
78
2362
DEPARTMENT STORE
ALEXANDERS
BERGEN
BROOK
PL
HEGNEY
95
2359
RAE ST.

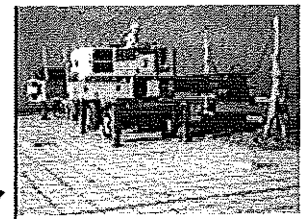

VOLUME TEN SOUTH
83
(74)
E. 156TH
ST.
AVENUE
AVENUE
AMUSEMENT PARK
2363
80
AV
2363
95
HEGNEY
PL.
2359
EAST 153RD
ST.
3RD
78
2362
2361
BERGEN
BROOK
EAST 152ND
ST.
84
ST.
85
WESTCHESTER
AVE.


VOLUME TEN SOUTH
83
(74)
E. 156TH
AVENUE
AVENUE
2363
80
OPEN DECK PARK'G
ALEXANDERS DEPT. STORE DISPLAY MFG.
AV.
2363
PL.
HEGNEY
95
2359
EAST 153RD
ST.
ALL BLDGS. IN BLK. 2361 HAVE BEEN DEMOLISHED.
2361
3RD
BERGEN
BROOK
EAST 152ND
ST.
85 WESTCHESTER
AVE.


VOLUME TEN SOUTH
83
(74)
AVENUE
E 156TH
ST
AVENUE
2363
80
AV
2363
95
PL.
2359
EAST 153RD
ST.
2362
2361
78
BERGEN
BROOK
EAST 152ND
84
85
WESTCHESTER
AVE.

APPENDIX C

Vapor Barrier Specifications



Stego® Wrap Vapor Barrier

STEGO INDUSTRIES, LLC

Vapor Retarders
07260, 03300

1 Product Name
Stego Wrap Vapor Barrier

2 Manufacturer
Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3 Product Description
USES: Stego Wrap is used as a true below-slab vapor barrier, and as a protection course for below grade waterproofing applications.
COMPOSITION: Stego Wrap Vapor Barrier is a multi-layer plastic extrusion manufactured with only the highest grade of prime, virgin, polyolefin resins.
SIZE: Stego Wrap Vapor Barrier comes in rolls 14' x 140' or 1,960 ft²
WEIGHT: Stego Wrap rolls weigh approximately 141 lb.

4 Technical Data
APPLICABLE STANDARDS
American Society for Testing & Materials (ASTM)

- ASTM E 1745 - Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs
- ASTM D 882 - Test Methods for Tensile Properties of Thin Plastic Sheeting
- ASTM D 1709 - Test Methods for Impact Resistance of Plastic Film by Free-Falling Dart Method
- ASTM E 96 - Test Methods for Water Vapor Transmission of Materials
- ASTM E 154 - Test Methods for Water Vapor Retarders Used in Contact with Earth under Concrete Slabs, on Walls, or as Ground Cover
- ASTM E 631 - Terminology of Building Constructions
- ASTM F 1249 - Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor
- ASTM E 1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

American Concrete Institute (ACI)

- ACI 302.1R-96 Minimum Thickness (10-mils)

ENVIRONMENTAL FACTORS
Stego Wrap Vapor Barrier can be used in systems for the control of soil gases (radon, methane), soil poisons (oil by-products) and sulfates.

5 Installation
UNDERSLAB: Unroll Stego Wrap Vapor Barrier over an aggregate, sand or tamped earth base. Overlap all seams a minimum of 6" and tape using Stego Tape. All penetrations must be sealed using a combination of Stego Wrap, Stego Tape and/or Stego Mastic.

VERTICAL WALL: Install Stego Wrap Vapor Barrier over the waterproofing membrane while still tacky. Mechanically fasten Stego Wrap to the wall at the top with termination bar and concrete nails. Drape Stego Wrap down across the footer and under the french drain.

6 Availability & Cost
Stego Wrap Vapor Barrier is available nationally via building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' sales department.

7 Warranty
Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8 Maintenance
None required.

9 Technical Services
Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or via the website: www.stegoindustries.com

10 Filing Systems
- Stego Industries' website
- Buildsite
- MasterSpec
- SpecSource

TABLE 1: PHYSICAL PROPERTIES OF STEGO WRAP VAPOR BARRIER

Property & Test	Stego Wrap Vapor Barrier
Underslab Vapor Retarders, ASTM E 1745 Class A	Exceeds
Water Vapor Permeance, ASTM F 1249	0.0084 perms (*0.0035 WVTR)
Tensile Strength, ASTM D 882	79.6 lbf./in.
Puncture Resistance, ASTM D 1709	2326 grams
Chemical Resistance, ASTM E 154	Unaffected
Life Expectancy, ASTM E 154	Indefinite
Thickness	15 mils

Note: perm unit = grains/(ft² *hr* in.Hg) * WVTR water vapor transmission rate

APPENDIX D

Health and Safety Plan

CA RICH
ENVIRONMENTAL SPECIALISTS

HEALTH AND SAFETY PLAN
&
COMMUNITY AIR MONITORING PLAN

FOR THE
REMEDIAL ACTION WORK PLAN
AT
VIA VERDE AKA
NEW HOUSING NEW YORK LEGACY PROJECT, BRONXCHESTER URBAN RENEWAL AREA
700-730 BROOK AVENUE
BRONX, NEW YORK

BCP SITE #C203043

April 2009

Prepared for:

Via Verde Homes, LLC
Via Verde Rental Associates, L.P.
902 Broadway, 13th Floor
New York, New York 10010

and

City of New York
Department of Housing Preservation and Development
Environmental Planning Unit
100 Gold Street
New York, New York 10038

Prepared by:

CA RICH CONSULTANTS, INC.
17 Dupont Street
Plainview, New York 11803
(516) 576-8844

HEALTH AND SAFETY PLAN
&
COMMUNITY AIR MONITORING PLAN
FOR THE
REMEDIAL ACTION WORK PLAN
AT
VIA VERDE AKA
NEW HOUSING NEW YORK LEGACY PROJECT, BRONXCHESTER URBAN RENEWAL AREA
700-730 BROOK AVENUE
BRONX, NEW YORK

BCP SITE #C203043

1.0 INTRODUCTION

This Health and Safety Plan (HASP) is developed for implementation during the planned remedial activities at 700-730 Brook Avenue in the Bronx, New York, BCP Site #C203043 (hereinafter referred to as 'Via Verde' or the 'Site'). The HASP is to be enforced by the Project Health and Safety Manager and on-Site Health & Safety Coordinator (HSC). The on-Site HSC will interface with the Project Manager and is vested with the authority to make field decisions including the termination of on-Site activities if an imminent health and safety hazard, condition or related concern arises. Information and protocol in the HASP is applicable to all on-Site personnel who will be entering the work zone.

2.0 POTENTIAL HAZARDS

2.1 Chemical Hazards

Based on the results of the Remedial Investigation (RI), the contaminants of concern are volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), the PCB Aroclor 1260, and metals.

The organic chemicals listed above are described as "sweet" or "aromatic" smelling and are narcotic in high concentrations. Acute exposure to significant concentrations of these chemicals can cause irritation of the skin, eyes and mucus membrane, headache, dizziness, nausea, and in high enough concentrations, loss of consciousness and death *(Sax, 1984)*. These compounds are suspected to be carcinogenic with chronic exposure.

Physical properties and additional toxicological information is included in Appendix A.

2.2 Other Health and Safety Risks

The HASP addresses the environmentally-related chemical hazards identified on the Site. Normal physical hazards associated with using excavation and injection equipment and hand tools as well as hazards associated with adverse climatic conditions (heat & cold) also exist and represent a certain degree of risk to be assumed by on-Site personnel.

Certain provisions in this Plan, specifically the use of personnel protective equipment, may tend to increase the risk of physical injury, as well as susceptibility to cold or heat stress. This is primarily due to restrictions in dexterity, hearing, sight, and normal body heat transfer inherent in the use of protective gear.

3.0 RISK MANAGEMENT

3.1 Work / Exclusion Zones

For each proposed remedial activity (e.g. limited soil excavation, cutting & filling, Regenox™/ORC® Advanced injection, well monitoring and sampling, vapor barrier installation, sub-slab depressurization (SSD) system installation and operation, tank and lift removals, etc.), a work / exclusion zone will be established surrounding the activity. Access to this area will be limited to properly trained, properly protected personnel directly involved with the on-Site activities. Enforcement of the work/exclusion zone boundaries is the responsibility of the on-Site Health and Safety Coordinator.

3.2 Personnel Protection

Health & Safety regulatory personnel have developed different levels of personnel protection to deal with differing degrees of potential risks of exposure to chemical constituents. The levels are designated as **A, B, C,** and **D** and are ranked according to the amount of personnel protection afforded by each level. Level **A** is the highest level of protection and Level **D** is the lowest level of protection as described below.

> **A** – Fully encapsulating suit, SCBA, hard hat, chemical-resistant steel-toed boots, boot covers, inner and outer gloves.
>
> **B** – One-piece, hooded chemical-resistant splash suit, SCBA, hard hat, chemical-resistant steel-toed boots, boot covers, inner and outer gloves.
>
> **C** – One-piece, hooded chemical-resistant splash suit, hard hat, canister equipped face mask, chemical-resistant steel-toed boots, boot covers, inner and outer gloves.
>
> **D** – Work clothes, hard hat (optional), work boots/shoes, gloves (as needed).

The different levels are primarily dependent upon the degree of respiratory protection necessary, in conjunction with appropriate protective clothing. Levels of protection mandate a degree of respiratory protection. However, flexibility exists within the lower levels (B, C, and D) concerning proper protective clothing.

The four levels of protection were developed for utilization in situations which involve suspected or known atmospheric and/or environmental hazards including airborne contamination and skin-affecting substances.

It is anticipated that all of the remedial work will be performed using Level D protection (no respiratory protection with protective clothing requirements limited to long sleeved shirts, long pants or coveralls, work gloves and steel-toe leather work boots).

Level D may be modified by the HSC to include protective clothing or equipment (Saran-coated disposable coveralls or PVC splash suits, safety glasses, hard hat with face shield, and chemically resistant boots) based upon physical hazards, skin contact concerns, and real-time monitoring.

Real-time air monitoring for total airborne organics using either a PID or an HNU will determine if and when an upgrade from Level D to a higher level of respiratory protection is warranted. Decisions for an upgrade from Level D to higher levels of protection, mitigative actions, and/or suspension of work are the responsibility of the Project Manager and/or the designated on-Site HSC.

3.3 Air Monitoring

The HSC or his properly trained assignee will conduct "Real Time" air monitoring for total organic vapor and total particulates. 'Real-time' monitoring refers to the utilization of instrumentation, which yields immediate measurements. The utilization of real time monitoring helps determine immediate or long-term risks to on-site personnel and the general public, the appropriate level of personnel respiratory protection necessary, and actions to mitigate the recognized hazard. Air monitoring will be conducted in accordance with NYSDOH's Community Air Monitoring Program.

3.3.1. Particulate Monitoring

a. Instrumentation

Dust particulates in air will be monitored using a light scattering technique MINIRAM Model PDM-3 Miniature Real-time Aerosol Monitor (MINIRAM) or equivalent. The MINIRAM is capable of measuring airborne dust particles within the range of 10 to 100,000 micrograms per cubic meter ($\mu g/m^3$).

b. Application

Dust monitoring will occur at regular intervals during excavation work activities. Monitoring will be conducted in upgradient and downgradient locations, relative to prevailing wind direction) along the perimeter of the work zone. The HSC or his designee will perform monitoring. As outlined in the NYSDOH Community Air Monitoring Plan, if particluate levels in the downwind location are 150 mg/m^3 greater than those measured in the upwind location, dust suppression techniques shall be employed.

3.3.2 Organic Vapor

a. Instrumentation

Real-time monitoring for total organic vapor (TOV) utilizes either a photo-ionization detector (PID) or flame ionization detector (FID). The appropriate PID is an intrinsically safe HNU Systems Model PI-101 (HNU) or MiniRae™ or equivalent, which is factory calibrated to benzene. The appropriate FID is a Foxboro model 128 Organic vapor Analyzer (OVA) or equivalent, which is factory calibrated to methane.

b. Application

Organic vapor monitoring is performed as outlined in the NYSDOH Community Air Monitoring Plan. Specifically, monitoring shall be conducted at the downwind perimeter of the work zone periodically during work activities. If TOV levels exceed 5 parts per million (ppm) above established pre-work background levels, work activities will be halted and monitoring will be continued under the provision of a Vapor Emission Response Plan (as outlined in the Community Air Monitoring Plan).

3.4 Worker Training

Personnel overseeing the excavation of the contaminated soil and/or other activities will be trained, fit-tested, and medically certified (OSHA 29 CFR 1910. 134). This includes the HSC or his/her properly trained assignee.

Prior to any work, all workers involved with the project should be aware of the potential chemical, physical and biological hazards discussed in this document, as well as the general safety practices outlined below. A safety briefing by the on-Site HSC and/or designee shall take place at the outset of work activities.

The HSC will be available to address project-related health & safety issues a site worker (such as an equipment operator or laborer) may have regarding the Site conditions. Once an issue is brought to the HSC's attention, he or she will evaluate the issue and apply the procedures outlined in this HASP.

3.5 General Safety Practices

All project personnel shall follow the following safety practices:

1. Avoid unnecessary skin exposure to subsurface materials. Long-sleeved shirts tucked into long pants (or coveralls), work gloves, and steel-toe leather work boots are required unless modified gear is approved by the HSC. Remove any excess residual soil from clothes prior to leaving the site.

2. No eating, drinking, gum or tobacco chewing, or smoking allowed in designated work areas. Thoroughly wash hands prior to these activities outside the work area. Avoid sitting on the ground during breaks or while eating and drinking. Thoroughly wash all exposed body areas at the end of the workday.

3. Some symptoms of acute exposure include: nausea, dizziness, light-headedness, impaired coordination, headache, blurred vision, and nose/throat/eye irritation. If these symptoms are experienced or strong odor is detected, leave the work area and immediately report the incident to the on-site HSC.

3.6 Enforcement

Enforcement of the Site Safety Plan will be the responsibility of the HSC or his/her designee. The Coordinator should be on-site on a full-time basis and perform or directly oversee all aspects of Project Health & Safety operations including: air monitoring; environmental mitigation; personnel respiratory and skin protection; general safety practices; documentation; emergency procedures and protocol; and reporting and recordkeeping as described below.

3.7 Reporting and Recordkeeping

Incidents involving injury, symptoms of exposure, discovery of contained (potentially hazardous) materials, or unsafe work practices and/or conditions should be immediately reported to the HSC.

A log book must be maintained on-Site to document all aspects of HASP enforcement. The log is paginated and dated with entries made on a daily basis in waterproof ink, initialed by the HSC or designee. Log entries should include date and time of instrument monitoring, instrument type, measurement method, test results, calibration and maintenance information, as well as appropriate mitigative actions responding to detections. Miscellaneous information to be logged may include weather conditions, reported complaints or symptoms, regulatory inspections, and reasons to upgrade personnel protection above the normal specification (Level D).

4.0 EMERGENCIES

4.1 EMERGENCY RESPONSE SERVICES

(1)	**HOSPITAL** Lincoln Hospital 234 E 149th St Bronx, NY 10451 (See Figure 1 for Map Route)	**(718) 993-3860**
(2)	**AMBULANCE**	**911**
(3)	**FIRE DEPARTMENT** **HAZARDOUS MATERIAL**	**911**
(4)	**POLICE DEPARTMENT**	**911**
(5)	**POISON CONTROL CENTER**	**(800) 222-1222**

The preceding list and associated attached map (Figure 1) illustrating the fastest route to the nearest hospital must be conspicuously posted in areas of worker congregation and adjacent to all on-site telephones (if any).

4.2 EMERGENCY PROCEDURES

4.2.1 Contact or Exposure to Suspected Hazardous Materials

In the event of a fire, chemical discharge, medical emergency, workers are instructed to immediately notify the HSC and proper emergency services (posted). Should physical contact with unknown or questionable materials occur, immediately wash the affected body areas with clean water and notify the HSC. Anyone experiencing symptoms of exposure should exit the work area, notify the HSC, and seek medical attention.

4.2.2 Personnel Decontamination, First Aid, and Fire Protection

The first step in the treatment of skin exposure to most chemicals is to rinse the affected area with water. For this reason, adequate amounts of potable water and soap are maintained on-Site in a clearly designated and readily-accessible location. Portable emergency eyewash stations and a first aid kit must be made available and maintained in the same locations as the potable water. Fire extinguishers are also to be maintained on-Site in designated locations. All on-Site personnel are to be made aware of the locations of the above-mentioned on-Site Health & Safety accommodations during the initial Health and Safety briefing.

4.2.3 Ingress/egress

Clear paths of ingress/egress to work zones and Site entrances/exits must be maintained at all times. Unauthorized personnel are restricted from accessing the site.

5.0 COMMUNITY AIR MONITORING PLAN

Real-time air monitoring for volatile compounds and particulate levels at the perimeter of the work area is necessary. This plan includes the following:

- Volatile organic compounds must be monitored at the downwind perimeter of the work area on a continuous basis. If total organic vapor levels exceed 5 ppm above background, work activities must be halted and monitoring continued under the provisions of a Vapor Emission Response Plan. All readings must be recorded and be available for State (DEC & DOH) personnel to review.

- Particulates should be continuously monitored upwind, downwind and within the work area at temporary particulate monitoring stations during excavation activities. If the downwind particulate level is 150 μg/m^3 greater than the upwind particulate level, then dust suppression techniques must be employed. All readings must be recorded and be available for State (DEC & DOH) personnel to review.

5.1 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- The organic vapor level 200 ft. downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

5.2 Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source are unsuccessful and if organic vapor levels are approaching 5 ppm above background for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect;

However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

5.3 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in the HASP will go into effect.
2. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.
3. Frequent air monitoring will be conducted at 30 minutes intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

6.0 HEALTH AND SAFETY PLAN REFERENCES

1. American Conference Governmental Industrial Hygienists, 1989; Threshold Limit Values And Biological Exposure Indices.
2. Geoenvironmental Consultants, Inc., 1987; Safety & Operations At Hazardous Materials Sites.
3. US Department Of Health And Human Services, Centers For Disease Control, 1985; NIOSH Guide To Chemical Hazards.
4. US Department Of Labor Occupational Safety & Health Administration, 1989; Hazardous Waste Operations And Emergency Response Interim Final Rule, 29 CFR Part 1910.
5. Sax, N. I., 1984; Dangerous Properties Of Industrial Materials.

