NEW YORK STATE
BROWNFIELDS CLEANUP PROGRAM
BCP ID No. C203039

SITE MANAGEMENT PLAN
DECEMBER 2008

EBC Project No: ARK0602

FORMER DICO G AUTO & TRUCK REPAIR
Block 4545, Lots 1001 & 1002

3001 - 3035 White Plains Road
Bronx, NY

Program Volunteer:

Bedford Park Associates, LLC
Adee & Lester, L.P.
3035 White Plains Retail, LLC
930 Broadway
Woodmere, NY 11598

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 Middle Country Road.Ridge, NY 11961 Ph: 631.504.6000 Fax: 631.924.2870

FORMER DICO G AUTO & TRUCK REPAIR
3035 White Plains Road
BRONX, NEW YORK

Site Management Plan

NYSDEC BCP Number: C203039

Prepared for:
Bedford Park Associates, LLC
Adee & Lester, L.P.
3035 White Plains Retail, LLC
930 Broadway
Woodmere, NY 11598

Prepared by:
Environmental Business Consultants
1808 Middle Country Road, Ridge, NY 11961
(631) 504-6000

DECEMBER 2008

TABLE OF CONTENTS
SITE MANAGE MENT PLAN
FORMER DICO G AUTO AND TRUCK REPAIR

TABLE OF CONTENTS Continued
SITE MANAGE MENT PLAN
FORMER DICO G AUTO AND TRUCK REPAIR

TABLES

FIGURES

APPENDICES

LIST OF ACRONYMS

Acronym	Definition
AMC	AMC Engineering
AWQS	Ambient Water Quality Standards
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CQMP	Construction Quality Management Plan
DUSR	Data Usability Statement Report
EBC	Environmental Business Consultants
FER	Final Engineering Report
HDPE	High Density Polyethylene
IRM	Interim Remedial Measure
NYC	New York City
NYCDEP	New York City Department of Environmental Protection
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PS	Public School
PVC	Polyvinyl Chloride
RAO	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
RSCOs	Recommended Site Cleanup Objectives
SCG	Standards, Criteria, and Guidelines
SMMP	Soil/Materials Management Plan
SSDS	Sub-slab Depressurization System
SWPPP	Stormwater Pollution Prevention Plan
SVOCs	Semi-Volatile Organic Compounds
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

SITE MANAGEMENT PLAN

1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM

1.1 INTRODUCTION

This document is required for fulfillment of Remedial Action at Former Dico G Truck and Auto Repair Site (hereafter referred to as the "Site") under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The Site was remediated in accordance with the Brownfield Cleanup Agreement (BCA) Index# No. W2-1108-07-07 Site No. C203039, which was issued on July 30, 2007.

1.1.1 General

Bedford Park Associates, LLC, Adee & Lester, LP and 3035 White Plains Retail, LLC entered into a BCA with the NYSDEC to develop a 0.39-acre acre property located in the Bronx, New York into a mixed use commercial/ residential development. This BCA required Bedford Park Associates, LLC, Adee & Lester, LP and 3035 White Plains Retail, LLC, to investigate and remediate contaminated media at the Site. The boundary of this 0.39-acre BCP Site is more fully described in **Appendix A** – Metes and Bounds. A map of the Site location is shown in **Figure 1**. The Site boundary is shown in **Figure 2**.

After completion of the remedial work described in the Remedial Action Work Plan, some contamination was left in the subsurface at this Site, which is hereafter referred to as 'residual contamination.' This Site Management Plan (SMP) was prepared to manage residual contamination at the Site in perpetuity or until extinguishment of the Environmental Easement in accordance with 6 NYCRR Part 375. Remedial Action work on the Site began in December, 2007, and was completed in September, 2008 . All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State.

This SMP was prepared by Environmental Business Consultants (EBC), on behalf of Bedford Park Associates, LLC, Adee & Lester, LP and 3035 White Plains Retail, LLC, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated

December, 2002 and the guidelines provided by NYSDEC. This SMP addresses the means for implementation of Institutional Controls (ICs) and Engineering Controls (ECs), which are required by the Environmental Easement for the Site.

1.1.2 Purpose

The Site contains residual contamination left after completion of the Remedial Action performed under the BCP. ECs have been incorporated into the Site remedy to provide proper management of residual contamination in the future to ensure protection of public health and the environment. A Site-specific Environmental Easement has been recorded with the Bronx County Clerk that provides an enforceable means to ensure the continued and proper management of residual contamination and protection of public health and the environment. It requires strict adherence to all Engineering Controls and all Institutional Controls placed on this Site by NYSDEC by the grantor of the Environmental Easement and any and all successors and assigns of the grantor. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. This SMP includes all methods necessary ensure compliance with all ECs and ICs required by the Environmental Easement for residual contamination at the Site. The SMP has been approved by the NYSDEC, and compliance with this Plan is required by the grantor of the Environmental Easement and grantor's successors and assigns. This plan is subject to change by NYSDEC.

Site management is the last phase of the remedial process and is triggered by the approval of the Final Engineering Report and issuance of the Certificate of Completion (COC) by NYSDEC. The SMP continues in perpetuity or until extinguished in accordance with 6NYCRR Part 375. It is the responsibility of the Environmental Easement grantor, and its successors and assigns to ensure that all Site Management responsibilities under this plan are performed.

The SMP provides a detailed description of all procedures required to manage residual contamination at the Site following the completion of the Remedial Action in accordance with the NYS 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 all 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 includes 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.

Site Management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be [annually].
Important notes regarding this SMP are as follows:

- This SMP defines Site-specific implementation procedures as required by the Environmental Easement. The penalty for failure to implement the SMP is revocation of the COC;
- The Brownfield Cleanup Agreement (No. W2-1108-07-07 Site No. C203039) for the Site requires conformance with this SMP, and therefore, serves as a contractual binding authority under which this SMP is to be implemented. The BCP law itself also requires the preparation of a SMP (formerly known as an Operation, Maintenance and Monitoring Plan) in ECL 27-1415 and 27-1419. Therefore, the BCA is a binding contract and the BCP law is statutory authority under which this SMP is required and is to be implemented.
- At the time this report was prepared, the SMP and all Site documents related to Remedial Investigation and Remedial Action are maintained at the NYSDEC Region 2 offices in Long Island City. At the time of SMP submission November, 2008, the Site documents can also be found in the repositories established for this project, including:

New York Public Library - Allerton Branch
2740 Barnes Avenue
Bronx, NY10467
(718) 881-4240
Please call for hours

1.2 SITE BACKGROUND

1.2.1 Site Location and Description

The Site is located in the County of the Bronx (New York City), New York and is identified as Block 4545, Lots 1001 and 1002 (formerly Lot 14) on the New York City Tax Map. The Site is an approximately 0.39-acre area bounded by commercial property to the north, Adee Street to the south, White Plains Road to the east, and residential properties to the west (see **Figure 3**). The boundary of the Site is more fully described in **Appendix A –** Metes and Bounds.

1.2.2 Site History

Previous owners and operators of the property at 3035 White Plains Road are shown below. A deed chain title search was performed from 1957 to the present, showing that the Tremarco Corporation owned the property from 1957 to 1973 when Gulf Oil Company became successor in title, as the result of a merger with Tremarco. Gulf transferred the title to 3035 White Plains Realty Corp in 1984. The title was then transferred from 3035 White Plains Realty Corp to G.S Dixon Realty Corp. in 2006, as a zero consideration transaction. A one-story building was constructed on the property in 1960. The building was used as a service/gasoline retail station from 1960 to approximately 1999, and then as an automotive repair shop and storage yard from 1999 to the present. Based on a business directory search of the address, the earliest business directory listing for the property was in 1961, for “Safeway Service Station” and “Salzano Service Station”. The Sanborn map from 1976 identifies the property as a filling station.

Dates	Name	Comments	Contact Info
prior to 3/29/57	Harry Jacobs	Owner from at least 1957	
3/29/57 to 8/73	Tremarco Corporation	Owner from 3/29/57 until merger with Gulf Oil Corp	
8/73 to 8/11/84	Gulf Oil Corp.	Acquired through merger with Tremarco Corp.	
8/11/84 to 5/18/06	3035 White Plains Realty Corp	Purchase from Gulf Oil Corp.	3035 White Plains Road Bronx
5/18/06 to present	G.S. Dixon Realty Corp.	Transfer of title as a zero consideration transaction and to wind up corporate affairs of grantor.	3035 White Plains Road Bronx

Previous Operators

Date of Listing	Name	Address
2005	Dico G Associates, Inc.	3035 White Plains Road, Bronx
2000	Dico G Associates, Inc.	3035 White Plains Road, Bronx
1993	Dico G Associates, Inc.	3035 White Plains Road, Bronx
1983	Pudix Service Center	3035 White Plains Road, Bronx
1976	L & A Gulf Service Station	3035 White Plains Road, Bronx
1971	G & A Service Station	3035 White Plains Road, Bronx
1965	Safeway Service Station Salzano Service Station	3035 White Plains Road, Bronx
1961	Safeway Service Station Salzano Service Station	3035 White Plains Road, Bronx

Summary of Phase I Report

A Phase I Environmental Site Assessment (ESA), in accordance with ASTM E 1527, was completed by Environmental Business Consultants (EBC) and documented in a report dated February, 2007. The Phase I ESA revealed that the property was historically used as an automotive service station from at least 1960 to 1999. Since 1999 the site has been used mainly as a truck and automotive repair shop and scrap yard. The records search identified two NYSDEC petroleum spill files, one of which remains open. The site inspection identified numerous environmental concerns including the improper storage of fuel oil, waste oil and automotive fluids. The Phase I revealed the following recognized environmental conditions:

- The site has an open spill file No. 99-00851 related to soil contamination discovered during the removal of twelve 550 gallon USTs in 1999. No documentation regarding endpoint sampling, impacts to groundwater or other media was available.
- The improper storage of hazardous and non-hazardous materials including gasoline, fuel oil, automotive fluids and solvents.
- The outdoor storage of derelict vehicles, auto parts, scrap metals and trash.
- The presence of a surface drain with obvious staining around the structure.
- The historic use of the property as a gas station from 1960 to 1999, and as an automotive repair facility from 1960 to the present.