7.0 KEY PERSONNEL

Responsibility	Name and Phone Number	Task Description
Project Manager	Deborah Shapiro (516) 576-8844	Oversee and coordinate all technical aspects for the project
Site Safety Officer	Victoria Whelan (516) 576-8844	Coordinate and inspect all health and safety operations from the project site

Client Representative Eliza Datta (212) 243-9090 x219 and Ari Goldstein (917) 542-3656

Project Manager Alternate Rich Izzo (516) 576-8844

Site Safety Officer Alternate Mike Yager (516) 576-8844

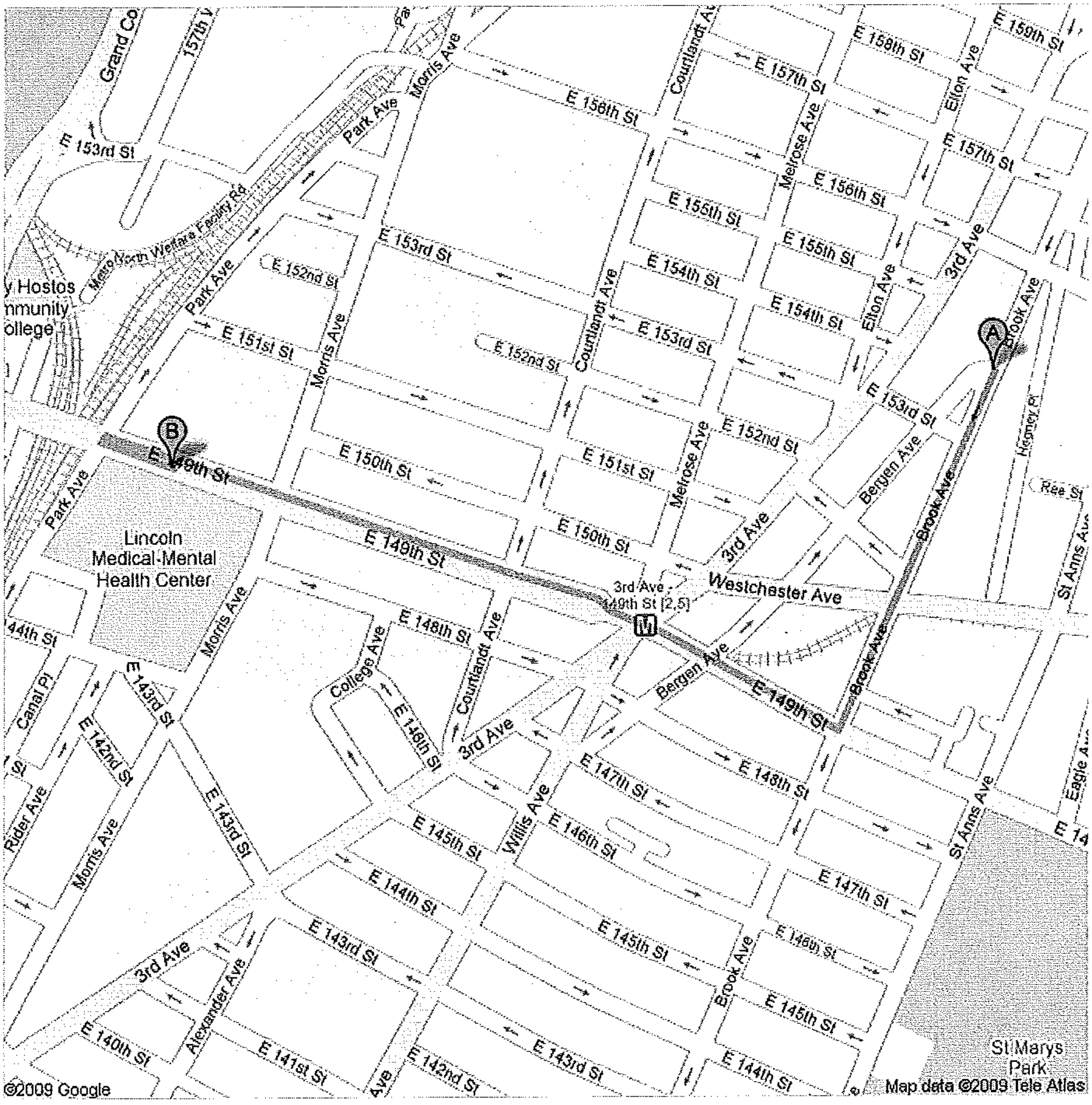
Figure 1

Hospital Route Map

Google Maps

Directions to 234 E 149th St, Bronx, NY 10451

0.9 mi – about 4 mins



A 700 Brook Ave, Bronx, NY 10455

1.	Head **southwest** on **Brook Ave** toward **Bergen Ave** About 1 min	go 0.3 mi total 0.3 mi
2.	Turn **right** at **E 149th St** About 2 mins	go 0.6 mi total 0.9 mi
3.	Make a **U-turn** at **Park Ave** Destination will be on the right About 1 min	go 325 ft total 0.9 mi

B 234 E 149th St, Bronx, NY 10451

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.

APPENDIX A

Material Safety Data Sheets

September 2005

NIOSH Pocket Guide to Chemical Hazards

Acetone

CAS 67-64-1

$(CH_3)_2CO$

RTECS AL3150000

Synonyms & Trade Names
Dimethyl ketone, Ketone propane, 2-Propanone

DOT ID & Guide
1090 127

Exposure Limits

NIOSH REL: TWA 250 ppm (590 mg/m^3)

OSHA PEL†: TWA 1000 ppm (2400 mg/m^3)

IDLH 2500 ppm [10%LEL] See: 67641

Conversion 1 ppm = 2.38 mg/m^3

Physical Description
Colorless liquid with a fragrant, mint-like odor.

MW: 58.1	BP: 133°F	FRZ: -140°F	Sol: Miscible
VP: 180 mmHg	IP: 9.69 eV		Sp.Gr: 0.79
Fl.P: 0°F	UEL: 12.8%	LEL: 2.5%	

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities
Oxidizers, acids

Measurement Methods
NIOSH 1300, 2555, 3800; OSHA 69
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH
Up to 2500 ppm:
(APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms Irritation eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system	

See also: INTRODUCTION See ICSC CARD: 0087 See MEDICAL TESTS: 0002

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

Chloroform			**CAS** 67-66-3
$CHCl_3$			**RTECS** FS9100000
Synonyms & Trade Names Methane trichloride, Trichloromethane			**DOT ID & Guide** 1888 151
Exposure Limits	**NIOSH REL**: Ca ST 2 ppm (9.78 mg/m^3) [60-minute] See Appendix A **OSHA PEL†**: C 50 ppm (240 mg/m^3)		
IDLH Ca [500 ppm] See: 67663	**Conversion** 1 ppm = 4.88 mg/m^3		

Physical Description
Colorless liquid with a pleasant odor.

MW: 119.4	BP: 143°F	FRZ: -82°F	Sol(77°F): 0.5%
VP: 160 mmHg	IP: 11.42 eV		Sp.Gr: 1.48
Fl.P: NA	UEL: NA	LEL: NA	

Noncombustible Liquid

Incompatibilities & Reactivities
Strong caustics; chemically-active metals such as aluminum or magnesium powder, sodium & potassium; strong oxidizers [Note: When heated to decomposition, forms phosgene gas.]

Measurement Methods
NIOSH 1003
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH
At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms Irritation eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]

Target Organs Liver, kidneys, heart, eyes, skin, central nervous system

Cancer Site [in animals: liver & kidney cancer]

See also: INTRODUCTION See ICSC CARD: 0027 See MEDICAL TESTS: 0047

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

Ethyl benzene

CAS 100-41-4

$CH_3CH_2C_6H_5$

RTECS DA0700000

Synonyms & Trade Names
Ethylbenzol, Phenylethane

DOT ID & Guide
1175 130

Exposure Limits

NIOSH REL: TWA 100 ppm (435 mg/m^3) ST 125 ppm (545 mg/m^3)

OSHA PEL†: TWA 100 ppm (435 mg/m^3)

IDLH 800 ppm [10%LEL] See: 100414

Conversion 1 ppm = 4.34 mg/m^3

Physical Description
Colorless liquid with an aromatic odor.

MW: 106.2	BP: 277°F	FRZ: -139°F	Sol: 0.01%
VP: 7 mmHg	IP: 8.76 eV		Sp.Gr: 0.87
Fl.P: 55°F	UEL: 6.7%	LEL: 0.8%	

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities
Strong oxidizers

Measurement Methods
NIOSH 1501; OSHA 7, 1002
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Water flush promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA
Up to 800 ppm:
(APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma

Target Organs Eyes, skin, respiratory system, central nervous system	

See also: INTRODUCTION See ICSC CARD: 0268 See MEDICAL TESTS: 0098

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

Cumene

CAS 98-82-8

$C_6H_5CH(CH_3)_2$

RTECS GR8575000

Synonyms & Trade Names
Cumol, Isopropyl benzene, 2-Phenyl propane

DOT ID & Guide
1918 130

Exposure Limits

NIOSH REL: TWA 50 ppm (245 mg/m^3) [skin]

OSHA PEL: TWA 50 ppm (245 mg/m^3) [skin]

IDLH 900 ppm [10%LEL] See: 98828

Conversion 1 ppm = 4.92 mg/m^3

Physical Description
Colorless liquid with a sharp, penetrating, aromatic odor.

MW: 120.2	BP: 306°F	FRZ: -141°F	Sol: Insoluble
VP: 8 mmHg	IP: 8.75 eV		Sp.Gr: 0.86
Fl.P: 96°F	UEL: 6.5%	LEL: 0.9%	

Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.

Incompatibilities & Reactivities
Oxidizers, nitric acid, sulfur acid [Note: Forms cumene hydroperoxide upon long exposure to air.]

Measurement Methods
NIOSH 1501
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Water flush promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA
Up to 500 ppm:
(APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*
(APF = 10) Any supplied-air respirator*
Up to 900 ppm:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode*
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*
(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

Exposure Routes	inhalation, skin absorption, ingestion, skin and/or eye contact
Symptoms	Irritation eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma
Target Organs	Eyes, skin, respiratory system, central nervous system

See also: INTRODUCTION See ICSC CARD: 0170 See MEDICAL TESTS: 0060

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

Toluene

CAS 108-88-3

$C_6H_5CH_3$

Synonyms & Trade Names
Methyl benzene, Methyl benzol, Phenyl methane, Toluol

Exposure Limits	NIOSH REL: TWA 100 ppm (375 mg/m^3)
	OSHA PEL†: TWA 200 ppm C 300 ppm 5
IDLH 500 ppm See: 108883	**Conversion** 1 ppm = 3.77 mg/m^3

Physical Description
Colorless liquid with a sweet, pungent, benzene-like odor.

MW: 92.1	BP: 232°F	FRZ: -	
VP: 21 mmHg	IP: 8.82 eV		Sp.Gr: 0.87
Fl.P: 40°F	UEL: 7.1%	LEL: 1.1%	

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities
Strong oxidizers

Measurement Methods
NIOSH 1500, 1501, 3800, 4000; OSHA 111
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH
Up to 500 ppm:
(APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms Irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage

Target Organs	Eyes, skin, respiratory system, central nervous system, liver, kidneys

See also: INTRODUCTION See ICSC CARD: 0078 See MEDICAL TESTS: 0232

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

Tetrachloroethylene

CAS 127-18-4

$Cl_2C{=}CCl_2$

RTECS KX3850000

Synonyms & Trade Names
Perchlorethylene, Perchloroethylene, Perk, Tetrachlorethylene

DOT ID & Guide
1897 160

Exposure Limits
NIOSH REL: Ca Minimize workplace exposure concentrations. See Appendix A
OSHA PEL†: †: TWA 100 ppm
C 200 ppm (for 5 minutes in any 3-hour period), with a maximum peak of 300 ppm

IDLH Ca [150 ppm] See: 127184

Conversion 1 ppm = 6.78 mg/m^3

Physical Description
Colorless liquid with a mild, chloroform-like odor.

MW: 165.8	BP: 250°F	FRZ: -2°F	Sol: 0.02%
VP: 14 mmHg	IP: 9.32 eV		Sp.Gr: 1.62
Fl.P: NA	UEL: NA	LEL: NA	

Noncombustible Liquid, but decomposes in a fire to hydrogen chloride and phosgene.

Incompatibilities & Reactivities
Strong oxidizers; chemically-active metals such as lithium, beryllium & barium; caustic soda; sodium hydroxide; potash

Measurement Methods
NIOSH 1003; OSHA 1001
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH
At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, liver, kidneys, central nervous system

Cancer Site [in animals: liver tumors]

See also: INTRODUCTION See ICSC CARD: 0076 See MEDICAL TESTS: 0179

September 2005

NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms & Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

Difluorodibromomethane

CAS 75-61-6

CBr_2F_2

RTECS PA7525000

Synonyms & Trade Names
Dibromodifluoromethane; Freon® 12B2; Halon® 1202

DOT ID & Guide
1941 171

Exposure Limits
NIOSH REL: TWA 100 ppm (860 mg/m^3)
OSHA PEL: TWA 100 ppm (860 mg/m^3)

IDLH 2000 ppm See: 75616

Conversion 1 ppm = 8.58 mg/m^3

Physical Description
Colorless, heavy liquid or gas (above 76°F) with a characteristic odor.

MW: 209.8	BP: 76°F	FRZ: -231°F	Sol: Insoluble
VP: 620 mmHg	IP: 11.07 eV		Sp.Gr(59°F): 2.29
Fl.P: NA	UEL: NA	LEL: NA	

Noncombustible Liquid
Nonflammable Gas

Incompatibilities & Reactivities
Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium

Measurement Methods
NIOSH 1012; OSHA 7
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: No recommendation
Remove: When wet or contaminated
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Water flush immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA
Up to 1000 ppm:
(APF = 10) Any supplied-air respirator
Up to 2000 ppm:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms In animals: irritation respiratory system; central nervous system symptoms; liver damage

Target Organs respiratory system, central nervous system, liver	

See also: INTRODUCTION See ICSC CARD: 1419

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

p-Xylene

CAS 106-42-3

$C_6H_4(CH_3)_2$

RTECS ZE2625000

Synonyms & Trade Names
1,4-Dimethylbenzene; para-Xylene; p-Xylol

DOT ID & Guide
1307 130

Exposure Limits	**NIOSH REL**: TWA 100 ppm (435 mg/m^3) ST 150 ppm (655 mg/m^3) **OSHA PEL†**: TWA 100 ppm (435 mg/m^3)
IDLH 900 ppm See: 95476	**Conversion** 1 ppm = 4.41 mg/m^3

Physical Description
Colorless liquid with an aromatic odor. [Note: A solid below 56°F.]

MW: 106.2	BP: 281°F	FRZ: 56°F	Sol: 0.02%
VP: 9 mmHg	IP: 8.44 eV		Sp.Gr: 0.86
Fl.P: 81°F	UEL: 7.0%	LEL: 1.1%	

Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.

Incompatibilities & Reactivities
Strong oxidizers, strong acids

Measurement Methods
NIOSH 1501, 3800; OSHA 1002
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA
Up to 900 ppm:
(APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys

See also: INTRODUCTION See ICSC CARD: 0086 See MEDICAL TESTS: 0243

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

o-Xylene

CAS 95-47-6

$C_6H_4(CH_3)_2$

RTECS ZE2450000

Synonyms & Trade Names
1,2-Dimethylbenzene; ortho-Xylene; o-Xylol

DOT ID & Guide
1307 130

Exposure Limits
NIOSH REL: TWA 100 ppm (435 mg/m^3) ST 150 ppm (655 mg/m^3)
OSHA PEL†: TWA 100 ppm (435 mg/m^3)

IDLH 900 ppm See: 95476

Conversion 1 ppm = 4.34 mg/m^3

Physical Description
Colorless liquid with an aromatic odor.

MW: 106.2	BP: 292°F	FRZ: -13°F	Sol: 0.02%
VP: 7 mmHg	IP: 8.56 eV		Sp.Gr: 0.88
Fl.P: 90°F	UEL: 6.7%	LEL: 0.9%	

Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.

Incompatibilities & Reactivities
Strong oxidizers, strong acids

Measurement Methods
NIOSH 1501, 3800; OSHA 1002
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA
Up to 900 ppm:
(APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys

See also: INTRODUCTION See ICSC CARD: 0084 See MEDICAL TESTS: 0243

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms & Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

m-Xylene

CAS 108-38-3

$C_6H_4(CH_3)_2$

RTECS ZE2275000

Synonyms & Trade Names
1,3-Dimethylbenzene; meta-Xylene; m-Xylol

DOT ID & Guide
1307 130

Exposure Limits	**NIOSH REL**: TWA 100 ppm (435 mg/m^3) ST 150 ppm (655 mg/m^3) **OSHA PEL†**: TWA 100 ppm (435 mg/m^3)
IDLH 900 ppm See: 95476	**Conversion** 1 ppm = 4.34 mg/m^3

Physical Description
Colorless liquid with an aromatic odor.

MW: 106.2	BP: 282°F	FRZ: -54°F	Sol: Slight
VP: 9 mmHg	IP: 8.56 eV		Sp.Gr: 0.86
Fl.P: 82°F	UEL: 7.0%	LEL: 1.1%	

Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.

Incompatibilities & Reactivities
Strong oxidizers, strong acids

Measurement Methods
NIOSH 1501, 3800; OSHA 1002
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA
Up to 900 ppm:
(APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys

See also: INTRODUCTION See ICSC CARD: 0085 See MEDICAL TESTS: 0243

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

1,2,4-Trimethylbenzene

CAS 95-63-6

$C_6H_3(CH_3)_3$

RTECS DC3325000

DOT ID & Guide

Synonyms & Trade Names
Asymmetrical trimethylbenzene, psi-Cumene, Pseudocumene [Note: hemimellitene is a mixture of the 1,2,3-isomer with up to 10% of related aromatics such as the 1,2,4-isomer.]

Exposure Limits
NIOSH REL: TWA 25 ppm (125 mg/m^3)
OSHA PEL†: none

IDLH N.D. See: IDLH INDEX

Conversion 1 ppm = 4.92 mg/m^3

Physical Description
Clear, colorless liquid with a distinctive, aromatic odor.

MW: 120.2	BP: 337°F	FRZ: -77°F	Sol: 0.006%
VP(56°F): 1 mmHg	IP: 8.27 eV		Sp.Gr: 0.88
Fl.P: 112°F	UEL: 6.4%	LEL: 0.9%	

Class II Flammable Liquid

Incompatibilities & Reactivities
Oxidizers, nitric acid

Measurement Methods
OSHA PV2091
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations Not available.
Important additional information about respirator selection

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

Symptoms Irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, fatigue, dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)

Target Organs Eyes, skin, respiratory system, central nervous system, blood

See also: INTRODUCTION See ICSC CARD: 1433

September 2005

NIOSH Pocket Guide to Chemical Hazards

1,3,5-Trimethylbenzene

CAS 108-67-8

$C_6H_3(CH_3)_3$

RTECS OX6825000

Synonyms & Trade Names
Mesitylene, Symmetrical trimethylbenzene, sym-Trimethylbenzene

DOT ID & Guide
2325 129

Exposure Limits
NIOSH REL: TWA 25 ppm (125 mg/m^3)
OSHA PEL†: none

IDLH N.D. See: IDLH INDEX

Conversion 1 ppm = 4.92 mg/m^3

Physical Description
Clear, colorless liquid with a distinctive, aromatic odor.

MW: 120.2	BP: 329°F	FRZ: -49°F	Sol: 0.002%
VP: 2 mmHg	IP: 8.39 eV		Sp.Gr: 0.86
Fl.P: 122°F	UEL: ?	LEL: ?	

Class II Flammable Liquid

Incompatibilities & Reactivities
Oxidizers, nitric acid

Measurement Methods
OSHA PV2091
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations Not available.
Important additional information about respirator selection

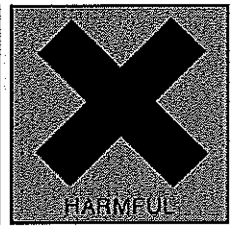
Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)

Target Organs Eyes, skin, respiratory system, central nervous system, blood

See also: INTRODUCTION See ICSC CARD: 1155

Safety data for tert-butyl methyl ether



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: methyl tert-butyl ether, MTBE, 2-methoxy-2-methylpropane, butyl methyl ether, t-butyl methyl ether, TBME, tert-butoxymethane, 1,1-dimethylethyl methyl ether, methyl 1,1-dimethylethyl ether
Molecular formula: $C_5H_{12}O$
CAS No: 1634-04-4
EINECS No: 216-653-1

Physical data

Appearance: 55.2 C
Melting point: -109 C
Boiling point:
Vapour density:
Vapour pressure: 245 mm Hg at 20 C
Density (g cm^{-3}): 0.741
Flash point: -10 C
Explosion limits:
Autoignition temperature:

Stability

Stable, but may form explosive peroxides in contact with air. Extremely flammable - note low flash point. Incompatible with strong oxidizing agents.

Toxicology

Possible carcinogen. Harmful by inhalation, ingestion or through skin contact. Irritant. Typical OEL 100 mg/m3.

Toxicity data
(The meaning of any abbreviations which appear in this section is given here.)
ORL-RAT LD50 4000 mg kg^{-1}
IPN-MUS LD50 2400 mg kg^{-1}
IHL-RAT LC50 23500 ppm.

Risk phrases
(The meaning of any risk phrases which appear in this section is given here.)
R12 R20 R21 R22 R36 R37 R38.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)
UN No 2398. Packing group II. Hazard class 3.0.

Personal protection

Safety glasses, good ventilation. Take precautions against the build-up of peroxides in storage; test before use.

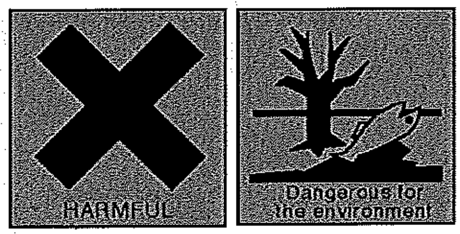
Safety phrases
(The meaning of any safety phrases which appear in this section is given here.)
S16 S26 S36.

[Return to Physical & Theoretical Chemistry Lab. Safety home page.]

---

are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL **begins** "http://msds.chem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for propylbenzene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 1-propylbenzene, n-propylbenzene, propyl benzene, 1-phenylpropane, isocumene
Molecular formula: C_9H_{12}
CAS No: 103-65-1
EC No: 203-132-9
Annex I Index No: 601-024-00-X

Physical data

Appearance: colourless or light yellow liquid
Melting point: -99 C
Boiling point: 159 C
Vapour density: 4.14
Vapour pressure: 2 mm Hg at 20C
Specific gravity: 0.862
Flash point: 47 C
Explosion limits: 0.8 - 6%
Autoignition temperature: 450 C

Stability

Stable. Flammable. Incompatible with strong oxidizing agents.

Toxicology

Harmful if swallowed. Respiratory irritant.

Toxicity data
(The meaning of any toxicological abbreviations which appear in this section is given here.)
ORL-RAT LD50 6040 mg kg^{-1}
IHL-RAT LC50 65000 ppm/2h

Risk phrases
(The meaning of any risk phrases which appear in this section is given here.)
R10 R37 R51 R53 R65.

Environmental information

Harmful in the environment - may cause long-term damage to the aquatic environment.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)
UN No 2364. Hazard class 3.0. Packing group III.

Personal protection

Safety glasses, adequate ventilation. Do not release into the environment.

Safety phrases
(The meaning of any safety phrases which appear in this section is given here.)
S24 S37 S61 S62.

[Return to Physical & Theoretical Chemistry Lab. Safety home page.]

---

are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL **begins** "http://msds.chem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

September 2005

NIOSH Pocket Guide to Chemical Hazards

Benzene

CAS 71-43-2

C_6H_6

RTECS CY1400000

Synonyms & Trade Names
Benzol, Phenyl hydride

DOT ID & Guide
1114 130

Exposure Limits

NIOSH REL: Ca TWA 0.1 ppm ST 1 ppm See Appendix A

OSHA PEL: [1910.1028] TWA 1 ppm ST 5 ppm See Appendix F

IDLH Ca [500 ppm] See: 71432

Conversion 1 ppm = 3.19 mg/m^3

Physical Description
Colorless to light-yellow liquid with an aromatic odor. [Note: A solid below 42°F.]

MW: 78.1	BP: 176°F	FRZ: 42°F	Sol: 0.07%
VP: 75 mmHg	IP: 9.24 eV		Sp.Gr: 0.88
Fl.P: 12°F	UEL: 7.8%	LEL: 1.2%	

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities
Strong oxidizers, many fluorides & perchlorates, nitric acid

Measurement Methods
NIOSH 1500, 1501, 3700, 3800; OSHA 12, 1005
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations (See Appendix E) NIOSH
At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, blood, central nervous system, bone marrow

Cancer Site [leukemia]

See also: INTRODUCTION See ICSC CARD: 0015 See MEDICAL TESTS: 0022

ScienceLab.com
Chemicals & Laboratory Equipment

Health	1
Fire	1
Reactivity	0
Personal Protection	A

Material Safety Data Sheet
Dioctyl phthalate MSDS

Section 1: Chemical Product and Company Identification

Product Name: Dioctyl phthalate

Catalog Codes: SLD3478

CAS#: 117-81-7

RTECS: TI0350000

TSCA: TSCA 8(b) inventory: Dioctyl phthalate

CI#: Not available.

Synonym: Bisoflex 81, Bisoflex DOP, DEHP, Eviplast 80, Eviplast 81, Fleximel, Flexol DOP, Flexol Plasticizer DOP, Hatcol DOP, Jayflex DOP, Kodaflex DOP, Octoil, Platinol DOP, Reomol DOP, Staflex DOP, Truflex DOP, Vestinol AH, Vinicizer 80, Witicizer 312; Di-(2-ethylhexyl)phthalate; BIS(2-Ethylhexyl)phthalate; 1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl)ester; 2-Ethylhexyl phthalate; bis(2-ethylhexyl)-1,2-benzenedicarboxylate; Di(2-Ethylhexyl)orthophthalate

Chemical Name: Phthalic acid, bis(2-ethylhexyl)ester

Chemical Formula: C24-H38-O4

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Dioctyl phthalate	117-81-7	100

Toxicological Data on Ingredients: Dioctyl phthalate: ORAL (LD50): Acute: 30000 mg/kg [Rat]. >30000 mg/kg [Mouse]. 34000 mg/kg [Rabbit]. DERMAL (LD50): Acute: 25000 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2 (Some evidence.) by NTP. 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to liver.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 390.56°C (735°F)

Flash Points: CLOSED CUP: 207°C (404.6°F). OPEN CUP: 215.56°C (420°F) - 218 C (Cleveland).

Flammable Limits: LOWER: 0.3%

Products of Combustion: These products are carbon oxides (CO, CO_2).

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of open flames and sparks, of heat.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection: Safety glasses. Lab coat.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 5 (mg/m3) from ACGIH (TLV) [United States]
TWA: 5 (mg/m3) from OSHA (PEL) [United States]
TWA: 5 STEL: 10 (mg/m3) from NIOSH [United States]3
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Oily liquid.)

Odor: Slight.

Taste: Not available.

Molecular Weight: 390.54 g/mole

Color: Colorless to light yellow.

pH (1% soln/water): Not applicable.

Boiling Point: 384°C (723.2°F)

Melting Point: -55 C to -46°C (-50.8°F)

Critical Temperature: Not available.

Specific Gravity: 0.9861 (Water = 1)

Vapor Pressure: 0 kPa (@ 20°C)

Vapor Density: 16 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 7.6

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water.
It is miscible in mineral oil, and hexane.
It is slightly soluble in carbon tetrachloride.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, ignition sources, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact.

Toxicity to Animals:
Acute oral toxicity (LD50): 30000 mg/kg [Rat].
Acute dermal toxicity (LD50): 25000 mg/kg [Rabbit].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2 (Some evidence.) by NTP. 3 (Not classifiable for human.) by IARC.
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast.
May cause damage to the following organs: liver.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
Testicular damage in animal. May cause adverse reproductive effects and birth defects (teratogenic).
May affect genetic material (mutagenic).
May cause cancer based on animal test data

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: It may cause mild skin irritation. It is not easily absorbed through human skin.
Eyes: It may cause mild eye irritation.
Inhalation: At significant concentrations, it may cause upper respiratory tract (nost, throat) and mucous membrane irritation. Acute larger inhalation exposure may result in tachypnea or dyspnea.
Ingestion: Considered innocuous at small doses. Low hazard for normal industrial handling. May cause digestisve tract irritation with mild gastric disturbances and diarrhea may occur following ingestion of larger doses. CNS depression may occur if large amounts of phthalate esters are absorbed.
Chronic Potential Heatlh Effects:
Ingestion: Prolonged or repeated ingestion may affect the liver

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 0.7 mg/l 96 hours [Lepomis macrochirus]. >100 mg/l 96 hours [Channel catfish]. >100 mg/l 96 hours [Trout].

BOD5 and COD: Not available.

Products of Biodegradation: Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Dioctyl phthalate
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Dioctyl phthalate
Connecticut hazardous material survey.: Dioctyl phthalate
Illinois toxic substances disclosure to employee act: Dioctyl phthalate
Illinois chemical safety act: Dioctyl phthalate
New York release reporting list: Dioctyl phthalate
Rhode Island RTK hazardous substances: Dioctyl phthalate
Pennsylvania RTK: Dioctyl phthalate
Minnesota: Dioctyl phthalate
Massachusetts RTK: Dioctyl phthalate

Massachusetts spill list: Dioctyl phthalate
New Jersey: Dioctyl phthalate
New Jersey spill list: Dioctyl phthalate
Louisiana spill reporting: Dioctyl phthalate
California Director's List of Hazardous Substances: Dioctyl phthalate
TSCA 8(b) inventory: Dioctyl phthalate
TSCA 8(a) IUR: Dioctyl phthalate
TSCA 8(d) H and S data reporting: Dioctyl phthalate: Effective date: 10/4/82; Sunset data: 10/4/92
SARA 313 toxic chemical notification and release reporting: Dioctyl phthalate
CERCLA: Hazardous substances.: Dioctyl phthalate: 100 lbs. (45.36 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R60- May impair fertility.
R61- May cause harm to the unborn child.
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 0

Personal Protection: a

National Fire Protection Association (U.S.A.):

Health: 0

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Not applicable.
Lab coat.
Wear appropriate respirator when ventilation is inadequate.
Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 05:14 PM

Last Updated: 11/06/2008 12:00 PM

NIOSH Publication No. 2005-149: September 2005

NIOSH Pocket Guide to Chemical Hazards

Coal tar pitch volatiles

CAS 65996-93-2

RTECS GF8655000

Synonyms & Trade Names
Synonyms vary depending upon the specific compound (e.g., pyrene, phenanthrene, acridine, chrysene, anthracene & benzo(a)pyrene). [Note: NIOSH considers coal tar, coal tar pitch, and creosote to be coal tar products.]

DOT ID & Guide
2713 153 (acridine)

Exposure Limits
NIOSH REL: Ca TWA 0.1 mg/m^3 (cyclohexane-extractable fraction) See Appendix A See Appendix C

OSHA PEL: TWA 0.2 mg/m^3 (benzene-soluble fraction) [1910.1002] See Appendix C

IDLH Ca [80 mg/m^3] See: 65996932

Conversion

Physical Description
Black or dark-brown amorphous residue.

Properties vary depending upon the specific compound.

Combustible Solids

Incompatibilities & Reactivities
Strong oxidizers

Measurement Methods
OSHA 58
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: Daily
Remove: No recommendation
Change: Daily

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH
At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

Exposure Routes inhalation, skin and/or eye contact	
Symptoms Dermatitis, bronchitis, [potential occupational carcinogen]	
Target Organs respiratory system, skin, bladder, kidneys **Cancer Site** [lung, kidney & skin cancer]	
See also: INTRODUCTION See ICSC CARD: 1415 See MEDICAL TESTS: 0054	

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms & Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

Naphthalene

CAS 91-20-3

$C_{10}H_8$

RTECS QJ0525000

Synonyms & Trade Names
Naphthalin, Tar camphor, White tar

DOT ID & Guide
1334 133 (crude or refined)
2304 133 (molten)

Exposure Limits
NIOSH REL: TWA 10 ppm (50 mg/m^3) ST 15 ppm (75 mg/m^3)
OSHA PEL†: TWA 10 ppm (50 mg/m^3)

IDLH 250 ppm See: 91203

Conversion 1 ppm = 5.24 mg/m^3

Physical Description
Colorless to brown solid with an odor of mothballs. [Note: Shipped as a molten solid.]

MW: 128.2	BP: 424°F	MLT: 176°F	Sol: 0.003%
VP: 0.08 mmHg	IP: 8.12 eV		Sp.Gr: 1.15
Fl.P: 174°F	UEL: 5.9%	LEL: 0.9%	

Combustible Solid, but will take some effort to ignite.

Incompatibilities & Reactivities
Strong oxidizers, chromic anhydride

Measurement Methods
NIOSH 1501; OSHA 35
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: Daily

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Molten flush immediately/solid-liquid soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA
Up to 100 ppm:
(APF = 10) Any air-purifying half-mask respirator with organic vapor cartridge(s) in combination with an N95, R95, or P95 filter. The following filters may also be used: N99, R99, P99, N100, R100, P100. Click here for information on selection of N, R, or P filters.*
(APF = 10) Any supplied-air respirator*
Up to 250 ppm:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode*
(APF = 50) Any air-purifying full-facepiece respirator equipped with organic vapor cartridge(s) in combination with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters.
(APF = 25) Any powered air-purifying respirator with an organic vapor cartridge in combination with a high-efficiency particulate filter.*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

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

Symptoms irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage

Target Organs Eyes, skin, blood, liver, kidneys, central nervous system

See also: INTRODUCTION See ICSC CARD: 0667 See MEDICAL TESTS: 0152

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

Phenol

CAS 108-95-2

C_6H_5OH

RTECS SJ3325000

Synonyms & Trade Names
Carbolic acid, Hydroxybenzene, Monohydroxybenzene, Phenyl alcohol, Phenyl hydroxide

DOT ID & Guide
1671 153 (solid)
2312 153 (molten)
2821 153 (solution)

Exposure Limits
NIOSH REL: TWA 5 ppm (19 mg/m^3) C 15.6 ppm (60 mg/m^3) [15-minute] [skin]
OSHA PEL: TWA 5 ppm (19 mg/m^3) [skin]

IDLH 250 ppm See: 108952

Conversion 1 ppm = 3.85 mg/m^3

Physical Description
Colorless to light-pink, crystalline solid with a sweet, acrid odor. [Note: Phenol liquefies by mixing with about 8% water.]

MW: 94.1	BP: 359°F	MLT: 109°F	Sol(77°F): 9%
VP: 0.4 mmHg	IP: 8.50 eV		Sp.Gr: 1.06
Fl.P: 175°F	UEL: 8.6%	LEL: 1.8%	

Combustible Solid

Incompatibilities & Reactivities
Strong oxidizers, calcium hypochlorite, aluminum chloride, acids

Measurement Methods
NIOSH 2546; OSHA 32
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: Daily
Provide: Eyewash, Quick drench

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA
Up to 50 ppm:
(APF = 10) Any air-purifying half-mask respirator with organic vapor cartridge(s) in combination with an N95, R95, or P95 filter. The following filters may also be used: N99, R99, P99, N100, R100, P100. Click here for information on selection of N, R, or P filters.
(APF = 10) Any supplied-air respirator
Up to 125 ppm:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered air-purifying respirator with an organic vapor cartridge in combination with a high-efficiency particulate filter.
Up to 250 ppm:
(APF = 50) Any air-purifying full-facepiece respirator equipped with organic vapor cartridge(s) in combination with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters.
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters.
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms Irritation eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine; cyanosis; liver, kidney damage; skin burns; dermatitis; ochronosis; tremor, convulsions, twitching

Target Organs Eyes, skin, respiratory system, liver, kidneys

See also: INTRODUCTION See ICSC CARD: 0070 See MEDICAL TESTS: 0182

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

PerkinElmer
precisely.

Creation Date: 11-20-2006

Revision Date: 11-20-2006

Material Safety Data Sheet

1. Chemical Product and Company Identification

Material Name	**Aroclor 1260**
Version #	01
CAS #	11096-82-5
Item #	N9331009
Synonym(s)	Hexane solution containing trace PCB * CHLORODIPHENYL (60% CL) * CLOPHEN A60 * PCB 1260 * PHENOCLOR DP6 * POLYCHLORINATED BIPHENYL (AROCLOR 1260) * POLYCHLORINATED BIPHENYLS (CONTAINING 60% OR MORE CHLORINE)
Identification Of The Company/Undertaking	PerkinElmer Life and Analytical Sciences 710 Bridgeport Avenue Shelton, CT 06484 Technical Support 800-762-4000
Emergency Telephone Number	CHEMTREC 800-424-9300 Emergency Phone 800-762-4000

2. Composition / Information on Ingredients

Hazardous component(s)	CAS #	Percent	PEL	TLV
HEXANE	110-54-3	> 90	50 ppm	50
Non-hazardous component(s)	**CAS #**	**Percent**		
Aroclor 1260	11096-82-5	0.01 - 0.1		

3. Hazards Identification

Emergency Overview

Harmful to aquatic organisms.

Potential Short Term Health Effects

Eyes

Contact will irritate or burn eyes.

Inhalation

May cause irritation of respiratory tract.

Ingestion

Do not ingest. May be harmful if swallowed.

Target Organs

Eyes. Respiratory system. Skin. Liver

HMIS RATINGS
Health: 3
Flammability: 3
Physical hazard: 1
Personal protection: B

4. First Aid Measures

General advice

Keep at rest.

First Aid

Skin contact

Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. If skin irritation persists, call a physician.

Eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

Inhalation

Move to fresh air. Oxygen or artificial respiration if needed. Call a physician or Poison Control Centre immediately.

Ingestion

If swallowed, seek medical advice immediately and show this container or label. If a person vomits when lying on his back, place him in the recovery position. Have victim rinse mouth thoroughly with water.

5. Fire Fighting Measures

Suitable extinguishing media

Do not use a solid water stream as it may scatter and spread fire. Carbon dioxide (CO_2). Dry chemical. Foam. Halons.

Specific methods

Fire-fighting equipment on the basis of class B.

Unusual Fire & Explosion Hazards

Many liquids are lighter than water.

6. Accidental Release Measures

Personal precautions

Use personal protective equipment. Keep people away from and upwind of spill/leak.

Environmental precautions

Prevent further leakage or spillage if safe to do so.

Methods for cleaning up

Dam up. Soak up with inert absorbent material. Shovel into suitable container for disposal. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Dike far ahead of liquid spill for later disposal. Never return spills in original containers for re-use.

Containment Procedures

Stop the flow of material, if this is without risk. Prevent entry into waterways, sewers, basements or confined areas. Dike the spilled material, where this is possible.

7. Handling and Storage

Handling

Keep away from heat and sources of ignition. Handle and open container with care.

Storage

Use care in handling/storage.

8. Exposure Controls / Personal Protection

Exposure Limit Values

ACGIH - Threshold Limits Values - Time Weighted Averages (TLV-TWA)

HEXANE	110-54-3	50 ppm TWA

OSHA - Final PELs - Time Weighted Averages (TWAs)

HEXANE	110-54-3	500 ppm TWA; 1800 mg/m3 TWA

Exposure Controls

Engineering measures to reduce exposure

Provide adequate local exhaust ventilation to maintain worker exposure below exposure limits.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice.

Respiratory protection

In case of insufficient ventilation wear suitable respiratory equipment. When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

Hand protection

impervious gloves

Eye protection

Wear safety glasses with side shields. or goggles If splashes are likely to occur, wear:

9. Physical & Chemical Properties

General Information

Form

Liquid.

Color

colorless

Odor

solvent

Important health, safety and environmental information

Flash Point	-7.6 °F (-22 °C) estimated
Auto Ignition	437 °F (225 °C) estimated
Flammability Class	Flammable IB
Boiling Point	156.2 °F (69 °C) estimated
Melting Point	-139 °F (-95 °C) estimated

10. Chemical Stability & Reactivity Information

Incompatibility

Strong oxidizing agents.

Further information

Stable at normal conditions

11. Toxicological Information

Acute Toxicity

NIOSH - Selected LD50s and LC50s

HEXANE	110-54-3	Inhalation LC50 Rat: 48000 ppm/4H; Oral LD50 Rat: 28710 mg/kg

Symptoms and Target Organs

NIOSH - Pocket Guide - Target Organs

HEXANE	110-54-3	skin, eyes, respiratory system, CNS, PNS

Further information

Description of possible hazardous to health effects is based on experience and/or toxicological characteristics of several components. The product contains no substances which at their given concentration, are considered to be hazardous to health.

12. Ecological Information

Ecotoxicity

Ecotoxicity - Freshwater Fish Species Data

HEXANE	110-54-3	96 Hr LC50 rainbow trout: 4.14 mg/L;96 Hr LC50 fathead minnow: 2.5 mg/L (flow-through);96 Hr LC50 bluegill: 4.12 mg/L

Ecotoxicity - Water Flea Data

HEXANE	110-54-3	48 Hr LC50 water flea: 3.87 mg/L

Ecological Information

Components of this product have been identified as having potential environmental concerns.

Other adverse effects

Based on the physical properties of this product, significant environmental persistence and bioaccumulation can be expected.