The Phase I concluded that the site has been impacted by petroleum products associated with underground leaking storage tanks, and that the potential exists for impacts to other areas of the site from the former dispenser system and associated piping, from the improper storage and use of petroleum products, solvents and automotive chemicals, and from the outdoor storage of derelict vehicles, auto parts and scrap metals.

The shallow groundwater and bedrock surface conditions at the site, combined with the documented historic use of the property, increases the potential liability for off-site impact to businesses and residences through the vapor intrusion pathway.

Summary of Preliminary Sampling

On December 29, 2006, gasoline contamination was encountered by a geotechnical drilling company advancing soil borings on the property to determine the foundation requirements of a potential new building for the site. On January 3, 2007, EBC visited the site and directed the geotechnical company to collect new samples from the area in which the contamination was discovered. This area corresponded to the general location of a former dispenser island, according to the property owner. Based on discussions with the property owner, two more borings were installed at locations which corresponded roughly to the location of a second dispenser island and the former UST area. Due to difficulties in accessing these areas from derelict vehicles stored on the property, optimal locations could not be achieved. Strong gasoline odors were noted from the samples collected from the borings near both of the former dispenser islands.

The geotechnical contractor was not equipped to collect groundwater samples, therefore, EBC returned to the site on January 10, 2007 to obtain a groundwater sample near the south property line, in an area where the contractor had previously encountered groundwater. The groundwater sample was collected from a depth of approximately 9 feet using a track-mounted probing machine.

Elevated VOCs above TAGM guidance levels were reported in the samples collected from the approximate location of the two former dispenser islands. Total VOCs in these areas exceeded 200,000 ug/kg. VOCs, indicative of gasoline contamination, were reported in all 3 borings. Elevated SVOCs also were reported in all 3 borings.

Fourteen VOC compounds associated with gasoline were found in exceedance of water quality standards. Total VOCs in the sample exceeded 27,000 ug/l. One SVOC parameter, naphthalene at a concentration of 820 ug/l, was also detected in excedance of its water quality standard (10 ug/L).

Based on the results of soil and groundwater samples collected and the historic use of the site, the preliminary investigation concluded that the site had been impacted by its use as a service station and repair shop over the past 45 years. The report noted that the borings installed were located based on general guidance from the property owner and that they were unlikely to represent worst case conditions. Although the boring near the former UST area had no VOC exceedances, it was not optimally located within the assumed UST location because derelict vehicles were blocking access. Contamination was previously discovered in this area during removal of the USTs and a spill was reported to the DEC (No. 99-00851). There is no documentation that endpoint samples were collected from the excavation and no investigation performed to determine the extent of affected media; accordingly the preliminary report concluded that it is highly likely that significant contamination remains in this area of the property.

Groundwater from a single boring location was found to contain gasoline-related VOCs at levels significantly above water quality standards. As the boring was located close to the south property line, the report concluded that it was highly likely that contaminated groundwater was migrating off of the property. The report noted that the sample was not believed to be hydraulically downgradient of the impacted soil areas, and, therefore, VOC concentrations may be considerably higher in other areas of the site or at off-site locations.

The report noted that other areas of the property may be affected with VOCs, SVOCs and metals due to materials stored at the site and recommended that a comprehensive investigation be performed encompassing all potentially affected media (soil, soil gas, groundwater). The report noted that because shallow soil and groundwater were affected, remedial action, and / or mitigation and control measures may be needed to prevent vapor intrusion, if the property is developed as intended.

Sanborn Maps

All Sanborn Maps available for this Site were reviewed prior to preparation of the RAWP. Sanborn fire insurance maps for the subject property and surrounding area were reviewed for the years 1887, 1908, 1918, 1935, 1950, 1976, 1978, 1981, 1983, 1986, 1989, 1991, 1992, 1993, 1995 and 1996. The review is summarized below. Copies of Sanborn maps are included as **Appendix B**.

Subject Property Historical Usage

Date	Description
1887	The lot has different dimensions then it does at present due since it predates the widening and straightening of White Plains road. A dwelling is shown on the eastern half of the lot where White Plains Road is today.
1908	The lot is shown in its present dimensions. White Plans Road has been widened and now covers the eastern half of the previous lot. The lot is vacant. Lester Street is shown as a paper road at the north end of the lot. Olinville Avenue is shown as a paper road separating the subject lot from residential properties to the east.
1918	Elliot Ave is shown as a narrower paper road in place of Olinville Avenue.
1935	3 small automobile garages “A” are shown along the east side of Elliot Avenue.
1950	The garage structures are no longer shown.
1976	A building of the present size and dimensions is shown as “filling station”
1978	Unchanged
1979	Unchanged
1981	Unchanged
1983	Unchanged
1986	Unchanged
1989	Unchanged
1991	Unchanged
1992	Unchanged
1993	Unchanged
1995	Unchanged

Information contained in the Sanborn maps indicates that the subject property has been used as a service station since at least 1961.

1.2.3 Geological Conditions

The bedrock below the site, known as the Manhattan Schist, is overlain by deposits of poorly permeable glacial till. This glacial till consists primarily of sandy silt with weathered bedrock fragments. Based upon observations made in the basement excavation which extended 8-10 feet into the bedrock, fractures and joints in the bedrock generally strike north-south and dip to the northeast at an angle of 12-18 degrees. However, joints and cleavage plains were also observed which dipped to the south, particularly in the south eastern area of the site.

Soils at the site are classified as Urban Land (Ug), as defined by the United States Department of Agriculture. Urban Land is described as areas where at least 85 percent of the land surface is covered with asphalt, concrete, or other impervious building material. These areas are mostly parking lots, shopping centers, industrial parks, or institutional sites. Most areas are nearly level to gently sloping and range in size from three acres to several hundred acres.

The soil borings performed at the site describe the subsurface material as silty sand and clayey silt with rock fragments and micaceous soil composed almost entirely of severely weathered bedrock. The depth to competent bedrock, as determined by refusal during drilling, ranged from 2-3 feet below surface in the north and eastern part of the site and 10-12 feet in the southern portion of the site.

Ground water at the site exists at approximately 12-15 feet below land surface placing the water table within the bedrock at most of the locations. A geologic section is shown in **Figure** 4. A groundwater flow map is shown in **Figure** 5.
As shown in the figure, groundwater flow is generally from the central portion of the site (vicinity of the former station building) in a radial pattern to the north, south and east.

The flow patterns and direction may be influenced locally by leaking drainage structures and the orientation of joints and fractures in the bedrock.

1.3 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The SMP and all Site documents, including the Remedial Investigation and Remedial Action Work Plan, are maintained by the NYSDEC (or successor agency). At the time of publication, these reports could be found at the Region 2 NYSDEC offices in Long Island City, New York and in the project document repository established at the Allerton Branch of the New York City Public Library located at 2740 Barnes Avenue Bronx, NY10467.

1.3.1 Summary of Remedial Investigation Findings

The Site was investigated in accordance with the scope of work presented in the NYSDEC-approved Remedial Investigation (RI) Work Plan dated September, 2007 and a Stipulation Letter (EBC) dated September 27, 2007. The investigation was conducted between October 2 and November 2, 2007. The RI Report was submitted to NYSDEC on October 3, 2008.

Although the date(s) and circumstances surrounding the release of gasoline at the site are not known, it can be assumed that it occurred sometime prior to the removal of the tanks and dispensers in 1999. Since the spill number assigned to the site was related to excavation of the tank area, it is assumed that at least some release of gasoline occurred in this area. Gasoline released from the tanks would be expected to contaminate soil within the tank bed, which was likely excavated into the bedrock surface to a depth of 8 feet. Based on the results of the RI, affected soil was removed at the time of the tank removal. The tank area itself does not appear to be a significant source of the gasoline contamination at the site.

There is evidence of a release at both the north and south dispensers as well. It is anticipated that a spill at these locations would migrate along the contours of the shallow bedrock surface (approximately 2-3 ft below grade) entering fractures in the bedrock until it encounters groundwater at a depth of approximately 15 feet below grade. The release appears to have been much more significant at the north dispenser where VOC concentrations in soil and groundwater were much greater and where free phase gasoline is still present. The volume of free phase gasoline may have been insufficient to reach the water table near the south dispenser and groundwater impacts in this area may be the result of transport water migrating through affected overburden soil

Upon contacting the groundwater, dissolved VOC components would form a plume which would migrate in the direction of groundwater flow. In the vicinity of the south dispenser the flow would be generally to the southeast and east. In the vicinity of the north dispenser flow would generally be to the northeast and east . Volatile organic compounds (VOCs) would be expected to off-gas to some degree from affected groundwater where it would migrate toward low pressure areas such as utility conduits or basements. Volatilization would be limited by the occurrence of groundwater only within bedrock fractures.

The primary areas of concern are the two former dispenser islands located on the southern half of the property along White Plains Road. Based on the degree of soil and groundwater contamination, the former north dispenser island has been identified as a primary source area with the former south dispenser island contributing to a lesser extent. Overburden soil consisted primarily of historic/urban fill material with slightly elevated levels of metals, SVOCs and pesticides.

It must be noted that soil and bedrock excavation performed by the Volunteer under an approved IRM Work Plan was successful in removing all petroleum contaminated soil, and in meeting the unrestricted soil cleanup objectives, as established in 6NYCRR 375-6. There are no known source areas (USTs, contaminated soil, etc.) remaining on the site**,** however, small accumulations of free-phase gasoline have been reported in one of the on-site monitoring wells following implementation of the IRM.

Contaminated media documented at the site during the RI, includes soil, groundwater and soil gas which were found to be contaminated with VOCs.