13. Disposal Considerations

Disposal Instructions

Dispose in accordance with all applicable regulations. If discarded, this product is considered a RCRA ignitable waste, D001.

14. Transportation Information

US DOT

Other Information

DOT regulated, small quantity provisions apply (see 49CFR173.4) This product forms part of a kit. Information in this section relates to the kit as a whole.

15. Regulatory Information

CERCLA/SARA Section 313

Material	Aroclor 1260
Ingredient(s)	HEXANE

US Federal Regulations

OSHA Process Safety Standard: This material is not known to be hazardous by the OSHA Highly Hazardous Process Safety Standard, 29 CFR 1910.119.

CERCLA/SARA - Hazardous Substances and their Reportable Quantities

HEXANE	110-54-3	5000 lb final RQ; 2270 kg final RQ

CERCLA/SARA - Section 313 - Emission Reporting

HEXANE	110-54-3	1.0 % de minimis concentration

State Regulations

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

Massachusetts - Right To Know List

HEXANE	110-54-3	Present

Massachusetts - Toxics Use Reduction Act

HEXANE	110-54-3	CERCLA and 313 chemical

International Regulations

Canada - WHMIS - Ingredient Disclosure List

HEXANE	110-54-3	1 % (English Item 828, French Item 965)

16. Other Information

Disclaimer

The information provided in this Material Safety Data Sheet is based on our present knowledge, and believed to be correct at the date of publication. However, no representation is made concerning its accuracy and completeness. It is intended as guidance only, and is not to be considered a warranty or quality specification. All materials may present unknown hazards, and should be used with caution. Although certain hazards are described, we cannot guarantee that these are the only hazards which exist. PerkinElmer Life and Analytical Sciences shall not be held liable for any damage resulting from handling or from contact with the product.

September 2005

NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms & Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

Antimony

CAS 7440-36-0

Sb

RTECS CC4025000

Synonyms & Trade Names
Antimony metal, Antimony powder, Stibium

DOT ID & Guide
1549 157 (inorganic compounds, n.o.s.)
2871 170 (powder)
3141 157 (inorganic liquid compounds, n.o.s.)

Exposure Limits
NIOSH REL*: TWA 0.5 mg/m^3 [*Note: The REL also applies to other antimony compounds (as Sb).]
OSHA PEL*: TWA 0.5 mg/m^3 [*Note: The PEL also applies to other antimony compounds (as Sb).]

IDLH 50 mg/m^3 (as Sb) See: 7440360

Conversion

Physical Description
Silver-white, lustrous, hard, brittle solid; scale-like crystals; or a dark-gray, lustrous powder.

MW: 121.8	BP: 2975°F	MLT: 1166°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 6.69
Fl.P: NA	UEL: NA	LEL: NA	

Noncombustible Solid in bulk form, but a moderate explosion hazard in the form of dust when exposed to flame.

Incompatibilities & Reactivities
Strong oxidizers, acids, halogenated acids [Note: Stibine is formed when antimony is exposed to nascent (freshly formed) hydrogen.]

Measurement Methods
NIOSH 7301, 7303, P&CAM261 (II-4); OSHA ID121, ID125G, ID206
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: Daily

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 5 mg/m^3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100. Click here for information on selection of N, R, or P filters.
(APF = 10) Any supplied-air respirator

Up to 12.5 mg/m^3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered air-purifying respirator with a high-efficiency particulate filter.

Up to 25 mg/m^3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters.
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 mg/m^3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms Irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly

Target Organs Eyes, skin, respiratory system, cardiovascular system

See also: INTRODUCTION See ICSC CARD: 0775 See MEDICAL TESTS: 0016

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms & Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

Arsenic (inorganic compounds, as As)

CAS 7440-38-2 (metal)

As (metal)

RTECS CG0525000 (metal)

Synonyms & Trade Names
Arsenic metal: Arsenia
Other synonyms vary depending upon the specific As compound. [Note: OSHA considers "Inorganic Arsenic" to mean copper acetoarsenite & all inorganic compounds containing arsenic except ARSINE.]

DOT ID & Guide
1558 152 (metal)
1562 152 (dust)

Exposure Limits
NIOSH REL: Ca C 0.002 mg/m^3 [15-minute] See Appendix A
OSHA PEL: [1910.1018] TWA 0.010 mg/m^3

IDLH Ca [5 mg/m^3 (as As)] See: 7440382

Conversion

Physical Description
Metal: Silver-gray or tin-white, brittle, odorless solid.

MW: 74.9	BP: Sublimes	MLT: 1135°F (Sublimes)	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 5.73 (metal)
Fl.P: NA	UEL: NA	LEL: NA	

Metal: Noncombustible Solid in bulk form, but a slight explosion hazard in the form of dust when exposed to flame.

Incompatibilities & Reactivities
Strong oxidizers, bromine azide [Note: Hydrogen gas can react with inorganic arsenic to form the highly toxic gas arsine.]

Measurement Methods
NIOSH 7300, 7301, 7303, 7900, 9102; OSHA ID105
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated/Daily
Remove: When wet or contaminated
Change: Daily
Provide: Eyewash, Quick drench

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations (See Appendix E) NIOSH
At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister having an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

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

Target Organs	Liver, kidneys, skin, lungs, lymphatic system
Cancer Site	[lung & lymphatic cancer]

See also: INTRODUCTION See ICSC CARD: 0013 See MEDICAL TESTS: 0017

MATERIAL SAFETY DATA SHEET

ALDON CORPORATION
221 Rochester Street
Avon, New York 14414-9409
(585) 226-6177

MSDS No.: BB0003
Effective Date: May.19, 2005

SECTION I NAME

Product	Barium
Chemical Synonyms	Barium Metal
Formula	Ba
Unit Size	up to 2.5 Kg.
C.A.S. No.	7440-39-3

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC 800-424-9300
Day 585-226-6177

NFPA: 3 / 1 / 2 / W

HMIS *	
Health	1
Fire	3
Reactivity	2

HAZARD RATING: MINIMAL 0, SLIGHT 1, MODERATE 2, SERIOUS 3, SEVERE 4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Barium metal	100%	See Section V.

DANGER! FLAMMABLE SOLID! DANGEROUS WHEN WET.

AVOID CONTACT WITH SKIN AND EYES.

SECTION III PHYSICAL DATA

Melting Point (°F)	850°C (1562°F)	Specific Gravity (H_2O = 1)	3.74
Boiling Point (°F)	1695°C (3085°F)	Percent Volatile by Volume (%)	N/A
Vapor Pressure (mm Hg)	N/A	Evaporation Rate (=1)	N/A
Vapor Density (Air=1)	N/A		
Solubility in Water	React violently with water, liberates highly flammable gases.		
Appearance & Odor	Silver or gray, slightly lustrous, somewhat malleable metal; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Flammable Limits in Air % by Volume	Lower	Upper
Flammable solid.	N/A		

Extinguisher Media: Dry sand, powder, graphite, soda ash. Do **NOT** use water or carbon dioxide type extinguisher.

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective clothing. Do NOT use water to extinguish fires.

(1996 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.7, GUIDE PAGE NO. 138)

UNUSUAL FIRE AND EXPLOSION HAZARDS

Do **NOT** use water. Reaction with water produces explosive hydrogen gas and enough heat to ignite gas/air mixture plus toxic, corrosive Barium hydroxide solution.

D.O.T. Water reactive solid, n.o.s., (Barium metal), 4.3, UN2813, PG II

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA

BB0003

Threshold Limited Value: Barium and soluble compounds, as Ba ACGIH 2001: TWA = 0.5 mg/m^3.
RTECS No. CQ8370000

Effects of Overexposure: Caustic burns on skin, eyes and mucous membranes, corneal damage and blindness may result. Moderately toxic via oral exposure route. Target organs: Central nervous system, kidneys.

Emergency and First Aid Procedures: INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. EYES: Check for and remove contact lenses. Do NOT flush with water. Carefully remove particles with cotton-tipped applicator. Get immediate medical attention. SKIN: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability			Conditions to Avoid
	Unstable		Excessive temperature, heat, ignition source, water.
	Stable	X	

Incompatibility (Materials to Avoid): Water, acids, oxidizing agents, chlorinated and fluorinated hydrocarbons such as CCl_4.

Hazardous Decomposition Products: Hydrogen (explosive), barium hydroxide solution (caustic/toxic).

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled: Recover for use if not contaminated. Collect and pack in dry, airtight container under paraffin oil, if possible. Do not sweep up material. Cover with dry sand. Do not allow material to contaminate water sources or sewers, reaction with water forms corrosive barium compounds.

Waste Disposal Method: Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

This material is a hazardous waste (as per RCRA) because of its reactivity. Disposal should be conducted by an EPA (RCRA) permitted disposer or an EPA (RCRA) permitted disposal facility.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type): None needed in normal laboratory handling. If dusty conditions prevail, work in ventilation hood or wear a NIOSH/MSHA-approved dust mask or respirator.

Ventilation				
	Local Exhaust	Recommended.	Special	No.
	Mechanical (General)	Recommended.	Other	No.

Protective Gloves	Rubber.	Eye Protection	Chemical safety goggles.

Other Protective Equipment: Lab coat, apron, eye wash station, proper gloves, ventilation hood.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing: Store in dry area, away from heat and other sources of ignition. Store under argon or paraffin oil in airtight container. Protect from moisture and air. Keep container dry.

Keep container tightly closed when not in use.

Other Precautions: Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Avoid contact with skin, eyes and clothing. Wash thoroughly after handling. Remove and wash contaminated clothing.

Revision No.	Date	Approved	Chemical Safety Coordinator
7	05/19/05	Michael Raszeja	MR

September 2005

NIOSH Pocket Guide to Chemical Hazards

Chromium metal

CAS 7440-47-3

Cr

RTECS GB4200000

Synonyms & Trade Names
Chrome, Chromium

DOT ID & Guide

Exposure Limits
NIOSH REL: TWA 0.5 mg/m^3 See Appendix C

OSHA PEL*: TWA 1 mg/m^3 See Appendix C [*Note: The PEL also applies to insoluble chromium salts.]

IDLH 250 mg/m^3 (as Cr) See: 7440473

Conversion

Physical Description
Blue-white to steel-gray, lustrous, brittle, hard, odorless solid.

MW: 52.0	BP: 4788°F	MLT: 3452°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 7.14
Fl.P: NA	UEL: NA	LEL: NA	

Noncombustible Solid in bulk form, but finely divided dust burns rapidly if heated in a flame.

Incompatibilities & Reactivities
Strong oxidizers (such as hydrogen peroxide), alkalis

Measurement Methods
NIOSH 7024, 7300, 7301, 7303, 9102; OSHA ID121, ID125G
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: No recommendation
Eyes: No recommendation
Wash skin: No recommendation
Remove: No recommendation
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH
Up to 2.5 mg/m^3:
(APF = 5) Any quarter-mask respirator. Click here for information on selection of N, R, or P filters.*

Up to 5 mg/m^3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100. Click here for information on selection of N, R, or P filters.*
(APF = 10) Any supplied-air respirator*

Up to 12.5 mg/m^3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode*
(APF = 25) Any powered air-purifying respirator with a high-efficiency particulate filter.*

Up to 25 mg/m^3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters.
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 250 mg/m^3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms Irritation eyes, skin; lung fibrosis (histologic)

Target Organs Eyes, skin, respiratory system

See also: INTRODUCTION See ICSC CARD: 0029 See MEDICAL TESTS: 0052

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

Copper (dusts and mists, as Cu)

CAS 7440-50-8

Cu

RTECS GL5325000

Synonyms & Trade Names
Copper metal dusts, Copper metal fumes

DOT ID & Guide

Exposure Limits

NIOSH REL*: TWA 1 mg/m^3 [*Note: The REL also applies to other copper compounds (as Cu) except Copper fume.]

OSHA PEL*: TWA 1 mg/m^3 [*Note: The PEL also applies to other copper compounds (as Cu) except copper fume.]

IDLH 100 mg/m^3 (as Cu) See: 7440508

Conversion

Physical Description
Reddish, lustrous, malleable, odorless solid.

MW: 63.5	BP: 4703°F	MLT: 1981°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 8.94
Fl.P: NA	UEL: NA	LEL: NA	

Noncombustible Solid in bulk form, but powdered form may ignite.

Incompatibilities & Reactivities
Oxidizers, alkalis, sodium azide, acetylene

Measurement Methods
NIOSH 7029, 7300, 7301, 7303, 9102; OSHA ID121, ID125G
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: Daily

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 5 mg/m^3:
(APF = 5) Any quarter-mask respirator. Click here for information on selection of N, R, or P filters.*

Up to 10 mg/m^3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100. Click here for information on selection of N, R, or P filters.*
(APF = 10) Any supplied-air respirator*

Up to 25 mg/m^3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode*
(APF = 25) Any powered air-purifying respirator with a high-efficiency particulate filter.*

Up to 50 mg/m^3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters.
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 mg/m^3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms Irritation eyes, respiratory system; cough, dyspnea (breathing difficulty), wheezing

Target Organs Eyes, skin, respiratory system, liver, kidneys (increase(d) risk with Wilson's disease)

See also: INTRODUCTION See ICSC CARD: 0240 See MEDICAL TESTS: 0057

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

Iron oxide dust and fume (as Fe)

CAS 1309-37-1

Fe_2O_3

RTECS NO7400000
NO7525000 (fume)

Synonyms & Trade Names
Ferric oxide, Iron(III) oxide

DOT ID & Guide
1376 135 (spent)

Exposure Limits	**NIOSH REL**: TWA 5 mg/m^3
	OSHA PEL: TWA 10 mg/m^3
IDLH 2500 mg/m^3 (as Fe) See: 1309371	**Conversion**

Physical Description
Reddish-brown solid. [Note: Exposure to fume may occur during the arc-welding of iron.]

MW: 159.7	BP: ?	MLT: 2664°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 5.24
Fl.P: NA	UEL: NA	LEL: NA	

Noncombustible Solid

Incompatibilities & Reactivities
Calcium hypochlorite

Measurement Methods
NIOSH 7300, 7301, 7303, 9102; OSHA ID121, ID125G
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: No recommendation
Eyes: No recommendation
Wash skin: No recommendation
Remove: No recommendation
Change: No recommendation

First Aid (See procedures)

Breathing: Respiratory support

Respirator Recommendations NIOSH
Up to 50 mg/m^3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100. Click here for information on selection of N, R, or P filters.
(APF = 10) Any supplied-air respirator
Up to 125 mg/m^3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered air-purifying respirator with a high-efficiency particulate filter.
Up to 250 mg/m^3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters.
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece
Up to 2500 mg/m^3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode
Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

Exposure Routes inhalation

Symptoms Benign pneumoconiosis with X-ray shadows indistinguishable from fibrotic pneumoconiosis (siderosis)

Target Organs respiratory system

See also: INTRODUCTION See ICSC CARD: 1577 MEDICAL TESTS: 0122

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

NIOSH Publication No. 2005-149: September 2005

NIOSH Pocket Guide to Chemical Hazards

Lead

CAS 7439-92-1

Pb

RTECS OF7525000

Synonyms & Trade Names
Lead metal, Plumbum

DOT ID & Guide

Exposure Limits

NIOSH REL*: TWA 0.050 mg/m^3 See Appendix C [*Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C.]

OSHA PEL*: [1910.1025] TWA 0.050 mg/m^3 See Appendix C [*Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C.]

IDLH 100 mg/m^3 (as Pb) See: 7439921

Conversion

Physical Description
A heavy, ductile, soft, gray solid.

MW: 207.2	BP: 3164°F	MLT: 621°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 11.34
Fl.P: NA	UEL: NA	LEL: NA	

Noncombustible Solid in bulk form.

Incompatibilities & Reactivities
Strong oxidizers, hydrogen peroxide, acids

Measurement Methods
NIOSH 7082, 7105, 7300, 7301, 7303, 7700, 7701, 7702, 9100, 9102, 9105; OSHA ID121, ID125G, ID206
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: Daily
Remove: When wet or contaminated
Change: Daily

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap flush promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations (See Appendix E) NIOSH/OSHA

Up to 0.5 mg/m^3:
(APF = 10) Any air-purifying respirator with an N100, R100, or P100 filter (including N100, R100, and P100 filtering facepieces) except quarter-mask respirators. Click here for information on selection of N, R, or P filters.
(APF = 10) Any supplied-air respirator

Up to 1.25 mg/m^3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter

Up to 2.5 mg/m^3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters.
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter

(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece
Up to 50 mg/m^3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode
Up to 100 mg/m^3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

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

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

See also: INTRODUCTION See ICSC CARD: 0052 See MEDICAL TESTS: 0127

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

Manganese compounds and fume (as Mn)

CAS 7439-96-5 (metal)

Mn (metal)

RTECS OO9275000 (metal)

DOT ID & Guide

Synonyms & Trade Names
Manganese metal: Colloidal manganese, Manganese-55
Synonyms of other compounds vary depending upon the specific manganese compound.

Exposure Limits
NIOSH REL*: TWA 1 mg/m^3 ST 3 mg/m^3 [*Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl, Methyl cyclopentadienyl manganese tricarbonyl, and Manganese tetroxide.]

OSHA PEL*: C 5 mg/m^3 [*Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl and Methyl cyclopentadienyl manganese tricarbonyl.]

IDLH 500 mg/m^3 (as Mn) See: 7439965

Conversion

Physical Description
A lustrous, brittle, silvery solid.

MW: 54.9	BP: 3564°F	MLT: 2271°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 7.20 (metal)
Fl.P: NA	UEL: NA	LEL: NA	

Metal: Combustible Solid

Incompatibilities & Reactivities
Oxidizers [Note: Will react with water or steam to produce hydrogen.]

Measurement Methods
NIOSH 7300, 7301, 7303, 9102; OSHA ID121, ID125G
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: No recommendation
Eyes: No recommendation
Wash skin: No recommendation
Remove: No recommendation
Change: No recommendation

First Aid (See procedures)
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH
Up to 10 mg/m^3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100. Click here for information on selection of N, R, or P filters.
(APF = 10) Any supplied-air respirator
Up to 25 mg/m^3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered air-purifying respirator with a high-efficiency particulate filter.
Up to 50 mg/m^3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters.
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 mg/m^3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

Exposure Routes inhalation, ingestion

Symptoms Manganism; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of discomfort); lassitude (weakness, exhaustion); kidney damage

Target Organs respiratory system, central nervous system, blood, kidneys

See also: INTRODUCTION See ICSC CARD: 0174 See MEDICAL TESTS: 0131

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

NIOSH Publication No. 2005-149: September 2005

NIOSH Pocket Guide to Chemical Hazards

Mercury compounds [except (organo) alkyls] (as Hg)

CAS 7439-97-6 (metal)

Hg (metal)

RTECS OV4550000 (metal)

Synonyms & Trade Names
Mercury metal: Colloidal mercury, Metallic mercury, Quicksilver
Synonyms of "other" Hg compounds vary depending upon the specific compound.

DOT ID & Guide
2809 172 (metal)

Exposure Limits
NIOSH REL: Hg Vapor: TWA 0.05 mg/m^3 [skin]
Other: C 0.1 mg/m^3 [skin]

OSHA PEL†: C 0.1 mg/m^3

IDLH 10 mg/m^3 (as Hg) See: 7439976

Conversion

Physical Description
Metal: Silver-white, heavy, odorless liquid. [Note: "Other" Hg compounds include all inorganic & aryl Hg compounds except (organo) alkyls.]