Below is a summary of Remedial Investigation findings:

1.3.1.1 Soil

A total of 27 soil samples from 18 soil borings (SB1-SB18) were collected during the RI to evaluate the extent and degree of impact in the identified and suspect source areas and to obtain general soil quality information in overburden soils at the site.

The soil boring program identified three adjacent locations with gasoline contamination in overburden soil. All three locations correlated to the former dispenser pads near the eastern edge of the property. The depth to bedrock in these areas was 2 to 4 feet below surface. Gasoline contamination was highest near the north dispenser pad. No gasoline contamination was reported in samples collected from borings within, and adjacent to, the former UST area. Overburden soils were comprised of urban fill which contained elevated levels (above unrestricted SCOs) of metals, SVOCs and/or pesticides.

Soil sample results from the RI are summarized in **Table 1A-D**. Further information on soil sample collection, handling and analysis can be found in the RI Report (EBC 9/08).

Table 2 shows exceedances from Track 1 Unrestricted SCOs for all overburden soil at the Site. **Figure 6** is a spider map that shows the location and summarizes exceedances from Track 1 Unrestricted SCOs for all overburden soil.

1.3.1.2 On-Site and Off-Site Groundwater

Groundwater impacts as reported during the RI were primarily limited to dissolved VOC components associated with gasoline. Impacted groundwater was encountered in the vicinity of and downgradient of the two former dispenser locations. In the case of the south dispenser location, impacted groundwater continued to migrate from this general area to the south property line. Total VOC concentrations in the vicinity of the former south dispenser were reported as 6,616 ug/L (MW3). Total VOC concentrations at the south property line ranged from 1,886 to 4,661 ug/L (MW2, MW1 respectively). Based on the southerly groundwater flow direction in this area of the site, the RI report concluded that it was probable that a VOC plume of similar magnitude was migrating south along the south property line.

The RI reported that groundwater in the vicinity of the former north dispenser pad had a greater degree of VOC impact, with concentrations as high as 13,722 ug/L in well MW15 and free-phase gasoline at well MW8, northwest of the former dispenser. High VOC concentrations were also present in MW5 along the east property line. The RI report concluded that impacted groundwater from this general area would be expected to be migrating northeast in response to the potentiometric surface. The report noted that the actual direction of plume migration would likely be influenced by the orientation of fractures within the bedrock. Based on the VOC concentrations in groundwater at well MW5 (12,045 ug/L), the report concluded that that a VOC plume of similar magnitude was migrating off-site along the central portion of the east property line.

The results of groundwater samples collected during the RI are summarized in **Table 3A-D**. Further information on groundwater sample collection, handling and analysis can be found in the RI Report (EBC 9/08).

A table that indicates exceedances from GA groundwater standards in monitor wells prior to the remedy is shown in **Table 4**. A spider map that indicates the location(s) of and summarizes exceedances from GA groundwater standards prior to the remedy is shown in **Figure 7**.

1.3.1.3 On-Site and Off-Site Soil Vapor

Total VOC concentrations detected in soil vapor samples collected during the RI were highest (>2,000 ug/m3) in SG10, SG12 and SG4 respectively. Soil vapor concentrations at the remainder of the locations were fairly consistent at less than 1,000 ug/m3. The highest total VOC concentration which was reported at location SG10 was largely made up of methylene chloride and other non-petroleum VOCs. When looking at gasoline related compounds, the highest concentrations were limited to SG4 and SG12, with concentrations at SG12 significantly higher. The RI report noted that although the SG12 sample had the highest concentrations of gasoline VOCs in soil gas, it was located in the far northwest corner of the site; the sample furthest away from the affected areas, while SG4 was located near the identified secondary source area (south dispenser pad). The RI report concluded that the distribution of gasoline related VOCs, and the site-wide detections of chlorinated compounds, which were not detected in any of the on-site soil or groundwater samples indicates that at least some of the VOCs detected were not related to on-site contamination.

A table of soil vapor data collected during the RI and prior to the remedy, is shown in **Table 5**. A spider map that indicates the location(s) of and summarizes soil vapor data prior to the remedy is shown in **Figure 8**. Further information on soil gas sample collection, handling and analysis can be found in the RI Report (EBC 9/08).

1.3.1.4 Underground Storage Tanks

Twelve 550 gallon storage tanks were removed from the site by the previous owner in 1999. The tanks were located in an area immediately south of the former service station building.

1.4 DESCRIPTION OF REMEDIAL ACTIONS

The Site was remediated in accordance with the scope of work presented in the NYSDEC-approved Remedial Action Work Plan dated December 2008 and the IRM Work Plan dated November 2007. The remedy approved for the site consisted of the removal and proper disposal of all overburden soil to the bedrock surface followed by the removal of liquid phase hydrocarbons (LPH) and injections of a chemical oxidant solution at specified locations throughout the site as needed to remediate groundwater. LPH is currently present in one of the post remedial monitoring wells. It will be removed using a combination of vacuum enhanced fluid recovery (VEFR) and hand bailing, as appropriate.

Chemical oxidant injection is intended to reduce the VOCs in high concentration areas, and thereby accelerate the restoration of impacted on and off-site groundwater through natural attenuation processes. Soil excavation to the bedrock surface and two rounds of chemical oxidant injections were previously completed under the approved IRM.

Below is a summary of the Remedial Actions required and implemented at the Site:

1. Chemical inventory and hydraulic lift removal;
2. Removal of drainage structures, surface drains and related piping, which included removal of subsurface piping related to the underground storage tank system;
3. The excavation of all overburden fill material to the bedrock surface;
4. The excavation of bedrock material;
5. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil and bedrock during intrusive Site work;
6. 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;
7. Import of materials to be used for backfill and cover in compliance with: a) Part 375-6.7 and b) all federal, state and local rules and regulations for handling and transport of materials;
8. The removal of LPH from on-site monitoring wells using VEFR and hand-bailing. This program will continue under this SMP;
9. The injection of a chemical oxidant solution to remediate the contaminated groundwater beneath the site. Chemical oxidants were injected throughout the site through pvc injection

points previously installed into the bedrock under the IRM program. This program will continue under this SMP;

10. The BCP site will be covered by a building which includes an unoccupied area (subgrade parking garage) and an occupied area (at grade retail). The occupied area has been constructed with a vapor barrier and sub-slab depressurization system beneath the slab. The unoccupied garage area will be ventilated with a mechanical system to meet the requirements of the NYC Building Code. Activation of the SSDS will be initiated prior to building occupation. The specifications for SSDS start-up testing are detailed in this SMP;
11. All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, were addressed in accordance with all applicable Federal, State and local rules and regulations.
12. Remedial activities will be performed at the Site in accordance with the NYSDEC-approved RAWP, IRM WP, Health and Safety Plan and Community Air Monitoring Plan;
13. If Track 1 is not achieved by the remedy, the recording of an Environmental Easement including institutional controls to prevent future exposure to any remaining residual contamination (see **Appendix C**); and,
14. Publication of a Site Management Plan for long term management of residual contamination as required by the Environmental Easement.

Remedial activities completed at the Site were conducted in accordance with the NYSDEC-approved RAWP for the Former Dico G Auto and Truck Repair site (December, 2008) and the NYSDEC approved Interim Remedial Measure Work Plan (IRM WP) for the Former Dico G Auto and Truck Repair site (November, 2007). The approved RAWP and IRM WP are included in Appendix D in digital format. All deviations from the RAWP and IRM WP are noted below.

1.4.1 Chemical Inventory and Hydraulic Lift Removal

On September 14, 2007, American Environmental Assessment (AEA) of Wyandanch, NY was on-site to remove the remaining components of the hydraulic lift system within the former service area of the building, empty and remove an aboveground 275 gallon fuel oil tank and remove any petroleum or automotive chemicals which remained on the site.

Prior to AEA's mobilization to the site, the former owner/operator of the auto repair shop removed most of the automotive chemicals which were noted in the building during the Phase I inspection. These chemicals were generally stored in small (>1 gallon) containers and included items such as: brake fluid, starting fluid, carburetor cleaner, transmission fluid, motor oil and other common automotive products.

Remaining chemical inventory included the following:

- 2 - 55 gallon drums of used motor oil
- 10 - 5 gallon pails of used motor oil
- 75 gallons of fuel oil in 275 gallon aboveground tank

AEA removed the liquid from the containers using a vacuum truck. Liquids were transported to the Clean Water of New York Waste Oil Reprocessing and Disposal Facility of Staten Island, NY. AEA also cleaned the 275 gallon fuel oil tank and disposed of it at Arrow Scrap Corp in Wheatley Height, NY, along with the empty 55 gallon waste oil drums and the empty hydraulic lift reservoir tank. The reservoir tank was the only component of the hydraulic lift system present at the site. The remaining parts of the system were removed at some time in the past.

1.4.2 Removal of Drainage Structures, Surface Drains and Related Piping

The on-site drainage structures and piping were investigated during removal of the overburden material which took place in December of 2007. Piping was limited to a sanitary line from the former service station building and a surface drain located in the northeastern area of the site. Both lines were traced to the combined sewer system located beneath White Plains Road. No significant leakage was observed along these lines and they were not considered to be a source of contamination at the site. With the exception of the 11 vertical vent lines along the south side of the former service station building, no piping related to the former underground storage tanks (USTs) or former dispensers was encountered during the excavation of overburden soil.

1.4.3 Removal of Contaminated Materials from the Site

All overburden soil was removed from the Site in accordance with the procedures outlined under the approved IRM Work Plan (EBC 10/07). The excavation of overburden soil began on December 6, 2007 and continued through December 12, 2007 within the south and southeastern areas of the property. Excavation was then suspended until January 2, 2008, to allow shoring along the western property line to progress. The majority of the soil excavation was completed during the month of January though small (1 or 2 day) shipment events continued each month through June 5, 2008. Overburden soil varied in thickness from 2-4 feet in the northern half of the site and along the east central area of the site, to 8-12 feet in the southern half of the site. Soil excavation was performed with two track-mounted bucket excavators and loaded directly on to 10-wheel dump trucks provided by the disposal facility. In accordance with the approved IRM Work Plan, a gravel road was constructed and maintained, as needed, to the edge of the excavation / load-out area to minimize dust generation and the off-site tracking of site soil. Two laborers inspected and brushed off the wheels and undercarriage of each truck before it exited the site and periodically swept the street and the site ingress / egress.

All excavated soil was disposed of as non-hazardous waste at permitted disposal facilities operated by Clean Earth incorporated. The majority of soil was taken to the Clean Earth of Carteret facility (CEC) located in Carteret, NJ. The CEC facility (ID# 13231) is a Class B Recycling Center operating under permit No. CBG060003 (expiration date 3/7/12) issued by the New Jersey Department of Environmental Protection (NJDEP). Approximately 25 loads were shipped to the Clean Earth of Southeastern Pennsylvania facility (CESP) located in Morristown, PA. The CESP facility is solid waste processing facility operating under permit No. 301254 (expiration date 1/19/17) issued by the Pennsylvania Department of Environmental Protection (PADEP).

A total of 10,537.98 tons of non-hazardous overburden soil was shipped to the Clean Earth facilities for disposal. The Soil Cleanup Objectives for this Site are listed in **Table 1**. A contour map showing the thickness of all cuts and fills is included in **Figures 9 and 10**.

1.4.4 Excavation and Disposal of Bedrock

Following the removal of overburden soils in the southern half of the property, work began on excavation of bedrock for construction of the basement level garage area. This work began on January 10, 2008 by chipping through the bedrock surface with a hydraulic demolition hammer attached to the track excavator.

Excavated bedrock was shipped from the site to the Tilcon NY, Inc. Quarry in Millington, NJ. The facility recycles the material for use in a variety of products such as railroad ballast, aggregate for concrete, etc. A field technician observed the excavation process and screened the work area visual or olfactory indications of petroleum contamination. Contaminated zones were identified along several fracture planes within central area of the site in the vicinity of the former north dispenser pad. Petroleum contaminated bedrock, as determined through screening, was stockpiled separately and shipped to the Clean Earth facility along with the remainder of overburden soil. A total of 6,875 cubic yards of uncontaminated bedrock was shipped to the Tilcon facility from January 30, 2008 through May 12, 2008.

On May 5, 2008, a survey team from Carman-Dunne, PC re-surveyed the site. The results of the survey were used to prepare a 1 foot contour interval map of the site and an excavation volume report. Based on comparison to the January 4, 2007 survey, Carman-Dunne calculated the cut volume as 7,824.68 cubic yards. The final contour map survey and excavation volume report prepared by Carman Dunne is presented as **Figure 9**.

1.4.5 Import of Backfill

Approximately 868 cubic yards (1,302 tons) of virgin mined stone dust and ¾ inch gravel material was imported to the Site for backfill and underlayment. This material was obtained from Tilcon Inc. Mt. Hope Quarry located at 625 Mt Hope Road in Morris County New Jersey and was defined as virgin-mined gneiss. The final fill survey and volume report prepared by Carman Dunne is presented as **Figure 10**.

1.4.6 LPH Recovery Program

LPH recovery was initiated in MW8 by daily hand bailing during the Remedial Investigation. Approximately 9.5 inches of weathered gasoline was present in well MW8 on 11/2/07. The gasoline was removed by hand bailing which was repeated on a weekly basis through 1/10/08 when the wells were lost due to excavation activity. Removed gasoline was stored on-site in a 55 gallon drum. Following the initial removal, only minor amounts (approximately 1/8 inch) of free phase gasoline were reported in MW8. In an attempt to delineate the free-phase gasoline found in MW8, four wells (MW13-MW16) were installed around MW8 on 11/9/07. These wells were also checked on a weekly basis through 1/10/08 with no free phase gasoline reported.

LPH was also discovered following the completion of excavation activity, in well IRM-W7 which was installed with eight other wells to monitor the chemical oxidant treatment program. On 10/3/08, 0.15 feet of LPH was measured in well IRM-W7. LPH removal was initiated in IRM-W7 on 12/16/08 using vacuum enhanced fluid recovery (VEFR). The 6-hour VEFR event was accomplished using a vacuum tanker truck equipped with a 3 foot section of clear, 2- inch diameter, pvc pipe. The 2-inch pvc section was connected to a 1 inch diameter pvc "stinger" pipe using a 2 inch by 1 inch "fernco" reducer. The stinger was initially set 2 feet below the water table. When fluid recovery ceased after the first 5 hours, the stinger was reset approximately 1 foot lower for the final hour of recovery. Approximately 900 gallons of VOC contaminated water were recovered from the well during the event. LPH was not present in the well during follow-up gauging both immediately after the event and the following day.

VEFR events will continue as needed to remove any remaining LPH. Hand bailing may be used to supplement VEFR recovery between recovery events. The decision to perform VEFR events will be based on monitoring results and will be made in concurrence with the NYSDEC project manager. Details regarding future VEFR events are provided in section 2.2.1.2 of this SMP.

1.4.7 Chemical Oxidant Treatment Program

Twelve oxidant injection points were initially installed throughout the basement level parking garage area on June 21, 22, 28 and 29, 2008 to target affected groundwater as defined by the results of the Remedial Investigation. The injection points were constructed of 1 inch pvc with a 5 foot 0.020 screened section installed within a 2-inch borehole cored into the bedrock, approximately five-feet below the water table. A No. 2 morie gravel pack was placed around the screen to a depth of approximately 1 foot above the screen followed by a 1 foot hydrated bentonite pellet seal. The injection wells were initially protected with a 4 inch pvc sleeve to protect the well during construction activity within the basement.

Oxidant injections were performed on two occasions; initially on July 20, 2008 and again on September 14, 2008. Based on the results of performance monitoring following the initial injection, three additional injection wells were installed at the site on September 13, 2008, just prior to the second injection. The three new injection wells were located in the vicinity of the former north dispenser pad, adjacent to the elevator shaft in the new building. The purpose of these additional injection points was to target a high concentration area of VOC affected groundwater in the vicinity of monitoring well IRM-7. See Figure 11_ for locations of the injection points.

The oxidant injections consisted of a sodium persulfate a chelated iron activator. Both components were delivered to the site as a dry powder and mixed then with water on-site to create a 15 to 20 percent solution. The activator was added at a ratio of 9 lbs of FeEDTA powder to each 55 lb bag of sodium persulfate. The injections consisted of approximately 100 gallons of solution per injection point. The initial injection consisted of a single application of 100 gallons of solution in each of the twelve injection points. The second injection included a single 100-gallon application in each of the original twelve injection points plus the three new points installed near the elevator shaft.

Chemical oxidants were also injected in wells IRM-W7, IRM-W10, IRM-W12 and IRM-W13 following the VEFR events in December 2008.

Chemical oxidant treatment will continue as needed to achieve further significant reduction of VOCs in groundwater at the site. The decision to perform subsequent oxidant applications will be based on performance sampling results and will be made in concurrence with the NYSDEC project manager. Details on future chemical oxidant applications are provided in section 2.2 1.3 of this SMP.

1.4.8 Engineering and Institutional Controls

Since contaminated groundwater/soil vapor remains beneath the Site, Engineering and Institutional Controls (ECs and ICs) are required to protect human health and the environment. Long-term management of EC/ICs and of residual contamination will be executed under this Site specific Site Management Plan (SMP) that will be developed and included in the FER.

The Controlled Property has 3 short term (<5 yrs) primary Engineering Controls as follows:

- Operation of a sub-slab depressurization system/vapor barrier beneath the occupied area (commercial space) of the new building;

- Continued recovery of LPH as needed using VEFR extraction and hand bailing;
- Continued chemical oxidant treatment as needed to significantly reduce VOC concentrations in groundwater.

A series of Institutional Controls are required to implement, maintain and monitor these Engineering Controls. The Environmental Easement requires compliance with these Institutional Controls. These Institutional Controls consist of the following:

- All Engineering Controls must be operated and maintained as specified in this SMP;
- All Engineering Controls on the Controlled Property (the Site) must be inspected and certified at a frequency and in a manner defined in this SMP;
- Groundwater, soil vapor, and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in this SMP;
- On-Site environmental monitoring devices, including but not limited to, groundwater monitor wells and soil vapor probes, must be protected and replaced as necessary to ensure continued functioning in the manner specified in this SMP.
- Compliance with the Environmental Easement by the Grantor and the Grantor's successors and assigns with all elements of this SMP;
- A soil vapor mitigation system consisting of a sub-slab depressurization system must be inspected, certified, operated and maintained as required in this SMP;
- Ground water and soil vapor monitoring must be performed as defined in this SMP; and
- Engineering Controls may not be discontinued without an amendment or the extinguishment of this Environmental Easement.

The Controlled Property has a series of Institutional Controls in the form of Site restrictions. Adherence to these Institutional Controls is required under the Environmental Easement. Site restrictions that apply to the Controlled Property are:

- The Controlled Property may be used for unrestricted residential use only provided the short-term Engineering and Institutional Controls included in this SMP remain in use;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for the intended use.

These EC/ICs should:

- Prevent ingestion of groundwater with contamination levels that exceed drinking water standards;
- Prevent contact with or inhalation of volatiles from contaminated groundwater;
- Remove LPH which is acting as a source of contamination to the groundwater;
- Restore groundwater to pre-disposal/pre-release conditions, to the extent practicable;
- Prevent contaminated groundwater from migrating off-Site.