MW: 200.6	BP: 674°F	FRZ: -38°F	Sol: Insoluble
VP: 0.0012 mmHg	IP: ?		Sp.Gr: 13.6 (metal)
Fl.P: NA	UEL: NA	LEL: NA	

Metal: Noncombustible Liquid

Incompatibilities & Reactivities
Acetylene, ammonia, chlorine dioxide, azides, calcium (amalgam formation), sodium carbide, lithium, rubidium, copper

Measurement Methods
NIOSH 6009; OSHA ID140
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection)
Skin: Prevent skin contact
Eyes: No recommendation
Wash skin: When contaminated
Remove: When wet or contaminated
Change: Daily

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations
Mercury vapor: NIOSH
Up to 0.5 mg/m^3:
(APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern†
(APF = 10) Any supplied-air respirator
Up to 1.25 mg/m^3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern†(canister)
Up to 2.5 mg/m^3:
(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern†

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern†
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/PAPRTS(canister)
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece
Up to 10 mg/m^3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Other mercury compounds: NIOSH/OSHA
Up to 1 mg/m^3:
(APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern†
(APF = 10) Any supplied-air respirator
Up to 2.5 mg/m^3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern†(canister)
Up to 5 mg/m^3:
(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern†
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern†
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/PAPRTS(canister)
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece
Up to 10 mg/m^3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

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

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

See also: INTRODUCTION See ICSC CARD: 0056 See MEDICAL TESTS: 0136

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

September 2005

NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms & Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

Nickel metal and other compounds (as Ni)

CAS 7440-02-0 (Metal)

Ni (Metal)

RTECS QR5950000 (Metal)

DOT ID & Guide

Synonyms & Trade Names
Nickel metal: Elemental nickel, Nickel catalyst
Synonyms of other nickel compounds vary depending upon the specific compound.

Exposure Limits
NIOSH REL*: Ca TWA 0.015 mg/m^3 See Appendix A [*Note: The REL does not apply to Nickel carbonyl.]
OSHA PEL*†: TWA 1 mg/m^3 [*Note: The PEL does not apply to Nickel carbonyl.]

IDLH Ca [10 mg/m^3 (as Ni)]
See: 7440020

Conversion

Physical Description
Metal: Lustrous, silvery, odorless solid.

MW: 58.7	BP: 5139°F	MLT: 2831°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 8.90 (Metal)
Fl.P: NA	UEL: NA	LEL: NA	

Metal: Combustible Solid; nickel sponge catalyst may ignite SPONTANEOUSLY in air.

Incompatibilities & Reactivities
Strong acids, sulfur, selenium, wood & other combustibles, nickel nitrate

Measurement Methods
NIOSH 7300, 7301, 7303, 9102; OSHA ID121, ID125G
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: No recommendation
Wash skin: When contaminated/Daily
Remove: When wet or contaminated
Change: Daily

First Aid (See procedures)
Skin: Water flush immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH
At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

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

Symptoms Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]

Target Organs Nasal cavities, lungs, skin

Cancer Site [lung and nasal cancer]

See also: INTRODUCTION See ICSC CARD: 0062 See MEDICAL TESTS: 0156

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

ScienceLab.com
Chemicals & Laboratory Equipment

Health	3
Fire	3
Reactivity	2
Personal Protection	E

Material Safety Data Sheet
Sodium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium

Catalog Codes: SLS3505

CAS#: 7440-23-5

RTECS: VY0686000

TSCA: TSCA 8(b) inventory: Sodium

CI#: Not applicable.

Synonym: Natrium

Chemical Name: Sodium

Chemical Formula: Na

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium	7440-23-5	100

Toxicological Data on Ingredients: Sodium LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant). Hazardous in case of skin contact (permeator), of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 115°C (239°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:
Extremely flammable in presence of moisture.
Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable solid. Moisture reactive material.
SMALL FIRE: Obtain advice on use of water. Use DRY chemical powder.
LARGE FIRE: Use water spray or fog. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Flammable solid that, in contact with water, emits flammable gases.
Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Cover with dry earth, sand or other non-combustible material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal.

Section 7: Handling and Storage

Precautions:
Keep under inert atmosphere. Keep container dry. Do not breathe dust. Never add water to this product In case of insufficient ventilation, wear suitable respiratory equipment If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. Keep container dry. Keep in a cool place.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 22.99 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 881.4°C (1618.5°F)

Melting Point: 97.8°C (208°F)

Critical Temperature: Not available.

Specific Gravity: 0.97 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances:
Highly reactive with oxidizing agents, acids, moisture.
The product reacts violently with water to emit flammable but non toxic gases.

Corrosivity: Not available.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available.
LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant).
Hazardous in case of skin contact (permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Material is destructive to tissue of the mucous membranes and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 4.3: Material that emits flammable gases on contact with water.

Identification: : Sodium : UN1428 PG: I

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: Sodium
Massachusetts RTK: Sodium
TSCA 8(b) inventory: Sodium
CERCLA: Hazardous substances.: Sodium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R17- Spontaneously flammable in air.
R38- Irritating to skin.
R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 3

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 3

Reactivity: 2

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
-SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984.
-The Sigma-Aldrich Library of Chemical Safety Data, Edition II.
-Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

Created: 10/09/2005 06:28 PM

Last Updated: 11/06/2008 12:00 PM

September 2005

NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms & Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

Zinc oxide

CAS 1314-13-2

ZnO

RTECS ZH4810000

Synonyms & Trade Names
Zinc peroxide

DOT ID & Guide
1516 143

Exposure Limits

NIOSH REL: Dust: TWA 5 mg/m^3 C 15 mg/m^3
Fume: TWA 5 mg/m^3 ST 10 mg/m^3

OSHA PEL†: TWA 5 mg/m^3 (fume) TWA 15 mg/m^3 (total dust) TWA 5 mg/m^3 (resp dust)

IDLH 500 mg/m^3 See: 1314132

Conversion

Physical Description
White, odorless solid.

MW: 81.4	BP: ?	MLT: 3587°F	Sol(64°F): 0.0004%
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 5.61
Fl.P: NA	UEL: NA	LEL: NA	

Noncombustible Solid

Incompatibilities & Reactivities
Chlorinated rubber (at 419°F), water [Note: Slowly decomposed by water.]

Measurement Methods
NIOSH 7303, 7502; OSHA ID121, ID143
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: No recommendation
Eyes: No recommendation
Wash skin: No recommendation
Remove: No recommendation
Change: No recommendation

First Aid (See procedures)
Breathing: Respiratory support

Respirator Recommendations NIOSH/OSHA

Up to 50 mg/m^3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100. Click here for information on selection of N, R, or P filters.
(APF = 10) Any supplied-air respirator

Up to 125 mg/m^3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered air-purifying respirator with a high-efficiency particulate filter.

Up to 250 mg/m^3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters.
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 mg/m^3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

Exposure Routes inhalation

Symptoms Metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function

Target Organs respiratory system

See also: INTRODUCTION See ICSC CARD: 0208 See MEDICAL TESTS: 0246

APPENDIX E

Resumes of Key Personnel

Resumes of Key Personnel

DEBORAH SHAPIRO, M.S.

- **TITLE**

  Project Manager/Environmental Scientist

- **EDUCATION**

  Master of Science, Environmental Science, American University (2001)
  Bachelor of Arts, Environmental Studies, American University (1998)

- **CERTIFICATIONS**

  40-hour OSHA Hazardous Waste Operations and Emergency Response Training (OSHA 29 CFR 1910.120)
  8-hour OSHA Hazardous Waste Operations and Emergency Response Refresher Training
  8-hour OSHA Site Supervisor Training
  Standard First Aid Training - American Red Cross
  CPR Training – American Red Cross

- **PROFESSIONAL AFFILIATIONS**

  Long Island Association of Professional Geologists (LIAPG)

- **PROFESSIONAL EXPERIENCE**

  Project Manager, CA Rich Consultants, Inc., 2004 - Present

  Ms. Shapiro serves as a Project Manager/Environmental Scientist for the Firm and has successfully performed field investigations and remedial activities at numerous sites. She is currently managing the testing and remediation of several E-Designated and restricted/negative delcaration Sites in New York City under the auspices of NYCDEP for redevelopment of industrial properties for residential and commercial usage.

  Ms. Shapiro assisted in the design and construction of an air sparge/soil vapor extraction system at Bon Ton Cleaners in Brooklyn, New York. She also oversaw the installation of multiple permanganate injection wells and the injection of permanganate into these wells at Bon Ton Cleaners.

  In addition, Ms. Shapiro conducts Phase I and Phase II Environmental Site Assessments of commercial and industrial properties, as well as other non-industrial properties to facilitate real property transfers, loan workouts, and refinances. The Phase I Environmental Site Assessment Reports are prepared for lending institutions and/or attorneys and are used in assessing the environmental integrity and liability associated with the property.

Ms. Shapiro is competent in conducting all aspects of environmental investigations and cleanups including monitoring well design/installation, groundwater, indoor air, soil gas, subslab vapor, and soil sampling, UST removals, soil delineation, excavation, petroleum and hazardous waste disposal, analytical interpretation, groundwater contouring, and report preparation. She also assists with the Firm's drafting requirements using AutoCad.

Staff Environmental Scientist, Groundwater and Environmental Services, Inc., 2002 - 2004

Ms. Shapiro was responsible for managing numerous accounts for major petroleum clients and the NYSDEC. Her portfolio included retail service stations, trucking facilities, a commercial building, and an overnight delivery company. Ms. Shapiro performed all tasks associated with environmental site assessments (Phase I and Phase II), exposure assessments, on-going remedial action (especially AS/SVE), and permitting. In addition, she oversaw field activities including UST removals, soil excavation, pilot testing, soil borings, and the installation of groundwater and soil vapor extraction monitoring wells, and permanganate and gas injection wells. Before being promoted to Staff Environmental Scientist, Ms. Shapiro was an Associate Environmental Scientist for Groundwater and Environmental Services, Inc.

Junior/Associate Environmental Scientist, Groundwater and Environmental Services, Inc., 2001 - 2002

Ms. Shapiro was responsible for groundwater monitoring and sampling, gauging and product bailing, High Intensity Targeting (HIT) or Effluent Fluid Recovery (EFR) events, sensitive receptor surveys, soil borings, monitoring well installations, surveying, and permitting.

Researcher, Department of Biology, American University, 2000 - 2001

Ms. Shapiro was responsible for mapping data using Geographical Information Systems (GIS) for a subterranean biodiversity study of the United States. Ms. Shapiro also sampled springs (water chemistry, structure and Baits sampling) for a water quality study of Rock Creek Park, Washington, DC.

Litigation Assistant/Paralegal, Earthjustice Legal Defense Fund, 1998 - 2000

Ms. Shapiro was responsible for managing all casework, including research, editing, and assisting with the preparation of legal documents for numerous environmental legal proceedings.

- **FELLOWSHIP**

Ms. Shapiro was a "Woman in Science Fellow" at the United States Senate Environmental Protection Agency, Office of Policy, Planning, and Evaluation in 1997.

- **SELECTED PUBLICATIONS**

Weinstock, Eric A. and **Shapiro, Deborah**, 2006, Redeveloping "E-Sites" in New York City, in The Real Estate Journal, January 3-9, 2006.

Weinstock, Eric A., Osmundsen, Steven, and **Shapiro, Deborah**, 2008, "Subsurface Evaluation Through Sub-Slab Depressurization, The Investigation and Remediation of a Dry Cleaning Facility in Brooklyn, NY", NGWA Conference on Eastern Regional Ground Water Issues, June 23-24, 2008, Ronkonkoma, NYH.

RICHARD J. IZZO, CPG

- **TITLE**

  Associate

- **EDUCATION**

  Bachelor of Science, Geology, State University of New York at Oneonta, 1985

- **CERTIFICATIONS AND REGISTRATIONS**

  AIPG Certified Professional Geologist No. 9644
  Hazardous Waste Operations & Emergency Response Supervisor (29 CFR 1910.120)
  Health & Safety Operations at Hazardous Materials Sites (29 CFR 1910.120)

- **PROFESSIONAL AFFILIATIONS**

  Association of Groundwater Scientists and Engineers
  American Society for Testing and Materials (ASTM)

- **PROFESSIONAL EXPERIENCE**

  Associate, CA Rich Consultants, Inc., 1985 - Present

  Mr. Izzo possesses over twenty years experience in the design, implementation, and management of environmental testing and remediation programs throughout the Tri-State Area. Examples of these programs include a NYSDEC Brownfields Investigation in Bushwick, NY, a Remedial Investigation for a Superfund Site in Maybrook, NY and a NYSDEC Phase II investigation in Croton-on-Hudson, NY. His responsibilities included design of monitoring well networks, including well location and depth selection; supervision of drilling and well installation; design of sampling and analysis programs including sampling methodology, protocol, and analytical parameters; sampling of soil, groundwater, surface water, ambient air, soil vapor, building materials, and interior radon testing; data reduction (including interpretation of laboratory results, determination of ground water flow direction and rate), and preparation of written reports; interface between responsible parties and regulatory agencies.

  Mr. Izzo has designed, implemented, and managed several remediation programs in the Tri-State Area including a NYSDEC Voluntary Cleanup of a former decal manufacturing facility in Mount Vernon, NY to restore the site to "unrestricted usage" conditions. Mr. Izzo has managed remedial investigative testing and analysis as well as conceptual design of active soil vapor extraction and groundwater treatmant systems. In addition, Mr. Izzo has participated in the design and implementation of passive and active floating product removal systems utilizing pump and treatment methods, oil-sorbent materials and oxygen-releasing products to remove light non-aqueous phase liquids (LNAPLS) and enhance natural bioremediation of dissolved hydrocarbons.

  Additional remedial action programs managed by Mr. Izzo include removal, testing and proper disposal of abandoned underground storage tanks, as well as contaminated soils and water at a US Postal Service construction site in Manhattan; and identification, testing, excavation and proper disposal of over 7,000 tons of hydrocarbon0impacted soils under a NYSDEC consent Order at a

Suffolk County, NY former industrial property as part of site re-development into a residential community.

Mr. Izzo implemented quarterly water quality monitoring program at a New Jersey Site contaminated with chlorinated hydrocarbons. As part of this project, he directed testing and remedial activities including excavation and disposal of contaminated soil based on soil vapor screening with real-time vapor monitoring equipment; removal and disposal of buried 1000 gallon storage tank; removal of contaminated groundwater through installation of small scale recovery well system. In addition, Mr. Izzo assisted in the design of a pilot-scale pump and treatment operation involving the installation of an air stripper to mitigate volatile organic contamination in shallow groundwater.

Mr. Izzo designed, authored, and assisted in the implementation of a Site Health and Safety Plan for the construction and eventual occupation of a United States Postal Service General Mail Facility/Vehicle Maintenance Facility on a former landfill in Brooklyn, NY.

Mr. Izzo assisted in development of the Firm's Phase I and Phase II assessment capabilities, and currently serves as the Firm's Environmental Assessment Manager. Related responsibilities include technical and budgetary management of Phase I/Phase II capabilities, as well as assessment sales and client liaison.

Mr. Izzo managed and participated in several ground water resource investigations for potential developers in Westchester, Putnam, and Dutchess Counties in New York. His experience includes participation in seismic exploration, performance of fracture trace analysis, selection of test well locations, supervision of test well installation, design and implementation of 24, 48 and 72-hour pumping tests, as well as reduction and analysis of pumping test data. Mr. Izzo managed a hydrogeologic investigation in support of a ground water allocation permit application for a golf course in Monmouth County, New Jersey. His responsibilities included a drainage basin recharge estimate, analysis of pumping test data and a computer model assessing pumpage impacts to surrounding wells. Additional related responsibilities included preparation of written report and expert testimony at a NJDEP hearing.

Mr. Izzo designed and implemented a town-wide ground water resource management study for the Town of North Castle, New York. This study included mapping of stratified drift and fracture bedrock aquifers, analysis of hydrogeologic information from existing well inventory, development of water budget and estimate of current and potential future ground water resource demand.

Mr. Izzo managed a water resource feasibility study for a golf course DEIS application in northern Westchester County. Activities included determination of irrigation requirements and ground water resource exploration. In addition, Mr. Izzo designed and managed a hydrogeologic assessment for a community water supply system in Westchester County. Activities include determination of normal well system operation impacts on nearby surface water bodies, and prediction of well interference effects through utilization of computer modeling.

- **PUBLICATIONS**

  Izzo, Richard J. *"Buyer Beware: User Responsibilities under All Appropriate Inquiry Standards"* New York Real Estate Journal; December 2007

  Izzo, Richard J. & Rich, Charles A. *"Monitored Natural Attenuation is not NO ACTION"*
  Long Island Business News; April 1999

  Izzo, Richard J. *"Lead Based Paint Risk and Risk Management"*
  Long Island Business News, New England Real Estate Journal; May 1993

STEPHEN J. OSMUNDSEN, P.E.

- **TITLE**

  Senior Engineer

- **EDUCATION**

  Master of Engineering, Cornell University, 1975
  Bachelor of Science, Clarkson College of Technology, 1974

- **CERTIFICATIONS AND REGISTRATIONS**

  Licensed Professional Engineer in the State of New York, State of Georgia, State of Kansas, State of Wisconsin, State of Michigan

- **PROFESSIONAL AFFILIATIONS**

  American Society of Civil Engineers
  N.Y. Water Pollution Control Federation
  Technical Association for the Pulp and Paper Industry
  Water Environment Federation
  Consulting Engineers Council
  Empire State TAPPI

- **PROFESSIONAL EXPERIENCE**

  Senior Engineer, CA Rich Consultants, Inc., 1993-Present

  Mr. Osmundsen serves CA Rich Consultants, Inc. as both a Senior Engineer and Engineering Supervisor. He directs and advises the environmental engineering staff at CA RICH, providing detailed inspection and oversight services relative to the Firm's compliance auditing workload. Stephen works closely with CA RICH staff on projects ranging from environmental auditing and compliance services, violations searches, costing detail for remediation, as well as conceptual, pilot and full-scale remedial design and permits for treatment systems to correct hazardous waste contamination problems.

  American Chemical Company

  Evaluated the use of brackish water in American Chemical Company's cooling tower systems at their Searles Valley Facilities. The study included development of operating scenarios that considered the desert operating conditions at the site, the impacts of the arsenic emissions in the drift from the towers and California's Proposition 65 and Air Toxic Emissions Modeling for California AB 2588. Variables considered in the study were alternate water sources, tower configuration, blowdown frequency, reverse osmosis and other water treatment options, and tower materials of construction.

Bay West

Developed the design and supervised the detailed engineering and construction of a $6 million wastewater treatment facility for the Bay West 400 ton deinked towel and tissue mill in Middletown, Ohio.

General Electric

Supervised the design of the $2.5 million expansion of the General Electric Schenectady Works industrial wastewater treatment plant from a 40 million gallon a day capacity to 60 million gallons per day. The design included the up-grading of the industrial based control system to an on-line computer system with interactive control and data acquisition.

Fairchild Industries

Supervised and prepared designs and specifications for the closure, clean-up and remediation activities at Fairchild Industries, Farmingdale, New York Facility. Activities at the site included hazardous waste treatment unit closure, underground tank removal, soil removal, asbestos removal, building demolition and soil vapor extraction.

Fort Orange Paper Company

Developed the process design for the cooling water treatment for the condensing water at Fort Orange Paper Company's 60 megawatt LM 5000 combined cycle cogeneration plant. The process evaluation included surface water and stand-by well water treatment, cooling tower materials of construction, and cooling tower blowdown treatment.

Pentec Paper

The process design for cooling tower to temper the wastewater from Pentec Papers 600 ton per day pulp mill as the preparatory step for biological treatment. The design had to consider some unusual conditions including the relatively high temperature of the six million gallon a day, the extremely corrosive nature of the pulp mill effluent, and the high fiber content of the wastewater. The design of the distribution system and tower configuration were especially important due to the plugging potential and the materials of construction critical because of the high temperature and corrosivity of the waste stream.

VICTORIA D. WHELAN, B.S.

- **TITLE**

Project Hydrogeologist/Field Supervisor

- **EDUCATION**

Bachelor of Science, Geology, State University of New York at Oswego, 2005

- **CERTIFICATIONS**

40-hour OSHA Hazardous Waste Operations and Emergency Response Training (OSHA 29 CFR 1910.120)
Standard First Aid Training - American Red Cross- Bohemia Fire Department
CPR Training – American Red Cross -Bohemia Fire Department

- **PROFESSIONAL EXPERIENCE**

Project Hydrogeologist, C A Rich Consultants, Inc., 2006 - Present

As a Project Hydrogeologist with CA RICH, Ms. Whelan's responsibilities include the conductance of Phase I and Phase II Environmental Site Assessments (ESAs). Ms. Whelan has also conducted all aspects of environmental investigations including monitoring well design/installation, groundwater, indoor air, soil gas, subslab vapor, and soil sampling, UST removals, soil delineation, excavation, petroleum and hazardous waste disposal, analytical interpretation, groundwater contouring, and report preparation.