2.0 ENGINEERING AND INSTITUTIONAL CONTROL PLAN

2.1 INTRODUCTION

2.1.1 General

Remedial activities completed at the Site were conducted in accordance with the NYSDEC-approved RAWP for the Former Dico G Auto and Truck Repair site (December 2008). The remedial goals included attainment of Track 1 Soil Cleanup Objectives (SCOs) for on-Site soils for unrestricted use. The Track 1 SCOs were approved by NYSDEC and are listed in Table 1. A summary of the remedial strategies and EC/ICs implemented at the Site are as follows:

- Excavation of soils exceeding Track 1 SCOs;
- Removal of Liquid Phase Hydrocarbons;
- Treatment of groundwater with chemical oxidant injections;
- Installation of a vapor barrier and operation of a short term (<5 yrs) sub-slab depressurization system;
- Implementation of a Site Management Plan; and
- Registration of an Environmental Easement, including Institutional Controls, to prevent future exposure to any contamination remaining at the Site (a copy of the Environmental Easement is provided in **Appendix C**).

Since residual contaminated groundwater/soil vapor exists beneath the Site, Engineering Controls and Institutional Controls (EC/ICs) are required to protect human health and the environment. This Engineering and Institutional Control Plan describes the procedures for the implementation and management of all EC/ICs at the Site. The EC/IC Plan is one component of the SMP and is subject to revision by NYSDEC.

2.1.2 Purpose

The purpose of this Plan is to provide:

- A description of all EC/ICs on the Site;

- The basic operation and intended role of each implemented EC/IC;
- A description of the key components of the ICs created as stated in the Environmental Easement;
- A description of the features that should be evaluated during each annual inspection and compliance certification period;
- A description of plans and procedures to be followed for implementation of EC/ICs, such as the implementation of the Soil Management Plan for the safe handling of residual contamination that may be disturbed during maintenance or redevelopment work on the Site; and
- Any other provisions necessary to identify or establish methods for implementing the EC/ICs required by the Site remedy, as determined by the NYSDEC.

2.2 ENGINEERING CONTROL COMPONENTS

2.2.1 Engineering Control Systems

2.2.1.1 Sub-slab Depressurization System (SSDS)

An active SSD system will be required beneath the completed retail section of the building as a temporary mitigation measure against vapor intrusion, since improvement in groundwater quality is expected to occur at the site over time. An SSD system will not be required beneath the parking garage since this area will be ventilated to remove vehicle fumes in accordance with the NYC Building Code.

An SSD system and vapor barrier were designed and incorporated into the new building plans as a preventive measure for the retail space in the new building. Design details of the SSD system beneath the 11,000 square foot commercial area on the ground floor will consist of three separate zones. Each zone will provide coverage of up to 3,666 sf of slab area. This is consistent with USEPA sub-slab depressurization design specifications which recommend a separate vent loop for every 4,000 sf of slab area.

The horizontal vent line is constructed of a continuous loop of perforated 4-inch HDPE smooth interior pipe. In each zone the horizontal pipe will extend to an adjacent utility chase-way where it will be piped individually to the roof via a 6-inch schedule 40 pvc line. Fill material around the horizontal vent piping is virgin-mined, ½ inch to ¾ inch gravel. Detailed specifications of the SSD system are provided in **Appendix E**.

The SSD system will be operated and tested prior to placing the new building in service. The specifications SSDS start-up testing are detailed in Section 3 of this SMP.

Procedures for operating and maintaining the SSD system are documented in the Operation and Maintenance Plan (Section 4 of this SMP). Procedures for monitoring the SSD system are included in the Monitoring Plan (Section 3 of this SMP). The Monitoring Plan also addresses severe condition inspections in the event that a severe condition occurs which may affect controls at the Site.

2.2.1.2 LPH Recovery

LPH removal will continue on a monthly basis, as necessary, using vacuum enhanced fluid recovery (VEFR) events. VEFR events will be performed on a monthly basis on all monitoring wells which contain 0.5 inches (0.04 feet) or more of LPH. Each event will last from 4 to 6 hour and will be performed using a vacuum tanker truck equipped with a 1 inch diameter pvc "stinger" downpipe. The downpipe will be connected to the 2 inch well casing using a 2 inch by 1 inch "fernco" reducer. The stinger will initially be set no more than 2 feet below the water table. If fluid recovery ceases altogether, the downpipe will be re-set deeper in the well, as needed, to continue recovery.

Depth to water (DTW) and depth to product (DTP) readings will be recorded in a log book both before and after the VEFR event.

VEFR events will continue as needed to remove any remaining LPH. Hand bailing may be used to supplement VEFR recovery between recovery events. The decision to perform a particular VEFR event will be based on monitoring results and will be made in concurrence with the NYSDEC Project Manager.

Procedures for performing LPH recovery are documented in the Operation and Maintenance Plan (Section 4 of this SMP). Procedures for monitoring the performance of LPH recovery are included in the Monitoring Plan (Section 3 of this SMP).

2.2.1.3 Chemical Oxidant Treatment of Groundwater

Following excavation of soil down to the bedrock throughout the site and the excavation of bedrock to the final level in the parking garage area, a chemical oxidant injection program was initiated under an IRM to reduce VOC concentrations in groundwater. This program was supplemented under the RAWP and will continue as needed until remedial goals have been met.

This program consists of the injection of a chemical oxidant solution in various injection wells (see Figure 11) located thoughout the site as needed to address affected groundwater as identified during the Remedial Investigation. Chemical oxidant injection is intended to significantly reduce the VOCs in the high concentration areas, and thereby accelerate the improvements in groundwater quality.

The oxidant injections will consist of a solution of sodium persulfate and chelated iron activator. Both components will be delivered to the site as a dry powder and mixed then with water on-site to create a 10 to 30 percent solution. The activator will initially be added at a ratio of 9 lbs of FeEDTA powder to each 55 lb bag of sodium persulfate. The injections will consist of approximately 100 gallons of solution per injection point.

The volume of solution and the number and location of injections will be based on the results of performance sampling and modified to concentrate on remaining areas with VOC concentrations above cleanup goals. The ratio of FeEDTA to sodium persulfate will be modified in response to the results of the performance sampling. If laboratory analysis shows persulfate concentrations above 250 mg/L and Fe^{2+} concentrations below 100 mg/L, the FeEDTA will be increased to 15 pounds per 55 pounds of sodium persulfate.

Chemical oxidant treatment will continue as needed to achieve further significant reduction of VOCs in groundwater at the site. The decision to perform subsequent oxidant applications will be based on performance sampling results and will be made in concurrence with the NYSDEC project manager.

Volume and density application rates have been based on the manufacturer’s recommendations and the conditions of the site. All drawings, diagrams, calculation and manufacturer's documentation for the chemical oxidation treatment program are presented in Appendix F.

Procedures for performing chemical oxidant injections are documented in the Operation and Maintenance Plan (Section 4 of this SMP). Procedures for monitoring the performance of the chemical oxidant injections are included in the Monitoring Plan (Section 3 of this SMP).

2.2.2 Criteria for Completion of Remediation/Termination of Remedial Systems

2.2.2.1 Sub-slab Depressurization System (SSDS)

The active SSDS system beneath the occupied area of the building, it will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the active SSD system may be submitted by the property 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.

2.2.2.2 LPH Recovery

VEFR events will continue on a monthly basis, as needed, to remove any remaining LPH. Hand bailing may be used to supplement VEFR recovery between recovery events. VEFR recovery events will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the treatment may be submitted by the property owner after residual LPH is no longer present in any of the monitoring wells. This assessment will be based the results of monthly gauging of the monitoring wells for LPH with an electronic interface tape. LPH delineation wells will remain in place and functional until permission to discontinue their use is granted in writing by NYSDEC and NYSDOH. These sampling/monitoring activities will adhere to stipulations outlined in the Monitoring Plan section of the SMP.

2.2.2.3 Chemical Oxidant Treatment of Groundwater

Chemical oxidant treatment will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the treatment may be submitted by the property owner after residual contamination concentrations in groundwater: (1) are cleaned up to levels below NYSDEC standards, or (2) have become asymptotic over an extended period of time as mandated by the NYSDEC and the NYSDOH, or (3) if NYSDEC has determined that the treatment has reached the limit of its effectiveness. This assessment will be based in part on post-remediation contaminant levels in groundwater collected from monitoring wells located throughout the Site. Injection wells will remain in place and functional until permission to discontinue their use is granted in writing by NYSDEC and NYSDOH. These sampling/monitoring activities will adhere to stipulations outlined in the Monitoring Plan section of this SMP.

2.3 INSTITUTIONAL CONTROLS COMPONENTS

2.3.1 Institutional Controls

A series of Institutional Controls are required under the RAWP to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to residual contamination by controlling disturbances of the subsurface contamination; and, (3) restrict the use of the Site to unrestricted residential use only. Adherence to these Institutional Controls on the Site (Controlled Property) is required under the Environmental Easement and will be implemented under this Site Management Plan. These Institutional Controls are:

- Compliance with the Environmental Easement by the Grantor and the Grantor's successors and assigns with all elements of this SMP;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- A composite cover system consisting of asphalt covered roads, concrete covered sidewalks, and concrete building slabs must be inspected, certified and maintained as required in this SMP;
- A soil vapor mitigation system consisting of a sub-slab depressurization system / vapor barrier under the occupied area of the building must be inspected, certified, operated and maintained as required in this SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defied in the SMP.
- Groundwater, soil vapor, and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in this SMP;

- On-Site environmental monitoring devices, including but not limited to, groundwater monitor wells and soil vapor probes, must be protected and replaced as necessary to ensure the devices function in the manner specified in this SMP.
- Engineering Controls may not be discontinued without an amendment or the extinguishment of this Environmental Easement.