Ms. Whelan conducts annual property inspections for the highly successful Tenant Environmental Compliance Program, which helps to ensure that the tenants are not contaminating a landlord's properties. This Program now covers almost two million square feet of multi-tenanted buildings on Long Island, NY.

Project Hydrogeologist, Walden Associates, P.L.L.C, 2005 - 2006

As a Hydrogeologist with Walden Associates, Ms. Whelan's responsibilities included the quarterly monitoring report write ups, sub-surface investigation reports, monitoring well installation oversight with logging and sampling, remediation system maintenance, well surveying, groundwater sampling, and free product recovery.

Ms. Whelan assisted with the start-up tests and monitoring for an air sparge/soil vapor extraction (AS/SVE) system for the remediation of PCE contamination on a Federal Superfund site.

- **PROFESSIONAL AFFILIATIONS**

Long Island Association of Professional Geologists (LIAPG)
National Ground Water Association, member
Sigma Xi, member

- **PUBLICATIONS**

Andrews, J., and **Whelan, V.,** Department of Earth Sciences, State University Of New York at Oswego NY 13126, Ordovician Carbonates in Northwest Lewis and parts of Southeastern Jefferson counties, New York Northeastern Section and Southeastern Section joint Meeting

- **FIELD RESEARCH FOR PAPER CONTRIBUTIONS**

Bauer, M., Valentino, D., Chiarenzelli, J., Solar, G., Department of Earth Sciences, State University of New York at Oswego, NY 13126, Metamorphic Petrology and Unit Distribution in The Oliver hill Dome, Eastern Adirondack Mountains, New York, Northeastern Section and Southeastern Section joint Meeting

Smith, N., Valentino, D., Chiarenzelli, J., Solar, G., Department of Earth Sciences, State University of New York at Oswego, NY 13126, Distribution of L- and L-S Tectonite in the Oliver Hill Dome, Eastern Adirondack Mountains, New York, Northeastern Section and Southeastern Section joint Meeting

Stilwell, S., Garwron, J., Andrews, J., Bauer, M., Crocetti, A., Meneilly, N., Piaschyk, D., Smith, N., and **Whelan, V.,** Earth Sciences, SUNY Oswego, Oswego, NY 13126, Fracture analysis along the southern shore of Lake Ontario in the Oswego Formation, Oswego County, New York, Northeastern Section and Southeastern Section joint Meeting

DAWN M. VOUGHT

- **TITLE**

Senior Project Manager/Quality Assurance Officer

- **EDUCATION**

Master of Science, Environmental Technology, New York Institute of Technology (Thesis Pending)
Master of Science, Hydrology, University of Arizona (Partial Completion)
Bachelor of Science, Marine Science-Geology, Long Island University – Southampton College, 1987

- **CERTIFICATIONS**

OSHA Hazardous Waste Operations and Emergency Response Training (OSHA 29 CFR 1910.120)
OSHA Hazardous Waste Operations and Emergency Response Refresher Training [OSHA 29 CFR 1910.120(e)(8)]
OSHA Site Supervisor Training
Loss Prevention System Safety Training
Loss Prevention System Refresher Training
Adult CPR Certified
Standard First Aid Certified
New Jersey DEP License #0011593 – Subsurface Investigations

- **PROFESSIONAL EXPERIENCE**

Senior Project Manager, CA Rich Consultants, Inc., 2007 - Present

Ms. Vought serves as a Senior Project Manager for the Firm. In that capacity, she is responsible for managing complex Phase I and Phase II Environmental Site Assessments and remediation of commercial and industrial properties, as well as other non-industrial properties to facilitate real property transfers, loan workouts, and refinances. In addition, she has extensive experience managing remedial investigations, design, construction, operation and maintenance at numerous sites.

Ms. Vought is competent in conducting all aspects of environmental investigations and cleanups including monitoring well design/installation, groundwater and soil investigations, sanitary system or dry well clean-outs, UST removals, soil delineation, excavation, petroleum and hazardous waste disposal, analytical interpretation, groundwater contouring, and report preparation.

Site Operations Manager, Groundwater & Environmental Services, Inc., 2006 - 2007

Ms. Vought was responsible for the complete operational, personnel, and financial responsibility for the Long Island office; supervision and mentoring of a staff of environmental scientists, geologists, project managers, case managers, engineers, and technicians; senior technical resource for office; ensured quality control of office product; client satisfaction; budgeting; marketing of major client portfolios

Senior Project Manager, Groundwater & Environmental Services, Inc., 2002 - 2006

Ms. Vought was responsible for the local account management of major oil company portfolios; responsible for the overall management of \$2.8M and \$2.2M portfolios, respectively, including complete operational and financial responsibility; quality and timeliness of all work performed by the group; client satisfaction; proposals; annual budgeting and tracking of the portfolio; review of all technical reports; regulations and general consulting expert

Consulting Group Manager, Tyree Bros. Environmental Services, Inc., 1998 - 2002

Ms. Vought was responsible for the overall management of the environmental site assessment and remediation group; marketing; contractual discussions, cost estimates, scope of work, and proposals; supervision and training of staff; annual budgeting; review of all technical reports; management of large or complex projects; and expert witness testimony/depositions

Senior Hydrogeologist/Project Manager, Tyree Bros. Environmental Services, Inc., 1988 - 1998

Ms. Vought was responsible for the complete management, supervision, and fiscal responsibility for complex environmental site assessment and consulting projects including Phase I/Phase II site assessments, Voluntary Cleanup Program/Brownfield projects, NYSDEC Stipulation Agreement projects, inactive hazardous waste sites, tank closure assessments, UIC remediation assessments, risk assessments, geophysical surveys, CAPs, RAPs, PSA work plans/reports, IRM work plans, monitoring plans, status reports, on-going remediation and monitoring sites, and preparation of various technical Standard Operating Procedures. Managed the installation, operation and maintenance of remedial systems, and pilot testing/system design; field supervision of drilling (hollow stem auger, air rotary, Geoprobe), soil borehole logging, split spoon sampling, well installations, pilot testing, surveying, tank removals, soil gas surveys, well monitoring and sampling.

Hydrologic Aid, United States Geological Survey, 1985 - 1986

Ms. Vought was responsible for the collection of water level measurements, site mapping, well surveying, and well characteristics; groundwater flow maps; geologic cross-sections based upon drilling logs

- **PROFESSIONAL AFFILIATIONS**

Long Island Professional Geologists Association
National Ground Water Association, Former Member
Environmental Assessment Association, Former Member
NYSDEC Advisory Committee Member for RBCA

JASON T. COOPER, B.S.

- **TITLE**

  Project Environmental Scientist/Draftsman/Field Technician

- **EDUCATION**

  Bachelor of Science, Geology, State University of New York at Buffalo, 1999

- **CERTIFICATIONS**

  40-hour OSHA Hazardous Waste Operations and Emergency Response Training (OSHA 29 CFR 1910.120)
  8-hour OSHA Hazardous Waste Operations and Emergency Response Refresher Training
  Standard First Aid Training - American Red Cross
  CPR Training – American Red Cross

- **PROFESSIONAL AFFILIATIONS**

  Long Island Association of Professional Geologists (LIAPG)

- **PROFESSIONAL EXPERIENCE**

  <u>Project Environmental Scientist, C A Rich Consultants, Inc., 2005 - Present</u>

  As a Project Environmental Scientist with CA RICH, Mr. Cooper's responsibilities include the conductance of Phase I and Phase II Environmental Site Assessments (ESAs). Jason's Phase I and Phase II ESA experience includes coordinating historical and regulatory database searches, conducting Property inspections, collecting soil, groundwater, and sediment samples and authoring Phase I and Phase II reports.

  Mr. Cooper has also assisted with the construction and start-up tests for an air sparge/soil vapor extraction (AS/SVE) system for the remediation of PCE contamination. In addition, he has conducted quarterly monitoring and troubleshooting for the AS/SVE system.

  Mr. Cooper also conducts annual property inspections for the highly successful Tenant Environmental Compliance Program, which helps to ensure that the tenants are not contaminating a landlord's properties. This Program now covers almost two million square feet of multi-tenanted buildings on Long Island, NY.

  <u>Geologist, Geologic Services Corporation, 2001 - 2005</u>

  As a Geologist with Geologic Services Corporation, Mr. Cooper's responsibilities included the authoring of quarterly monitoring reports, sub-surface investigation reports, and sensitive receptor survey reports. In addition he has conducted monitoring well installation oversight with logging and sampling, remediation system maintenance, well surveying, groundwater sampling, 24-hour pump tests, equipment maintenance and peer mentoring.

  Mr. Cooper developed and implemented a program for the management and oversight for the collection of over 1,000 groundwater samples for a retail gasoline station in Smithtown, New York. His duties included the training of personnel, management and QA/QC of samples, and meeting monthly deadlines. In addition, he conducted monthly mass flux calculations, MTBE vertical cross-section contour maps, vertical cross-section groundwater flow maps (flow nets), and aerial groundwater flow maps.

Jason has also assisted with the construction of a groundwater pump and treat remediation system and determined the most affective locations for the submersible pumps for maximum contamination recovery.

Jason has completed the ExxonMobil Loss Prevention Safety (LPS) program and participated in monthly Health and Safety meetings. Jason conducted health and safety oversight of drilling activities, tank cleanings and removals and soil removal. The LPS and health and safety programs were implemented in the field by Jason as a health and safety officer with zero incidences.

<u>Field Technician, Environmental Assessment and Remediation (EAR) 2000 - 2001</u>

As a field technician with EAR, Mr. Cooper's responsibilities included the construction of remediation systems, operations and maintenance along with troubleshooting of remediation systems, groundwater sampling, air sampling and well abandonment.

MICHAEL T. YAGER

- **TITLE**

  Project Manager/Environmental Scientist/Field Technician

- **EDUCATION**

  Biology and Environmental Science SUNY Cortland, 1988

- **CERTIFICATIONS AND REGISTRATIONS**

  Hazardous Waste Operations and Emergency Response-Supervisor OSHA Part 1910.120
  Health & Safety Operations at Hazardous Materials Sites 29 CFR1910.120 (E) (2) - 40 hours
  NYS Department of Labor (NYSDOL) Asbestos Air Sampling Technician
  USEPA AHERA, NYSDOL Approved Asbestos Inspector

- **PROFESSIONAL EXPERIENCE**

  <u>Project Manager/Environmental Scientist, CA Rich Consultants Inc., 1988 – Present</u>

  As a Project Manager/Environmental Scientist for CA RICH, Mr. Yager conducts all aspects of the asbestos abatement industry including asbestos inspections for residential, commercial, and industrial properties; Large and small scale asbestos abatement supervision including third party air monitoring for asbestos fiber control. In addition, Mr. Yager conducts Phase I ESAs and all aspects of hazardous waste site investigations and remediation including hazardous waste characterization, consolidation and disposal; regulatory compliance - RCRA, CERCLA (Superfund), ECRA, AHERA, large and small quantity generator reporting; SARA Title III Community Right-to-Know Reporting, discharge permits for air and groundwater.

  Mr. Yager has also designed, implemented and supervised investigatory and/or remedial activities conducted on-site. Investigatory activities include: sub-surface soil sampling, soil vapor/gas sampling; installation, development and sampling of groundwater monitoring wells, Hydropunch groundwater sampling; air sampling and/or monitoring; etc., to determine and/or delineate the extent and degree of existing contamination at the site. Corrective actions include: asbestos abatement activities; underground storage tank removal or abandonment; excavation of contaminated soils and/or materials; consolidation and proper disposal of hazardous waste; etc., to remediate hazardous materials and/or on-site conditions.

JESSICA E. PROSCIA, B.S.

- **TITLE**

  Project Environmental Scientist/Field Technician

- **EDUCATION**

  Bachelor of Science, Health Science, Environmental Health and Safety, State University of New York at Stony Brook, 2007

- **CERTIFICATIONS**

  40-hour OSHA Hazardous Waste Operations and Emergency Response Training (OSHA 29 CFR 1910.120)
  8-hour OSHA Hazardous Waste Operations and Emergency Response Refresher Training
  Standard First Aid Training - American Red Cross
  CPR Training – American Red Cross

- **PROFESSIONAL EXPERIENCE**

  <u>Project Environmental Scientist, C A Rich Consultants, Inc., Oct. 2008 – Present</u>

  As a Project Environmental Scientist with CA RICH, Ms. Proscia's responsibilities include the conductance of Phase I and Phase II Environmental Site Assessments (ESAs). Ms. Proscia has also conducted all aspects of environmental investigations including UST removals, supervision of drilling and well installation, sanitary system or dry well clean-outs, groundwater, and soil sampling, soil delineation, excavation, petroleum and hazardous waste disposal, analytical interpretation, groundwater contouring, and report preparation.

  <u>Environmental Scientist/Health and Safety Officer, Hydro Tech Environmental, Corp., 2007 - 2008</u>

  As an Environmental Scientist with Hydro Tech Environmental, Ms. Proscia's responsibilities included Phase I ESA's through Subsurface Investigations. Ms. Proscia was also involved in site supervision on several properties in New York State.

  Ms. Proscia performed on site safety inspections for the company's field crew as well as trained staff for the OSHA 40-hour and 8-hour refresher course.

- **PROFESSIONAL AFFILIATIONS**

  Long Island Association of Professional Geologists (LIAPG)

APPENDIX F

Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN

FOR THE
REMEDIAL ACTION WORK PLAN
AT
VIA VERDE AKA
NEW HOUSING NEW YORK LEGACY PROJECT, BRONXCHESTER URBAN RENEWAL AREA
700-730 BROOK AVENUE
BRONX, NEW YORK

BCP SITE #C203043

April 2009; Revised June 2009

Prepared for:

Via Verde Homes, LLC
Via Verde Rental Associates, L.P.
902 Broadway, 13th Floor
New York, New York 10010

and

City of New York
Department of Housing Preservation and Development
Environmental Planning Unit
100 Gold Street
New York, New York 10038

Prepared by:

CA RICH CONSULTANTS, INC.
17 Dupont Street
Plainview, New York 11803
(516) 576-8844

Quality Assurance Project Plan

1.1 Introduction - The following Quality Assurance Project Plan ("QAPP") has been prepared specifically for the Remedial Action Work Plan at 700-730 Brook Avenue located in the Bronx, New York (hereinafter referred to as the 'Site'). This Plan was prepared in accordance to Section 2 of DER-10 and approved as stated below.

Prepared by: Dawn M. Vought ______ Date: 6-25-09

Dawn Vought, Quality Assurance Officer

Approved by: D. Shapiro ______ Date: 6-25-09

Deborah Shapiro, Project Manager

1.2 QAPP - Table of Contents

The following elements are included in this QAPP:

1.3 Project Description - The Remedial Action Work Plan (RAWP) subject to this QAPP has been prepared to address the following issues:

- Conduct a limited excavation of soil/fill for off-Site disposal with collection of end point samples;
- Remove any underground storage tanks (USTs) and/or hydraulic lifts on the Site;
- Inject a combination of Regenox™ and ORC® Advanced into the groundwater table and smear zone;
- Installation of a two-foot clean fill buffer;
- Conduct post-remedial groundwater sampling; and
- Installation of a vapor barrier and sub-slab depressurization (SSD) system.

These remedial actions are described in detail in the RAWP.

1.4 Project Organization – Ms. Deborah Shapiro will serve as the Project Manager (PM) and will be responsible for the overall scheduling and performance of all the NYSDEC-approved remedial action activities.

Ms. Dawn Vought will serve as the Quality Assurance Officer (QAO) for this project. Her duties will include:

- Review of laboratory data packages
- Interface with laboratory
- Performance of Field Audits

Experienced CA RICH staff will perform and/or oversee completion of all field activities described in the RAWP.

1.5 Quality Assurance Objectives and Data Measurement – There are two sources of data collection methodology that will provide data information during this RAWP.

Field Screening - Organic vapor readings will be recorded from the head space of soil samples. This data is intended to be used only as a screening tool. To meet these goals, clean sampling tools will be used for each head space measurement and the photoionization detector (PID) will be calibrated at the beginning of each screening day on-Site.

Chemical Analysis – All environmental samples will be delivered to a New York State-Certified laboratory contracted to CA RICH for chemical analysis. Soil samples will be analyzed for volatile organic compounds (VOCs) via EPA Method 8260, semi-volatile organic compounds (SVOCs) via EPA Method 8270 and TAL metals using EPA Method 6000/7000 series. Groundwater samples will be analyzed for VOCs via EPA Method 8260, SVOCs via EPA Method 8270, PCBs, and dissolved TAL metals. This data is intended to determine that the remedial measures have mitigated the risk from any contaminants in the soil and groundwater at the Site. The laboratory will follow the NYSDEC – Analytical Services Protocol dated 2005. All samples will be analyzed using NYSDEC ASP Category B deliverables. All samples will be collected in pre-cleaned laboratory supplied containers, placed in iced-filled coolers, and delivered to the laboratory by CA RICH within 48 hours of collection.

Quality assurance objectives are generally defined in terms of five parameters:

- **Representativeness -** Representativeness is the degree to which sampling data accurately and precisely represents Site conditions, and is dependent on sampling and analytical variability. The RAWP has been designed to assess the presence of the constituents in the target media at the time of sampling. The Plan presents the rationale for sample quantities and location. The RAWP also presents field sampling methodologies and laboratory analytical methodologies.

  The use of the prescribed field and laboratory analytical methods with associated holding times and preservation requirements are intended to provide representative data. Further discussion of QC checks is presented in Section 1.11.

- **Comparability** - Comparability is the degree of confidence with which one data set can be compared to another data set. Comparability between this RAWP, and to the extent possible, with existing data, will be maintained through consistent sampling and analytical methodology set forth in the QAPP; the RAWP; the NYSDEC ASP analytical methods (2005) with NYSDEC ASP QA/QC requirements (2005); and through use of QA/QC procedures and appropriately trained personnel.

- **Completeness -** Completeness is defined as a measure of the amount of valid data obtained from an event and/or remedial action compared to the amount that was expected to be obtained under normal conditions. This will be determined upon assessment of the analytical results, as discussed in Section 1.12.

- **Precision -** Precision is the measure of reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the objectives of the RAWP. To maximize precision, sampling and analytical procedures will be followed. All work for the investigation phase of this project will adhere to established protocols presented in the QAPP and RAWP. Checks for analytical precision will include the analysis of matrix spike duplicates, laboratory duplicates, and field duplicates. Checks for field measurement precision will include obtaining duplicate field measurements. Further discussion of precision QC checks is provided in Section 1.11.

- **Accuracy** - Accuracy is the deviation of a measurement from the true value of a known standard. Both field and analytical accuracy will be monitored through initial and continuing calibration of instruments. In addition, internal standards, matrix spikes, blank spikes, and surrogates (system monitoring compounds) will be used to assess the accuracy of the laboratory analytical data. Further discussion of these QC samples is provided in Section 1.11.

1.6 Sampling Procedures - The sampling procedures that will be employed are discussed in detail in the RAWP.

1.7 Sample and Document Custody Procedures

- **General** - The Chain-of-Custody program allows for the tracing of possession and handling of the sample from its time of collection through its chemical analysis in the laboratory. The chain-of-custody program at this site will include:

  - Sample labels
  - Chain-of-Custody records
  - Field records

- **Sample Labels -** To prevent misidentification of samples, a label will be affixed to the sample container and will contain the following information:

  - Site Name
  - Sample identification number
  - Date and time of collection
  - Name of Sampler
  - Preservation (if any)
  - Type of analysis to be conducted

- **Chain-of-Custody Records** - To establish the documentation necessary to trace sample possession from the time of collection, a chain-of-custody record (sample attached) will be filled out and will accompany samples at all times. The record will contain the following information:

  - Project name
  - Printed name and signature of samplers
  - Sample number
  - Date and time of collection
  - Sampling location
  - Number of containers for each sample
  - Signature of individuals involved in sample transfer (when relinquishing and accepting samples)
  - Inclusive dates and times of possession

- **Field Records** - Field records will be maintained during each sampling effort in a logbook. All aspects of sample collection, handling and visual observations will be recorded. All sample collection equipment, field analytical equipment and equipment utilized to make physical measurements will be identified in the field logbook.