The Site ("Controlled Property") has a series of Institutional Controls in the form of Site restrictions. Adherence to these Institutional Controls is required by the Environmental Easement. Site restrictions that apply to the Controlled Property are:

- The use of the groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- The Controlled Property may be used for unrestricted residential use provided that the Engineering and Institutional Controls included in this SMP are employed.
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property 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 Controlled Property 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

2.4 INSPECTIONS AND NOTIFICATIONS

2.4.1 Inspections

Inspections of all systems installed on-Site will be conducted at the frequency specified in SMP Monitoring Plan schedule. A comprehensive Site-wide inspection will be conducted annually. The inspections will determine and document the following:

- Whether Engineering Controls continue to perform as designed;
- If these controls continue to be protective of human health and the environment;

- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria;
- Sampling and analysis of appropriate media during monitoring events;
- If Site records are complete and up to date; and
- Changes, or needed changes, to the remedial or monitoring system;

Inspections will be conducted in accordance with the procedures set forth in the Monitoring Plan of this SMP (Section 3). The reporting requirements are outlined in the Site Management Reporting Plan (Section 5).

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the Site will be conducted to verify the effectiveness of the EC/ICs implemented at the Site by a qualified environmental professional as determined by NYSDEC.

2.4.2 Notifications

2.4.2.1 NYSDEC-acceptable Electronic Database

The following information is presented in **Appendix D** in an electronic database format:

- A Site summary;
- The name of the current Site owner and/or the remedial party implementing the SMP for the Site;
- The location of the Site;
- The current status of Site remedial activity;
- A copy of the Environmental Easement; and
- A contact name and phone number of a person knowledgeable about the Environmental Easement's requirements, in order for NYSDEC to obtain additional information, as necessary.

This information should be: 1) modified as conditions change; (2) revised in **Appendix D** of this document; and, (3) submitted to NYSDEC in the Annual Site Monitoring Report. Should the

Environmental Easement be modified or terminated, the copy of the revised Environmental Easement will also be updated in this manner.

2.4.2.2 Non-routine Notifications

Non-routine notifications are to be submitted by the property owner(s) to the NYSDEC on an as-needed basis for the following reasons:

- 60-day advance notice of any proposed changes in Site use that are consistent with the terms of the Brownfield Cleanup Agreement.
- 10-day advance notice of any proposed ground-intrusive activities.
- Notice within 48-hours of any damage or defect to the foundations structures that reduces or has the potential to reduce the effectiveness of other Engineering Controls and likewise any action taken to mitigate the damage or defect.
- Notice within 48-hours of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of Engineering Controls in place at the Site, including a summary of action taken and the impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

3.0 MONITORING PLAN

3.1 INTRODUCTION

3.1.1 General

The Monitoring Plan describes the measures for evaluating the performance and effectiveness of the implemented ECs in reducing or mitigating contamination at the Site. ECs at the Site include a sub-slab depressurization system, LPH recovery and chemical oxidant treatment of groundwater. This Monitoring Plan is subject to revision by NYSDEC.

3.1.2 Purpose

This Monitoring Plan describes the methods to be used for:

- Sampling and analysis of appropriate media (e.g., groundwater, and soil vapor);
- Evaluating Site information periodically to confirm that the remedy continues to be effective as per the design; and
- Preparing the necessary reports for the various monitoring activities.
- Assessing compliance with NYSDEC groundwater standards;
- Assessing achievement of the remedial performance criteria.

To adequately address these issues, this Monitoring Plan provides information on:

- Sampling locations, protocol, and frequency;
- Information on all designed monitoring systems (e.g., well logs);
- Analytical sampling program requirements;
- Reporting requirements;
- Quality Assurance/Quality Control (QA/QC) requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitor well decommissioning procedures; and
- Annual inspection and certification.

Quarterly monitoring of the performance of LPH recovery and chemical oxidant treatment through groundwater sampling will be conducted while chemical oxidant treatment continues and for up to eight additional quarters after the treatment program has been completed. Frequency thereafter will be determined by NYSDEC. Monitoring wells will be gauged for LPH on a weekly basis for the first three months and then monthly. Trends in contaminant levels in groundwater in the affected areas will be evaluated to determine if the remedy continues to be effective in achieving remedial goals. Monitoring programs are summarized in **Table 6** and outlined in detail in Sections 3.2, below.

Table 6: Monitoring/Inspection Schedule

Monitoring Program	**Frequency***	**Matrix**	**Analysis**
SSDS	at system start-up and system re-start	air pressure/vacuum	manometer
LPH Recovery	weekly for first 3 months; monthly thereafter	LPH/Groundwater	interface probe
Chemical oxidant treatment	quarterly	Groundwater	VOCs (EPA Method 8260), persulfate & Fe2+

** The frequency of events will be conducted as specified until otherwise approved by NYSDEC and NYSDOH*

3.2 ENGINEERING CONTROL SYSTEM MONITORING

3.2.1 Sub-Slab Depressurization System

An SSD system has been installed to mitigate possible soil vapor intrusion into occupied areas of the new building. System designs are described in the Engineering and Institutional Control Plan, and as-built drawings are located in **Appendix E**

3.2.1.1 Monitoring Schedule

The components of the SSDS system will be inspected by a qualified environmental professional on a bi-annual basis to assure that the system is functioning properly.

Sub-slab vacuum readings will be collected from various locations across the slab following system start up to ensure that the SSDS is providing adequate depressurization across the slab.

Inspection frequency is subject to change by NYSDEC and NYSDOH. Unscheduled inspections and/or sampling may take place when a suspected failure of the SSD system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. Monitoring deliverables for the SSD system are specified later in this Plan.

3.2.1.2 General Equipment Monitoring

A visual inspection of the complete system will be conducted during the monitoring event. SSD system components to be monitored include, but are not limited to, the following:

- Vacuum blower; and,
- General system piping.
- Vacuum gauges.
- Control switches and system alarms.

A complete list of components to be checked is provided in the Inspection Checklist, presented in **Appendix G**. If any equipment readings are not within their typical range, any equipment is observed to be malfunctioning, or the system is not performing within specifications, maintenance and repair as per the Operation and Maintenance Plan are required immediately, and the SSD system restarted.

3.2.1.3 System Monitoring Devices and Alarms

The SSD system has a warning device to indicate that the system is not operating properly. This device will be located in the electric panel control room within the retail area of the building or other utility room frequented by the building superintentant. In the event that the warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SSD system restarted. Operational problems will be noted in the quarterly monitoring report and in the annual Site Management Report.

3.2.1.4 Sampling Event Protocol

Sub-slab vacuum readings will be collected from at least 4 locations (SS1-SS4 shown on Figure 12) upon system start up (or re-start) in accordance with USEPA and NYSDOH guidance.

Vacuum sampling locations can be as simple as a hole drilled through the slab to allow access to a 1/4 to 3/8 inch sampling tube which is sealed to the slab. The tube is then connected to a digital manometer to demonstrate negative pressure. Once the reading is taken vacuum is measured across the entire slab, sampling ports should be permanently sealed to prevent preferential pathway for vapor intrusion. If system defaults and is required to be re-started, the sampling ports will be re-installed, sampled and sealed in the same manner.

3.2.2 LPH Recovery and Chemical Oxidant Treatment Programs

Groundwater monitoring will be performed on a quarterly basis to assess the performance of the remedy.

3.2.2.1 Monitoring System Design

The network of monitoring wells is designed to monitor both up-gradient and down-gradient groundwater conditions at the Site. The network of on-Site wells has been located based on the following criteria:

- The radial pattern of groundwater flow from the central-west area of the site to the northeast, east and southeast. (See **Figure 5**);
- Provide downgradient coverage of the chemical injection well network;
- Provide downgradient coverage of the former location of identified source areas (i.e. dispenser islands);
- Provide downgradient coverage of LPH areas;
- The concentration distribution of VOCs across the site (See **Figure 7**); and
- To provide coverage of upgradient areas, downgradient areas and former source areas as previously defined.

3.2.2.2 Groundwater Well Construction

Six IRM performance monitoring wells (IRM1-IRM6) were installed in the basement area of the excavation on May 24, 25 and 26, 2008 to monitor and direct the oxidant injection program. The monitoring wells were installed by coring a 2-inch borehole into the bedrock, approximately five-feet below the water table. The wells were constructed of 1 inch pvc with a 7-foot 0.010 screened section. A No. 00 morie gravel pack was placed around the screen to a depth of approximately 1 foot above the screen followed by a 1 foot hydrated bentonite pellet seal. The monitoring wells were initially protected with a 4 inch pvc sleeve to protect the well during construction activity within the basement.

In addition to the six basement wells, two monitoring wells (IWM8, IRM9) were installed within the retail area of the new building on June 11, 2008. Due to the required drilling depth through bedrock (20 ft) these wells were installed within a 6 inch borehole advanced using the air rotary drilling method. The wells were constructed of 2 inch pvc casing with a 10 foot 0.010 screened section set approximately 8 feet below the water table. The wells were completed with a No. 00 morie gravel pack paced to a depth of approximately 5 feet above the screen followed by a hydrated bentonite seal. The wells were protected with locking compression-style cap and an 8-inch bolt down manhole cover. A third well (IRM-7) was installed in this area on August 2, 2008 using the rock coring method. Consequently, well IRM-7 was constructed in the same manner as those of the basement wells IRM-1 through IRM-6. IRM-W7 is constructed with 10 feet of 0.010 slotted 1-inch diameter pvc well screen and approximately 10 feet of 1 inch pvc well casing.

Following the discovery of LPH in IRM-W7, four additional monitoring wells (IRM-W10 through IRM-W13) were installed to delineate the LPH. Three of the wells were installed around IRM-W7 while the fourth was installed at the former location of well MW8, in which LPH had previously been reported during the remedial investigation. All four wells were installed using the rock coring method as previously described. The wells were installed with a 2 inch pvc riser through the sub-slab fill material and sealed to the bedrock with a bentonite cement grout. The 2 inch bedrock cored borehole was left open to facilitate LPH recovery, if present.

The locations of the performance monitoring wells and LPH delineation wells are shown in **Figure 11**. Well construction logs are included in **Appendix H**.