  All calculations, results and calibration data for field sampling, field analytical and field physical measurement equipment will also be recorded in the field logbook. Entries will be dated and initialed. Entries will be made in ink, and will be legible.

1.8 Calibration Procedures and Frequency - The contracted laboratory will follow the NYSDEC Category-B requirements for equipment calibration procedures and frequency.

The QA Officer and/or PM will be responsible for ensuring that the Field PID is calibrated at the beginning of each day of field sampling using calibration gas supplied by the manufacturer. A log of the meter calibration will be kept in the filed logbook.

1.9 Analytical Procedures - The laboratory analysis includes VOCs using EPA method 8260, SVOCs using USEPA Method 8270, PCBs, and TAL metals using EPA Method 6000/7000 series and will follow NYSDEC ASP (2005) protocols with Category B deliverables. The following samples will be collected for QA/QC purposes for both the soil and groundwater sampling: 1 trip blank, 1 field blank, 1 duplicate sample, 1 matrix spike, and 1 matrix spike duplicate. A qualified data validator will review the laboratory data and a Data Usability Summary Report (DUSR) will be prepared.

1.10 Data Reduction, Validation and Reporting

- **Field Data -** All field data recorded in logbooks or on log sheets will be evaluated in the Office and transferred to word processor text by field personnel or clerical staff. PID readings will be included on the logs. The QAO and/or PM will review this data for accuracy and completeness.

- **Laboratory Data** - The laboratory will transfer the instrument readings to laboratory report forms. Premier Environmental will perform independent data validation of all analytical data using NYSDEC DUSR protocols.

  The data validator will provide CA RICH with a Data Validation Summary Report. The QAO and/or PM will review the summary report as well as other field data and prepare a Data Usability Report. Both the Data Validation Summary Report and the Data Usability Report will be provided to NYSDEC.

  CA RICH will prepare summary tables of the validated analytical data using computer spreadsheet software. The data entries will be reviewed using the red check-green check method. All entries will be reviewed and entry errors will be marked in red ink. Once these entries are corrected, the printouts will be marked with green ink and placed in the project file.

1.11 Internal Quality Control Checks

Both field and laboratory quality control checks are proposed for this project. In the event that there are any deviations from these checks, the PM and QAO will be notified. The proposed field and laboratory control checks are discussed below.

Field Quality Control Checks

- **Field Measurements -** To verify the quality of data collected using field instrumentation, at least one duplicate measurement will be obtained per day and reported for all field analytical measurements.

- **Sample Containers -** Certified-clean sample containers will be supplied by the contracted laboratory.

- **Field Duplicates** – Field duplicates will be collected to check reproducibility of the sampling methods. Field duplicates will be prepared as discussed in the RAWP. In general, field duplicates will be analyzed at a five percent frequency (every 20 samples).

- **Field Rinse Blanks** – Field rinse blanks are used to monitor the cleanliness of the sampling equipment and the effectiveness of the cleaning procedures. Field rinse blanks will be prepared and submitted for analysis during the soil and groundwater end point sampling. Field rinse blanks will be prepared by filling sample containers with analyte-free water (supplied by the laboratory), which has been routed through a cleaned sampling device.

- **Trip Blanks** – Trip blanks will be used to assess whether Site samples have been exposed to non-Site-related volatile constituents during storage and transport. Trip blanks will be analyzed at a frequency of once per day, and will be analyzed for VOCs. A trip blank will consist of a container filled with analyte-free water (supplied by the laboratory), which remains unopened with field samples throughout the sampling event. Trip blanks will only be analyzed for VOCs.

1.12 Performance and Systems Audits

Performance and systems audits will be completed in the field and the laboratory during the remedial action phase of this project as described below.

- **Field Audits –** The PM and QAO will monitor field performance and field meter calibrations to verify that measurements are taken according to established protocols. The Project Manager will review all field logs. In addition, the PM and QAO will review the field rinse and trip blank data to identify potential deficiencies in field sampling and cleaning procedures.

- **Laboratory Audits** – The contracted laboratory will perform internal audits consistent with NYSDEC ASP (2005).

1.13 Preventive Maintenance

Preventive maintenance schedules have been developed for both field and laboratory instruments. A summary of the maintenance activities to be performed is presented below.

- **Field Instruments and Equipment -** Prior to any field sampling, each piece of field equipment will be inspected to assure it is operational. If the equipment is not operational, it must be serviced prior to use. All meters which require charging or batteries will be fully charged or have fresh batteries. If instrument servicing is required, it is the responsibility of the field personnel to follow the maintenance schedule and arrange for prompt service.

- **Laboratory Instruments and Equipment -** The laboratory will document Laboratory instrument and equipment procedures. Documentation includes details of any observed problems, corrective measure(s), routine maintenance, and instrument repair (which will include information regarding the repair and the individual who performed the repair).

  Preventive maintenance of laboratory equipment generally will follow the guidelines recommended by the manufacturer. A malfunctioning instrument will be repaired immediately by in-house staff or through a service call from the manufacturer.

1.14 Data Assessment Procedures

The analytical data generated during the RAWP will be evaluated with respect to precision, accuracy, and completeness. The procedures utilized when assessing data precision, accuracy, and completeness are presented below.

- **Data Precision Assessment Procedures -** Field precision is difficult to measure because of temporal variations in field parameters. However, precision will be controlled through the use of experienced field personnel, properly calibrated meters, and duplicate field measurements. Field duplicates will be used to assess precision for the entire measurement system including sampling, handling, shipping, storage, preparation and analysis.

  Laboratory data precision for organic analyses will be monitored through the use of matrix spike duplicate sample analyses. For other parameters, laboratory data precision will be monitored through the use of field duplicates and/or laboratory duplicates.

The precision of data will be measured by calculation of the standard deviation (SD) and the coefficient of variation (CV) of duplicate sample sets. The SD and CV are calculated for duplicate sample sets by:

$$SD = (A-B)/1.414$$
$$CV = SD/((A+B)/2) = 1.414(A-B)/(A+B)$$

Where:

A = Analytical result from one of two duplicate measurements
B = Analytical result from the second measurement.

Where appropriate, A and B may be either the raw measurement or an appropriate mathematical transformation of the raw measurement (e.g., the logarithm of the concentration of a substance).

Alternately, the relative percent difference (RPD) can be calculated by the following equation:

$$RPD = \frac{(A-B)}{(A+B)/2} \times 100$$

$$RPD = 1.414\,(CV)(100)$$

- **Data Accuracy Assessment Procedures -** The accuracy of field measurements will be controlled by experienced field personnel, properly calibrated field meters, and adherence to established protocols. The accuracy of field meters will be assessed by review of calibration and maintenance logs.

  Laboratory accuracy will be assessed via the use of matrix spikes, surrogate spikes, and internal standards. Where available and appropriate, QA performance standards will be analyzed periodically to assess laboratory accuracy. Accuracy will be calculated as a percent recovery as follows:

$$Accuracy = \frac{A-X}{B} \times 100$$

  Where:

  A = Value measured in spiked sample or standard
  X = Value measured in original sample
  B = True value of amount added to sample or true value of standard

  This formula is derived under the assumption of constant accuracy over the original and spiked measurements. If any accuracy calculated by this formula is outside of the acceptable levels, data will be evaluated to determine whether the deviation represents unacceptable accuracy, or variable, but acceptable accuracy. Accuracy objectives for matrix spike recoveries and surrogate recovery objectives are identified in the NYSDEC, ASP (2005).

- **Data Completeness Assessment Procedures -** Completeness of a field or laboratory data set will be calculated by comparing the number of samples collected or analyzed to the proposed number.

$$\text{Completeness} = \frac{\text{No. Valid Samples Collected or Analyzed}}{\text{No. Proposed Samples Collected or Analyzed}} \times 100$$

As general guidelines, overall project completeness is expected to be at least 90 percent. The assessment of completeness will require professional judgment to determine data usability for intended purposes.

1.15 Corrective Action

Corrective actions are required when field or analytical data are not within the objectives specified in this QAPP, or the RAWP. Corrective actions include procedures to promptly investigate, document, evaluate, and correct data collection and/or analytical procedures. Field and laboratory corrective action procedures for this project are described below.

- **Field Procedures -** When conducting fieldwork, if a condition is noted that would have an adverse effect on data quality, corrective action will be taken so as not to repeat this condition. Condition identification, cause and corrective action implemented will be documented as a memo to the project file and reported to the Project Manager.

  Examples of situations, which would require corrective actions, are provided below:

  - Protocols as defined by the QAPP and the RAWP have not been followed;
  - Equipment is not in proper working order or properly calibrated;
  - QC requirements have not been met; and
  - Issues resulting from performance or systems audits.

  Project field personnel will continuously monitor ongoing work performance in the normal course of daily responsibilities.

- **Laboratory Procedures -** In the laboratory, when a condition is noted to have an adverse effect on data quality, corrective action will be taken so as not to repeat this condition. Condition identification, cause and corrective action to be taken will be documented, and reported to the QAO.

  Corrective action may be initiated, at a minimum, under the following conditions:

  - Specific laboratory analytical protocols have not been followed;
  - Predetermined data acceptance standards are not obtained;
  - Equipment is not in proper working order or calibrated;
  - Sample and test results are not completely traceable;
  - QC requirements have not been met; and,
  - Issues resulting from performance or systems audits.

  Laboratory personnel will continuously monitor ongoing work performance in the normal course of daily responsibilities.

1.16 Quality Assurance Reports and Management

- **Internal Reporting -** The analytical laboratory will submit analytical reports using NYSDEC ASP (2005), Category B requirements. The analytical reports will be submitted to the data validator for review. Supporting data (i.e., historic data, related field or laboratory data) will also be reviewed to evaluate data quality, as appropriate. The Quality Assurance Officer will incorporate results of data validation reports (if any) and assessments of data usability into a summary report. This report will be filed in the project file and will include the following:

    - Assessment of data accuracy, precision, and completeness for field & laboratory data;
    - Results of the performance and systems audits;
    - Significant QA/AC problems, solutions, corrections, and potential consequences;
    - Analytical data validation report; and
    - Data usability report.

- **Reporting** – The Final Engineering Report will contain a separate QA/QC section summarizing the quality of data collected and/or used as appropriate to the project DQOs. The QAO will prepare the QA/QC summaries using reports and memoranda documenting the data assessment and validation.

Sample Chain of Custody

CHAIN OF CUSTODY

ACCUTEST Laboratories

2235 Route 130, Dayton, NJ 08810
732-329-0200 FAX: 732-329-3499/3480

FED-EX Tracking #	Bottle Order Control #
Accutest Quote #	Accutest Job #

Client / Reporting Information | **Project Information**

Company Name 0	Project Name:
Address	Street
City State Zip	City State
Project Contact: E-mail	Project #
Phone #	Fax #
Samplers's Name	Client Purchase Order #

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	8260 ☐ 624 ☐ 8021 ☐ 602 ☐ BTEX ☐ MTBE ☐ TBA☐ NAP ☐	8260 ☐ 624 ☐ TCL ☐ PPL ☐ STARS ☐ MTBE ☐ TBA ☐ NAP☐ +10 ☐ +15 ☐	8270 ☐ 625 ☐ TCL ☐ PPL ☐ STARS☐ ABN☐ AE☐ BN☐ PAH☐ +TICs☐	Requested Analysis								Matrix Codes
																										LAB USE ONLY

Matrix Codes

DW- Drinking Water
GW- Ground Water
WW- Water
SW- Surface Water
SO- Soil
SL-Sludge
OI-Oil
LIQ- Other Liquid
AIR- Air
SOL-Other Solid
WP-Wipe

Turnaround Time (Business days)

- [X] Std. 15 Business Days
- [ ] 10 Day *RUSH*
- [ ] 5 Day *RUSH*
- [ ] 3 Day *EMERGENCY*
- [ ] 2 Day *EMERGENCY*
- [ ] 1 Day *EMERGENCY*
- [ ] Other

Approved By:/ Date:

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [X] Commercial "A"
- [ ] Commercial "B"
- [ ] NJ Reduced
- [ ] NJ Full
- [ ] Other ________
- [ ] FULL CLP
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] State Forms
- [ ] EDD Format________

Commercial "A" = Results Only

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler: 1	Date Time:	Received By: 1	Relinquished By: 2	Date Time:	Received By: 2
Relinquished by: 3	Date Time:	Received By: 3	Relinquished By: 4	Date Time:	Received By: 4
Relinquished by: 5	Date Time:	Received By: 5	Custody Seal #	Preserved where applicable ☐	On Ice ☐ Cooler Temp.

Resume of Data Validation Specialist

RENEE G. COHEN

- **TITLE**

  Data Validation Specialist

- **EDUCATION**

  Bachelor of Science, Environmental Science, Old Dominion University, 1984
  Bachelor of Science, Biology, Old Dominion University, 1984
  16 hours of Chemistry coursework
  Graduate Coursework - Rutgers University, New Brunswick, New Jersey
  Long Island University at C.W. Post, Glen Cove, New York

- **PROFESSIONAL EXPERIENCE**

  Data Validation Specialist, CA Rich Consultants, Inc. 1993 - Present

  Perform organic and inorganic data validation according to the various protocols from the USEPA EPA CLP, NYS ASP and USEPA Test Methods for the Evaluation of Solid Waste, Methods for the Chemical Analysis of Water and Waste and the Federal Register. Use the USEPA National Functional Guidelines for Organic and Inorganic Data Validation (where applicable) as well as State (NYS DEC ASP/DUSR) and EPA Region requirements to report on laboratory data quality and data usability. Review and write Quality Assurance Project Plans using Regional and State guidelines for Remedial Investigations, Ground Water Monitoring programs and Superfund Programs. Review data and work plans as they relate to project data quality objectives. Conducts seminars on client specific topics. Perform on-site laboratory QA/QC audits as required by the client and site-specific work plans. Perform ASTM Phase 1 Assessments for engineering firms.

  QA Specialist, Environmental Testing Laboratories, 2002 - 2003

  Performed the data review and report compilation of organic and inorganic data for report preparation. Performed departmental audits in compliance with NELAC and internal Helped to revise laboratory logbooks for bench chemists. Revised/updated laboratory SOP's for method compliance. Participated in on-site audit by both state representatives and commercial clients.

  Keyspan Laboratory Services, 1999 - 2002

  Developed laboratory QAPP (in accordance with NELAC) and Chemical Hygiene Plan. Modified and updated laboratory SOP's. Perform audits in the different work areas. Maintained the NYS DOH proficiency program for analytes of interest. Review data for completeness and QC criteria. Implemented client inquiry system. Performed QC training and method training for bench and field chemists. Developed protocols and documentation for field PCB wipe sampling. Responsible for update/maintenance of laboratory state certifications.

Quality Assurance Officer, Nytest Environmental Inc., 1994 - 1998

Responsible for the overall quality program at the laboratory. This included the auditing test methods, systems and data reporting. Performed the review of 10% of all data reports prior to submission to client. Oversaw the training program of new employees. Maintain the documentation of the training records. Review and maintain state certification paperwork and SOP files. Update and file annual MDL datum. Worked with sales and customer service to insure that client needs are met. Respond to client data inquires. Work with state and federal auditors for review of laboratory to receive certification. Successfully lead the laboratory to an Army Corp of Engineer validation.

QA/QC Scientist, Enseco East, 1989 - 1993

Performed organic and inorganic audits of the laboratory. Performed and coordinated corrections and revisions to data reports. Wrote and reviewed laboratory Quality Assurance Project plans (QAPjP's) for client specific projects. Developed and led seminars for both client and employees on a number of topics including; data quality objectives, data review vs. data validation and laboratory QC. Interacted with clients, project managers and state personnel for regulatory concerns and data/lab issues. Performed lab audits for method compliance and project specific requirements. Acted as the Technical Representative for Ensecos EPA 3/90 Organic CLP Contract.

QA/QC Manager, Intech Biolabs, 1988 - 1989

QA/QC Manager - Responsible for the review of all organic and inorganic data. Performed general laboratory and safety audits. Recorded and charted all QA/QC data. Reviewed and assembled all CLP organic data reports.

Central Laboratory, Chemist, International Technologies Corporation, 1986 - 1988

REAC and EERU Contract for the Emergency Response Branch (ERB) of the USEPA. Responsible for the organic and inorganic extraction of environmental samples according to EPA Methods. This included both metals digestion as well as organic extraction's for semivolatiles, pesticides and PCB's. Performed Volatile Organic analyses using Gas Chromatography, Total Petroleum Hydrocarbon Analysis by IR, Metal Analyses by both Graphite Furnace AA and ICP. Field experience included s on site analyses for both metals and GC volatiles.

Chemist, U.S. Testing Company, 1985 - 1986

Responsible for the digestion and analysis of both soil and aqueous samples for metals according to USEPA CLP and SW 846 protocols. Responsible for the analysis of sample digestates using the Varian Graphite Furnace Atomic Absorption Spectrophotometer and a Jerall Ash ICP-61.

APPENDIX G

Storm-Water Pollution Prevention Plan

CA RICH
ENVIRONMENTAL SPECIALISTS

STORM-WATER POLLUTION PREVENTION PLAN

VIA VERDE AKA
NEW HOUSING NEW YORK LEGACY PROJECT, BRONXCHESTER URBAN RENEWAL AREA
700-730 BROOK AVENUE
BRONX, NEW YORK

BCP SITE #C203043

April 2009

Prepared for:

Via Verde Homes, LLC
Via Verde Rental Associates, L.P.
902 Broadway, 13th Floor
New York, New York 10010

and

City of New York
Department of Housing Preservation and Development
Environmental Planning Unit
100 Gold Street
New York, New York 10038

Prepared by:

CA RICH CONSULTANTS, INC.
17 Dupont Street
Plainview, New York 11803
(516) 576-8844

STORM-WATER POLLUTION PREVENTION PLAN (SWPPP)

"VIA VERDE"

700-730 Brook Avenue, Bronx, New York

BCP SITE #C203043

1.0 Introduction

The following Storm-Water Pollution Prevention Plan (SWPPP) was prepared by CA Rich Consultants, Inc. (CA RICH) of Plainview, NY on behalf of Via Verde Homes, LLC, Via Verde Rental Associates, L.P., and the New York City Department of Housing Preservation and Development (NYCHPD), collectively, the BCP "Volunteer", relative to the planned residential redevelopment and improvement of 700-730 Brook Avenue in the Bronx, New York, BCP Site #C203043 (hereinafter referred to as the 'Site'). The purpose of this SWPPP is to implement practices and procedures to meet the Site's environmental goals, which include obtaining a 'Certificate of Completion' from NYSDEC and achieving a *Gold* LEED building rating. Specific project goals include: use of recycled materials; use of locally-manufactured materials; use of low-emitting materials; use of certified wood products; construction waste recycling and to minimize the effect of construction activities on the environment.

2.0 Storm-Water Pollution Prevention and Sedimentation Control Objectives

The owner has established that construction activities at this Site will minimize soil erosion, sedimentation of surrounding storm drains, pollution of storm-water runoff leaving the Site, and the migration of dust and dirt from the Site to surrounding streets and buildings. To achieve this requirement, Contractors will employ the measures in this plan to satisfy the following objectives:

1. Minimize unnecessary soil disturbance and dust generation on Site.
2. Minimize storm-water contamination from on-Site activities.
3. Inhibit or slow the flow of runoff across the Site.
4. Remove sediment from on-Site runoff before it leaves the Site.
5. Remove soil from vehicles leaving the Site.
6. Inhibit dust migration from the Site to surrounding streets and buildings without excessive use of water.
7. Prevent concrete washout from filling catch basins.
8. Minimize on-Site pollution due to construction activity.

3.0 Minimize Unnecessary Soil Disturbance and Dust Generation

Construction-related Site soil excavation activities for this project generally include cutting of in-situ soils/fill from the northern and western sides of the Site and filling along the southern and eastern sides of the Site to compensate for the current significant disparity in land surface elevation across the Site. In addition, it will be necessary to import a significant quantity of clean fill to achieve final planned land surface elevation. The excavation aerial limits are the property boundary lines which will be vertically protected by soldier piles and/or sheeting. The vertical limits of the excavation are further defined by the depth of the concrete foundation. Over excavation is not anticipated.

Soil excavation and removal/re-use for environmental purposes is covered by the CA RICH Remedial Action Work Plan (The RAWP). The RAWP includes a Health and Safety Plan and Community Air Monitoring Plan that outline the requirements for dust monitoring and dust control during construction activities and record keeping requirements.

Perimeter fencing at the Site will also provide protection from the wind thus reducing the potential for wind blown dust from leaving the Site.

4.0 Minimize Storm-Water Contamination

During the first phases of construction, storm-water will be managed on Site. Run-off from the Site is not anticipated after the excavation starts. On-Site soils/fill are permeable and storm-water is expected to freely leach into the ground. If ponding does occur, pumping of storm-water to a New York City storm sewer may be required. Storm-water discharge permits will be obtained as required from NYCDEP before storm-water may be pumped to the sewer. As a precautionary measure, sediment control measures such as silt fencing and/or hay bales may be put in place along the southern (down-gradient) perimeter of the Site to minimize any sediment carried by storm-water leaving the Site. In addition, an existing retaining wall along the eastern property boundary will prevent any sediments carried by storm-water or dust from leaving the Site to the east.

On-site soils/fill that are stockpiled for transportation will be positioned such that all storm-water and any soil erosion will be prevented from leaving the Site by the proper grading around the pile. This will cause run-off to flow to the on-Site low point or a retention area.

Stockpiled materials for off-Site disposal will be properly enveloped in plastic sheeting to prevent storm-water contamination, on-Site migration of sediments during rain events, and to minimize dust generation from these materials.

5.0 Inhibit or Slow the Flow of Run-off Across the Site

On-Site control of flow across the Site should only become a problem if the excavation of the Site does not proceed uniformly. Areas in the excavation where steep slopes occur should be bermed at the top of the slope to prevent run-off from the upper bench from flowing over the open fence of the excavation.

Due to the size and depth of the excavation and permeability of the soils on Site, storm-water control should not be a difficult task and normal prudent excavating procedures should be capable of controlling the storm-water flow.

6.0 Remove Sediment from Storm-Water before Leaving the Site

NYCDEP has established standards for storm-water discharged to the city's sewer system. The standards for suspended solids usually require that storm-water be settled and sometimes filtered before it can be discharge to the sewer. Any storm-water pumped from the Site would have to meet the requirement.

7.0 Remove Soil from Vehicles Leaving the Site

A tracking control pad is proposed for the Site's entrance gate. This is a crushed stone pad to prevent tracking of Site soils and mud from the Site to the nearby roadways. Each truck leaving the Site will be inspected for soil/fill or mud on its tires. If found, the soil/fill or mud will be washed off by a laborer, with a hose before the truck leaves the Site.

Additional stone may have to be added to the tracking control pad from time to time as it becomes fouled with on-site soils.

In the event sediment from the trucks leaving the Site does begin to flow down the street, such as on rainy days, the following procedures will be employed.

- Disposalable absorbent socks will be laid on the ground in front of the downgradient stormdrains to catch the sediment. The sediment will then be pushed up the street and back onto the Site with brooms.

- In extreme cases when even the use of absorbent socks will not prevent all of the sediment from flowing toward the storm drain, a drain insert filter will be placed in the storm drain to catch the sediment that flows into the drain.

8.0 Prevent Concrete Washout from Filling Catch Basins

A specific area will be designated on-Site for concrete truck wash down. No wash down water will be allowed to flow off the Site. Excess concrete delivered to the Site, but not used, shall remain on the truck and be returned to the supplier. If minor amounts of excess concrete are discharged at the Site, it shall be collected by the contractor after it has hardened and placed in a roll-off container for recycling.

During construction, wash water generated from the delivery trucks will be discharged to the ground and allowed to percolate into the soil. Once the foundation is completed, a portable wash down tank shall be located at the Site to collect wash down water.

9.0 Minimize Site Pollution Due to Construction Activities

Construction waste management practices are described in Section 5 of the RAWP. These include fluids management, construction & demolition debris management, soil materials management and re-use, and Site clearing waste management. Additional preventative measures are described below in Section 12.0.

10.0 Permit Requirements

The only permit that may be required for storm-water and erosion control is a Storm-water Discharge permit from the NYCDEP. However, discharge of storm-water to the public sewer is not anticipated at this time.

11.0 Control Measures for SWPPP

- Construction fencing with wind screen shall be erected.
- Dust control during Site excavation by Site Contractor - monitored by CA RICH
- Limited trucking of excavated materials to recycle or disposal in covered trucks - monitored by CA RICH.
- Controlled sprinkling of the Site by Site Contractor as need to suppress dust - monitored by CA RICH
- Use of a ready mix company that can washout concrete trucks off-Site and limit on-Site washouts to concrete chutes only. Use on-Site washout tanks only if necessary.
- Soil and dust shall be rinsed from trucks before leaving Site at gravel covered Tracking Control Station.
- The construction manager shall designate storage areas for construction materials and areas for staging equipment at the Site.
- Waste materials from the Site will be handled according to Section 5 of the RAWP.
- On rainy days, disposable absorbent socks will be laid on the ground in front of the downgradient storm drain to catch the sediment. The trapped sediments will then be pushed up the street and back onto the site with brooms.
- In extreme cases when even the use of absorbent socks will not prevent all of the sediment from flowing toward the storm drain, a drain insert filter will be placed in the storm drain to catch the sediment that flows into the drain.

12.0 Other Related Items

- Good housekeeping efforts shall be employed during vehicle refueling. A contracted vendor supplies a delivery truck that is used to fuel construction vehicles. The operator shall be careful to prevent overfill or spillage of fuel.

- If any minor spills occur, they shall be quickly and completely cleaned up and the impacted soil shall be disposed of off-Site. All major releases of fuel shall be reported to the NYSDEC in accordance with regulations.

- Waste chemicals, such as used motor oil or used oil filters, shall be disposed of off-Site in accordance with NYSDEC regulations.

13.0 Recommendations

- Line up ready mix and concrete pump trucks that can do off-Site wash-out and/or can supply portable wash-out tanks.
- Set-up a Site inspection log (example attached) documenting the SWPP Practices, noting any deficiencies or improvements that can be made. This should be done on a weekly basis at a minimum.
- Site Contractor should hold monthly SWPPP meetings to coordinate all contractors and subcontractor efforts.

Weekly SWPPP Site Inspection Log

To be completed by construction contractor

Week of ____________________ Yes No

Were there any major releases of dust from the construction site? _______ _______

If so, how was this rectified?____

____

____

Were there any major releases of storm-water from the construction site?_______ _______

If so, how was this rectified?____

____

____

Were there any releases of concrete wash down water or excess concrete from the construction site? _______ _______

If so, how was this rectified?____

____

____

Were there any releases of fuel or oil from the construction site? _______ _______

If so, how was this rectified?____

____

____

Were there any major releases of sediment laden water from the construction site? _______ _______

If so, how was this rectified?____

____

____

Is the gravel tracking control pad in good working condition? _______ _______

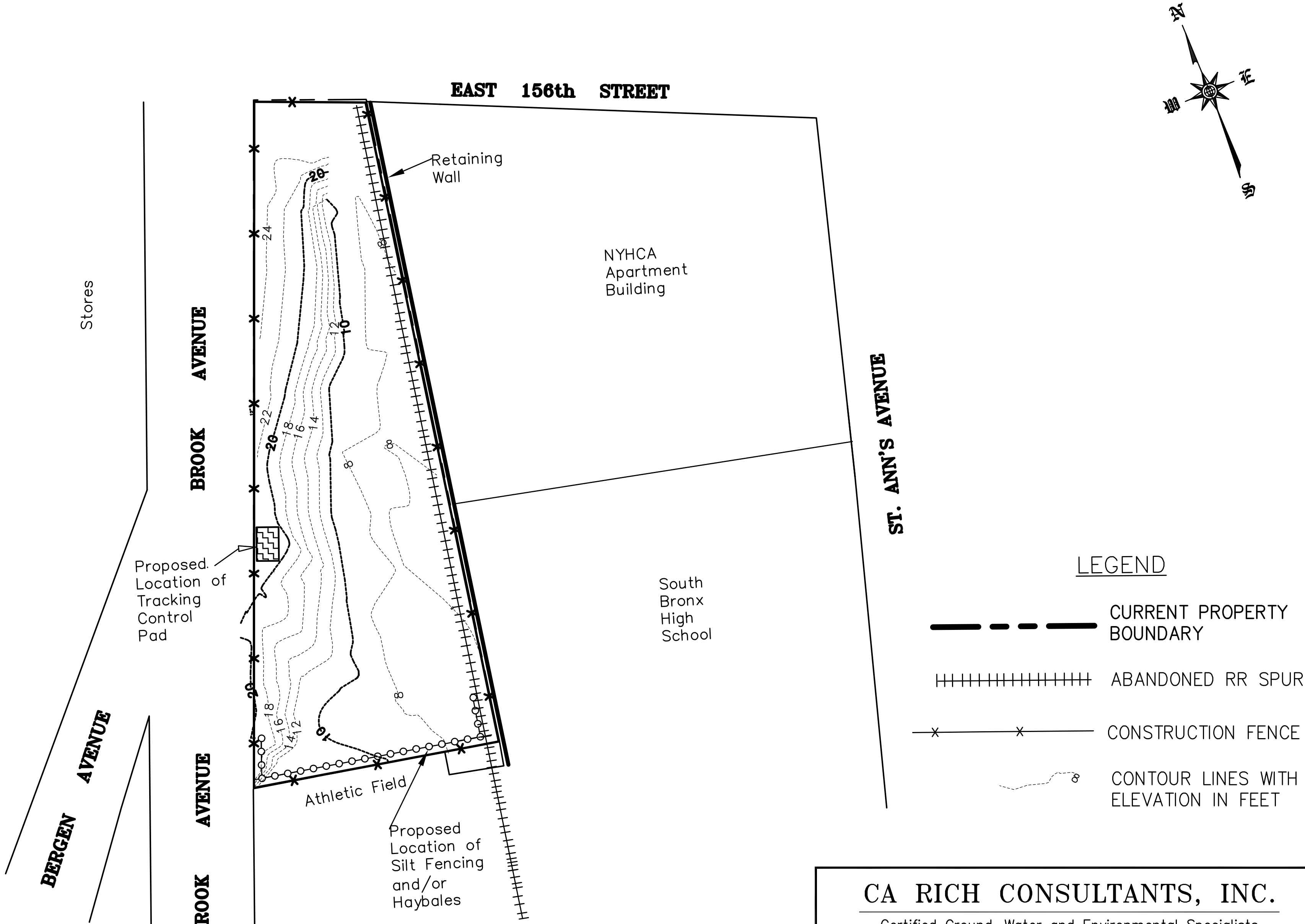
If not, how was this rectified?____

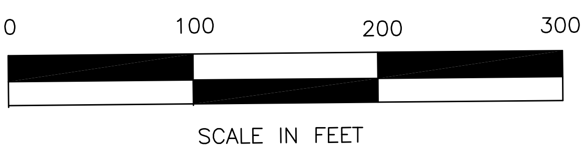
____

____

I have read the Soil Storm-Water Pollution Prevention Plan for the Via Verde Project and I am familiar with the procedures outlined in this document.

Name	Date





NOTES:

1. MAP ADAPTED FROM DDC TOPOGRAPHICAL AND PROPERTY LINE MAP 8-17-06 AND MONTROSE SURVEY DATED 10-8-07

CA RICH CONSULTANTS, INC.
Certified Ground-Water and Environmental Specialists
17 Dupont Street, PLainview, New York 11803

Possible Placement of SWPPP Control Measures

DATE:	6/22/2009
SCALE:	AS SHOWN
FIGURE:	1
DRAWING NO:	2009-36
TITLE:	VIA VERDE NEW HOUSING NEW YORK LEGACY 700-730 BROOK AVENUE BRONX, NEW YORK
DRAWN BY:	J.C.
APPR. BY:	D.S.

APPENDIX H

Fact Sheet Number 3

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

This fact sheet serves to announce the public comment period for the draft Remedial Action Work Plan (RAWP) submitted under New York's Brownfield Cleanup Program (BCP)

Document Repositories:
New York Public Library
Woodstock Branch
761 East 160th Street
Bronx, NY 10456-7816
(718) 665-6255
Please call for hours

Bronx Community Board 1
3024 Third Avenue
Bronx, NY 10455
(718) 585-7117
Hours: Mon.-Fri. 9AM to 5PM

NYSDEC, Region 2 Office
47-40 21st Street
Long Island City, New York 11101
(Call in advance): (718) 482-4900
Hours: Mon. to Fri. 8AM to 4 PM

Project Contacts:
Ms. Mandy Yau
NYSDEC
47-40 21st Street
Long Island City, NY 11101
mxyau@gw.dec.state.ny.us
(718) 482-4897

For Public Health questions:
Mr. Christopher M. Doroski
NYSDOH
547 River Street
Troy, NY 12180-2216
(800) 458-1158 ext. 27880
beei@health.state.ny.us

For more information about NY State's Brownfield Cleanup Program, visit:
www.dec.ny.gov/chemical/brownfields.html

FACT SHEET # 3

BROWNFIELD CLEANUP PROGAM

New Housing New York Legacy Project
(a.k.a. Via Verde)
700 - 730 Brook Avenue
Bronx, New York

Site No: C203043
NYSDEC REGION 2

April 2009

Remedial Investigation Complete
Draft Remedial Action Work Plan Available For Public Comment

Comment period runs from May 2, 2009 through June 15, 2009

As called for by the New York State Environmental Conservation Law and the New York State Department of Environmental Conservation's ("NYSDEC") Brownfield Cleanup Program ("BCP")., you have been sent this fact sheet because you own or live on a property near the New Housing New York Legacy Site a.k.a Via Verde ("Site") or because the NYSDEC believes you may otherwise be interested in activities at the Site. The Site is located on the southeast corner of the intersection of East 156th Street and Brook Avenue.

Via Verde Homes, LLC, Via Verde Rental Associates, L.P., and the New York City Department of Housing Preservation and Development, collectively, the BCP "Volunteer" has submitted a Remedial Investigation Report (RIR) and draft Remedial Action Work Plan ("RAWP") to NYSDEC and the New York State Department of Health ("NYSDOH") for review. The draft RIR and RAWP and other project documents are available for your review at the document repositories identified on the left-hand side of this page. NYSDEC is accepting written public comments on the draft RAWP from May 2, 2009 through June 15, 2009.

Site Description: The Site consists of a vacant, approximately 1.4-acre irregularly-shaped parcel. Along the west side (Brook Avenue) of the Site, a steep slope of approximately 10 feet descends from the sidewalk eastward. The eastern portion of the Site consists of an abandoned rail spur that connected the former New York and Harlem Railroad to Port Morris.

Investigations to Date: Previous environmental investigations conducted at the Site have included the following: 1) Phase I Environmental Site Assessment - December 2004; 2) Site Characterization and Data Summary Report - September 2006; 3) Supplemental Site Investigation Report - April 2007; and, 4) Remedial Investigation Report - April 2009. The Phase I collected information about the Site history and recognized environmental concerns. The Site Characterization and Supplemental Site Investigation included the collection of seven soil samples from soil borings, three soil samples from test pits, and eight groundwater samples from temporary wells for analysis. Semi-volatile organic compounds (SVOCs) and metals were found to exceed NYSDEC standards, criteria and guidance in one or more of the soil samples. In addition, volatile organic compounds (VOCs), SVOCs, the PCB Aroclor 1260, and select metals were detected above NYSDEC groundwater standards in one or more of the samples.

The Supplemental Site Investigation included the collection and analysis of surface and shallow soil samples at six locations at the Site. SVOCs and select metals were detected above NYSDEC standards, criteria and guidance in several borings. The RIR confirmed the findings of the previous investigations relative to soil impacts and identified potential on-site soil vapor intrusion issues and low-level groundwater quality impacts. The RI Report also concluded that on-site remedial action is necessary.

Components of the Remedy: The RAWP has several goals: 1) Identify cleanup levels to be attained or the process to be used to determine these levels; 2) Explain why the RAWP concludes that the results of remediation will protect public health and the environment; and 3) Provide a detailed description of the remedy selected to address Site contamination. The Volunteer will perform the work with oversight by NYSDEC and the NYSDOH and has proposed a remedy in accordance with the requirements of 6 NYCRR Part 375 - Track 4 Restricted Use with Site Specific Cleanup Objectives. The proposed remedial action is summarized on the following page.

BROWNFIELD CLEANUP PROGRAM

Summary of Proposed Remedial Action:

- Excavation and off-site disposal of impacted soil/fill at targeted locations and removal of underground storage tanks (USTs) and/or hydraulic lifts (if encountered), with confirmatory end-point sampling
- Installation of a composite cover system (consisting of building slabs, asphalt roadways or a minimum two-foot thick certified clean fill and associated demarcation barrier over all planned uncapped/landscaped areas of the Site), a sub-slab vapor barrier, and an active sub-slab depressurization system
- Enhanced Monitored Natural Attenuation of groundwater including application of an oxygenating agent to speed the natural attenuation process
- Post remedial monitoring to assess remedy performance;
- A site-specific health and safety plan (HASP) will be implemented for protection of on-site workers and off-site residents and will include a community air monitoring plan (CAMP)
- Implementation of dust and odor suppression measures
- Institutional controls, including a long term Site Management Plan (SMP) and environmental easements

Significant Threat Determination: As part of every BCP project, NYSDEC, in conjunction with NYSDOH, is required to make a determination whether the conditions at the Site pose a significant threat to human health or the environment, as defined in the NYSDEC's regulations 6 NYCRR Part 375. The Site has been determined by the NYSDEC and the NYSDOH not to pose a significant threat to public health or the environment. This decision is based on the nature of the contaminants identified at the Site; the potential for off-site migration of contaminants in the groundwater; and the potential for human exposure to site-related contaminants via soil vapors.

Next Steps: NYSDEC is accepting written public comments on the RIR and RAWP from May 2 through June 15, 2009. Comments and questions are encouraged and should be directed to the NYSDEC project manager identified on the front page.

The RIR, RAWP and previous NYSDEC-approved documents for the project are available for review at the document repositories shown on the front page. NYSDEC will consider public comments as it completes its review of the RIR and RAWP,, have any necessary revisions made and, if appropriate, approve the RIR and RAWP. NYSDOH must concur in the approval of the RIR and RAWP. When the NYSDEC approves the RIR and RAWP, the Volunteer may proceed with the design and construction of the Site remedy.

Brownfield Cleanup Program Overview: New York established its BCP to address the environmental, legal, and financial barriers that often hinder the redevelopment and reuse of contaminated properties and to enhance private sector cleanups. New York's BCP is a cooperative approach among the NYSDEC, the NYSDOH, and Volunteers or Participants to investigate and/or remediate contaminated sites. The goal under the BCP is to remediate sites to a level that is protective to public health and the environment consistent with the proposed uses of the Site. When a Volunteer or Participant completes work, a release from liability from the NYSDEC is provided with standard reservations. A Certificate of Completion (COC) is issued. With its receipt of a COC, this Site would:

- Have no liability to the State for contamination at or coming from the Site, subject to certain conditions; and
- Be eligible for tax credits to offset the costs of remedial activities and for redevelopment of the Site.

A COC may be modified or revoked if, for example, the applicant does not comply with the terms of its BCA with NYSDEC, or if the applicant commits fraud regarding its application or its certification that it has met cleanup levels.

If you know someone who would like to be added to the project mailing list, have them contact the NYSDEC project manager. We encourage you to share this fact sheet with neighbors and tenants, and/or post this fact sheet in a prominent area of your building for others to see.

BROWNFIELD CLEANUP PROGRAM