3.2.2.3 Monitoring Schedule

Depth to groundwater (DTW) and depth to LPH (DTP) readings will be taken on a weekly basis for the first 3 months after issuance of the COC, and then on a monthly basis thereafter using an electronic interface probe. DTW/DTP readings will be taken from five LPH delineation wells IRM-W7 and IRM-W10 through IRM-W13 (see Figure 11).

Groundwater samples will be collected from nine monitoring wells (IRM-W1 through W9) on a quarterly basis (see Figure 11). Changes in the sampling frequency or number and location of wells included in the program will not be made without written approval from NYSDEC. The SMP will be modified to reflect changes in sampling plans approved by NYSDEC. Deliverables for the groundwater-monitoring program are specified in Section 3.6 below.

3.2.2.4 Sampling Event Protocol

All well sampling activities will be recorded in a field book and a groundwater-sampling log presented in **Appendix I**. Other observations (e.g., well integrity, etc.) will be noted on the well sampling log. The well sampling log will serve as the inspection form for the groundwater monitoring well network. This should include a description of:

- Well gauging;
- Well purging;
- Sampling methodology;
- Analytical methodology:
    - Lab certification;
    - Analytical methods;
    - Analytes.

Groundwater samples will be collected using a peristaltic pump and dedicated polyethylene tubing in accordance with standard low-flow sampling methods as follows:

- Record pump make & model on sampling form.
- Wear appropriate health and safety equipment as outlined in the Health and Safety Plan

- Inspect each well for any damage or evidence of tampering and note condition in field logbook.
- Remove the well cap.
- Lay out plastic sheeting and place the monitoring, purging and sampling equipment on the sheeting.
- To avoid cross-contamination, do not let any downhole equipment touch the ground.
- Measure well headspace with a PID or FID and record the reading in the field logbook.
- A synoptic water level measurement round should be performed (in the shortest possible time) before any purging and sampling activities begin. Measure and record the depth to water using a water level meter or interface probe to the nearest 0.01 ft. Record the measurement in the field logbook. Do not measure the depth to the bottom of the well at this time (to avoid disturbing any sediment that may have accumulated). Obtain depth to bottom information from installation information in the field logbook or soil boring logs.
- Collect samples in order from wells with lowest contaminant concentration to highest concentration.
- Connect the polyethylene tubing to the peristaltic pump and lower the tubing into the well to approximately the middle of the screen. Tubing should be a minimum of 2 feet above the bottom of the well as this may cause mobilization of any sediment present in the bottom of the well.
- Start the pump at its lowest speed setting and slowly increase the speed until discharge occurs. Check water level. Adjust pump speed until there is little or no water level drawdown (less than 0.3 feet). If the minimal drawdown that can be achieved exceeds 0.3 feet but remains stable, continue purging until indicator field parameters stabilize.
- There should be at least 1 foot of water over the end of the tubing so there is no risk of entrapment of air in the sample. Pumping rates should, if needed, and reduced to the minimum capabilities of the pump to avoid purging the well dry. However, if the recharge rate of the well is very low and the well is purged dry, then wait until the well has recharged to a sufficient level and collect the appropriate volume of sample.
- During well purging, monitor indicator field parameters (turbidity,temperature, specific conductance, pH, Eh, DO) every three to five minutes (or less frequently, if appropriate). Note: during the early phase of purging emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments. Purging is considered complete and sampling

may begin when all the above indicator field parameters have stabilized. Stabilization is considered to be achieved when three consecutive readings, taken at three (3) to five (5) minute intervals, are within the following limits:

turbidity (10% for values greater than 1 NTU),DO (10%),
specific conductance (3%),
temperature (3%),
pH (± 0.1 unit),
ORP/Eh (± 10 millivolts).

- All measurements, except turbidity, must be obtained using a flowthrough- cell. Transparent flow-through-cells are preferred, because they allow field personnel to watch for particulate build-up within the cell. This build-up may affect indicator field parameter values measured within the cell and may also cause an underestimation of turbidity values measured after the cell. If the cell needs to be cleaned during purging operations, continue pumping and disconnect cell for cleaning, then reconnect after cleaning and continue monitoring activities.
- Water samples for laboratory analyses must be collected before water has passed through the flow-through-cell (use a by-pass assembly or disconnect cell to obtain sample). VOC samples should be collected first and directly into pre-preserved sample containers. Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.
- Use pre-preserved 40 ml glass vials and non-acidified 100 ml nalgene bottles as provided by the contract laboratory. Fill the VOA vials first, and then fill the remaining containers for persulfate and ferrous iron analysis. Fill each container with sample to just overflowing so that no air bubbles are entrapped inside. Fill all sample bottles by allowing the pump discharge to flow gently down the inside of the bottle with minimal turbulence. Cap each bottle as it is filled.
- Label the samples, and record them on the chain of custody form. Place immediately into a cooler for shipment and maintain at 4°C.
- Remove the tubing from the well. The polyethylene tubing must either be dedicated to each well or discarded. If dedicated the tubing should be placed in a large plastic garbage bag, sealed, and labeled with the appropriate well identification number.
- Close and lock the well.

- Decontaminate pump either by changing the surgical pump tubing between wells or as follows:
  - Flush the equipment/pump with potable water.
  - Flush with non-phosphate detergent solution. If the solution is recycled, the solution must be changed periodically.
  - Flush with potable or distilled/deionized water to remove all of the detergent solution. If the water is recycled, the water must be changed periodically.
  - Flush with isopropyl alcohol (pesticide grade). If equipment blank data from the previous sampling event show that the level of contaminants is insignificant, then this step may be skipped.
  - Flush with distilled/deionized water. The final water rinse must not be recycled.

Samples will be collected in pre-cleaned laboratory supplied glassware, stored in a cooler with ice and submitted to a New York State ELAP certified environmental laboratory. All purging and sampling data will be recorded on dedicated well sampling forms. Standard operating procedures for collecting groundwater samples are provided in **Appendix J**.

3.2.2.5 Well Replacement/Repairs and Decommissioning

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance. Well decommissioning, for the purpose of replacement, should be reported to NYSDEC prior to performance and in the annual report. Well decommissioning without replacement must receive prior approval by NYSDEC. Well abandonment will be performed in accordance with NYSDEC's "Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC and NYSDOH. It is anticipated that monitoring wells (IRM-W7, W8 and W9) inside of the occupied space of the new building will be lost as early as March 2009 when construction of this space is completed. When this occurs, interior wells IRM-W8 and IRM-W9 will be replaced with two new wells, PIRM-W14 and PIRM-W15 located outside of the building as shown in **Figure 11**. IRM-W11, installed as an LPH delineation well, will be used as a replacement well for IRM-W7 if this well is no longer accessible.

3.3 SITE-WIDE INSPECTION

Site-wide inspections will be performed on a regular schedule at a minimum of once a year. Site-wide inspections should also be performed after all severe weather conditions that may affect Engineering Controls or monitoring devices. During these inspections, an inspection form will be completed (**Appendix G**). The form will compile sufficient information to assess the following:

- Compliance with all ICs, including Site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General Site conditions at the time of the inspection;
- The Site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection;
- Compliance with permits and schedules included in the Operation and Maintenance Plan; and
- Confirm that Site records are up to date.

3.4 MONITORING QUALITY ASSURANCE/QUALITY CONTROL

3.4.1 Quality Assurance Project Plan (QAPP)

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. Internal validation will be performed by the analytical laboratory on a quarterly basis. In accordance with DER-10, the final round of confirmatory (post remediation) samples will include Category B laboratory data deliverables and a Data Usability Summary Report will be prepared by a party independent from the laboratory performing the analysis.

All sampling and analysis will be performed in accordance with the requirements of this QAPP. Main components of the QAPP include:

- QA/QC Objectives for Data Measurement;
- Sampling Program:

  - Sample containers will be properly washed, decontaminated, and appropriate preservative will be added (if applicable) prior to their use by the analytical laboratory. Containers with preservative will be tagged as such.
  - Sample holding times will be in accordance with the NYSDEC ASP requirements.
  - Field QC samples (e.g., trip blanks, coded field duplicates, and matrix spike/matrix spike duplicates) will be collected as necessary.
- Sample Tracking and Custody;
- Calibration Procedures:
  - All field analytical equipment will be calibrated immediately prior to each day's use. Calibration procedures will conform to manufacturer's standard instructions.
  - The laboratory will follow all calibration procedures and schedules as specified in USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods.
- Analytical Procedures;
- Data Reduction and Validation:
  - Data validation will be performed in accordance with the USEPA validation guidelines for organic and inorganic data review. Validation will include the following:
    - Verification of 100% of all QC sample results (both qualitative and quantitative);
    - Verification of the identification of 100% of all sample results (both positive hits and non-detects);
    - Recalculation of 10% of all investigative sample results; and
    - A Data Usability Summary Report (DUSR) which will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method will be prepared for the final round of confirmatory (post-remedial) samples.
- Internal QC and Checks;
- QA Performance and System Audits;

- Preventative Maintenance Procedures and Schedules;
- Corrective Action Measures.

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier 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 through the use of ice or "cold-paks" to maintain a temperature of 4oC.

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:

- Flush the equipment/pump with potable water.
- Flush with non-phosphate detergent solution. If the solution is recycled, the solution must be changed periodically.
- Flush with potable or distilled/deionized water to remove all of the detergent solution. If the water is recycled, the water must be changed periodically.
- Flush with isopropyl alcohol (pesticide grade). If equipment blank data from the previous sampling event show that the level of contaminants is insignificant, then this step may be skipped.
- Flush with distilled/deionized water. The final water rinse must not be recycled.

Field blanks, if used, will be prepared by poring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. Trip blanks will accompany samples each time they are transported to the laboratory. Matrix spike and matrix spike duplicates (MS/MSD) will be collected at the rate of one per 20 samples submitted to the laboratory. Laboratory reports will be upgradeable to ASP category B deliverables for use in the preparation of a data usability report (DUSR). In accordance with DER-10, the final round of confirmatory (post remediation) samples will include Category B laboratory data deliverables and a Data Usability Summary Report will be prepared by a party independent from the laboratory performing the analysis.

3.4.1.1 Groundwater Samples

Dedicated disposable materials (polyethylene tubing, dedicated samplers, etc.) will be used for collecting groundwater samples; therefore, field equipment (rinsate) blanks will not be part of the QA/QC program. Trip blanks will accompany samples each time they are transported to the laboratory.

3.4.1.2 Soil Vapor Samples (if collected)

Extreme care will be taken during all aspects of sample collection to ensure that sampling error is minimized and high quality data are obtained. The sampling team members will avoid actions (e.g., using permanent marker pens and wearing freshly dry-cleaned clothes or personal fragrances) which can cause sample interference in the field. QA/QC protocols will be followed for sample collection and laboratory analysis, such as use of certified clean sample devices, meeting sample holding times and temperatures, sample accession, and chain of custody. A tracer gas, helium, will be used in accordance with NYSDOH sampling protocols to serve as a QA/QC device to verify the integrity of the soil vapor probe seals.

Samples will be delivered to the analytical laboratory as soon as possible after collection. The laboratory analyzes QC samples with each analytical batch, including a Method Blank (MB), Laboratory Control Sample (LCS), and a Laboratory Control Sample Duplicate (LCSD).

3.5 MONITORING REPORTING REQUIREMENTS

Forms and any other information generated during regular monitoring events and inspections will be kept on file on-Site. All forms, and other relevant reporting formats used during the monitoring/inspection events, will be (1) subject to approval by NYSDEC and (2) submitted at the time of the annual Site Management Report, as specified in the Reporting Plan of the SMP.

A report or letter will be prepared for submission, subsequent to each quarterly groundwater sampling event and submitted to the NYSDEC within 15 days of the receipt of the laboratory validated data. The report (or letter) will include, at a minimum:

- Date of event;
- Personnel conducting sampling;
- Description of the activities performed;
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air, etc);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (also to be submitted electronically in the NYSDEC-identified format);
- A copy of the laboratory certification;
- Any observations, conclusions, or recommendations; and
- A determination as to whether plume conditions have changed since the last reporting event.

Data will be reported in hard copy or digital format as determined by NYSDEC. A summary of the monitoring program deliverables are summarized in Table 7 below.

Table 7: Monitoring/Inspection Deliverables

Task	Frequency*	Quarterly Reporting Requirement	Bi-annual Reporting Requirement	Annual Reporting Requirement
SSDS Inspection	Bi-annual		Inspection checklist	Summary of Inspection checklists for year
Sub-Slab Pressure/Vacuum Monitoring	At system start up/re-start			Table of Manometer Readings
LPH Monitoring	Monthly	Summary of monitoring results for quarter		Summary of monitoring results for year
Groundwater Sampling	Quarterly	Analytical Results Sample log		Summary of Analytical Results Sample logs for year

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC and NYSDOH

A summary of all monitoring data collected during the year will be reported to NYSDEC on an annual basis in the Site Management Report (SMP). The SMP will be submitted to NYSDEC on a calendar year basis and must be submitted by March 1 of the following year. Further information on the reporting requirements are outlined in the Reporting Plan of the SMP.

3.6 CERTIFICATIONS

Site inspections and sampling activities will take place as outlined above. Frequency of inspection is subject to change by NYSDEC. Inspection certification for all ICs and ECs will be submitted to NYSDEC on a calendar year basis and must be submitted by March 1 of the following year. A qualified environmental professional, as determined by NYSDEC, will perform inspection and certification. Further information on the certification requirements are outlined in the Reporting Plan of the SMP.

4.0 OPERATION AND MAINTENANCE PLAN

4.1 INTRODUCTION

The Operation and Maintenance Plan describes the measures necessary to operate and maintain any mechanical components of the remedy selected for the Site. This Operation and Maintenance Plan:

- Includes the steps necessary to allow individuals unfamiliar with the Site to operate and maintain the SSD systems;
- Includes the steps necessary to allow individuals unfamiliar with the Site to perform the LPH recovery;
- Includes the steps necessary to allow individuals unfamiliar with the Site to perform the chemical oxidant applications;
- Includes an operation and maintenance contingency plan; and,
- Will be updated periodically to reflect changes in Site conditions or the manner in which the SSD systems are operated and maintained, or the manner in which the LPH recovery and/or chemical oxidant applications are performed.

Information on non-mechanical Engineering Controls can be found in Section 3 - Engineering and Institutional Control Plan. A copy of this Operation and Maintenance Plan, along with the complete SMP, will be kept at the Site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of the SMP. The Operation and Management Plan is subject to NYSDEC revision.

4.2 ENGINEERING CONTROL SYSTEM OPERATION AND MAINTENANCE

4.2.1 SSD System Scope

The SSD systems at the site will operate 24/7 with no maintenance requirements. Periodic bi-annual inspections will be performed to assure that the system is continuing to operate properly. Each fan will be fitted with a pressure switch which will activate a visual and audible alarm if the fan stops operating.

4.2.2 SSD System Start-Up and Testing

The start-up test procedure will first consist of a visual inspection to make sure all of the system components are installed properly. Following this, each system will be started individually and checked for leaks and adequate pressure at the discharge stack. Power to each blower will then be cut in sequence to verify that each warning alarm is functioning properly. Negative pressure readings will be taken at each soil vapor implant (SG1-SG4) with a digital manometer. The system testing described above will be conducted if, in the course of the SSD system lifetime, significant changes are made to the system, and the system restarted.

4.2.3 SSD System Operation: Non-Routine Equipment Maintenance

The SSD systems are maintenance free. The fans should only stop operating in the event of a power outage or a severe blockage. The visual / audible alarm is triggered when negative pressure is not maintained in the vertical vent system piping. In the event that one of the system alarms trips, the owner, owner's representative or Environmental Business Consultants should be contacted for repairs.

4.2.4 LPH Recovery Scope

LPH removal will continue on a monthly basis, as necessary, using vacuum enhanced fluid recovery (VEFR) events. VEFR events will be performed on a monthly basis on all monitoring wells which contain 0.5 inches (0.04 feet) or more of LPH. Each event will last from 4 to 6 hours.

4.2.5 LPH Recovery Procedure

LPH recovery will be performed using a vacuum tanker truck equipped with a 1 inch diameter pvc "stinger" downpipe. The downpipe will be connected to the 2 inch well casing using a 2 inch by 1 inch "fernco" reducer. The stinger will initially be set no more than 2 feet below the water table. If fluid recovery ceases altogether, the downpipe will be re-set deeper in the well, as needed, to continue recovery.

Depth to water (DTW) and depth to product (DTP) readings will be recorded in a log book both before and after the VEFR event.

VEFR events will continue as needed to remove any remaining LPH. Hand bailing may be used to supplement VEFR recovery between recovery events. LPH recovered through hand bailing will be initially placed in a 5 gallon plastic bucket which will be emptied into a DOT-approved 55 gallon drum stored on-Site. The contents of the drum will be removed using the vacuum tanker truck during the regularly scheduled VEFR event.

4.2.6 Chemical Oxidant Treatment Scope

This program consists of the injection of a chemical oxidant solution within the occupied (retail) and unoccupied (garage area) and area as needed to address affected groundwater as identified during the Remedial Investigation. Chemical oxidant injection is intended to significantly reduce the VOCs in the high concentration areas, and thereby accelerate the improvements in groundwater quality.

4.2.7 Chemical Oxidant Treatment Procedure

The oxidant injections will consist of a solution of sodium persulfate and chelated iron activator. Both components will be delivered to the site as a dry powder and mixed then with water on-site to create a 10 to 30 percent solution. The activator will initially be added at a ratio of 9 lbs of FeEDTA powder to each 55 lb bag of sodium persulfate. The injections will consist of approximately 100 gallons of solution per injection point.

The volume of solution and the number and location of injections will be based on the results of performance sampling and modified to concentrate on remaining areas with VOC concentrations above cleanup goals. The ratio of FeEDTA to sodium persulfate will be modified in response to the results of the performance sampling. If laboratory analysis shows persulfate concentrations above 250 mg/L and Fe^{2+} concentrations below 100 mg/L, the FeEDTA will be increased to 15 pounds per 55 pounds of sodium persulfate.

Chemical oxidant treatment will continue as needed to achieve further significant reduction of VOCs in groundwater at the site. The decision to perform subsequent oxidant applications will be based on performance sampling results and will be made in concurrence with the NYSDEC project manager.

Volume and density application rates have been based on the manufacturer's recommendations and the conditions of the site. All drawings, diagrams, calculation and manufacturer's documentation for the chemical oxidation treatment program are presented in the FER.

4.3 GROUNDWATER MONITORING WELL MAINTENANCE

If biofouling or silt accumulation has occurred in the on-Site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced (as per the Monitoring Plan), if an event renders the wells unusable. Monitoring well caps and covers will be replaced as needed.

4.4 MAINTENANCE REPORTING REQUIREMENTS

Maintenance reports and any other information generated during regular operations at the Site will be kept on-file on-Site. All reports, forms, and other relevant information generated will be available upon request to the NYSDEC and submitted as part of the bi-annual Site Management Report, as specified in the Section 5 of this SMP.

4.4.1 Routine Maintenance Reports

Checklists or forms (see **Appendix G**) will be completed during each routine maintenance event. Checklists/forms will include, but not be limited to the following information:

- Date;
- Name, company, and position of person(s) conducting maintenance activities;
- Maintenance activities conducted;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

4.4.2 Non-Routine Maintenance Reports

During each non-routine maintenance event, a form will be completed which will include, but not be limited to, the following information:

- Date;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Presence of leaks;
- Date of leak repair;
- Other repairs or adjustments made to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and,
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

4.5 CONTINGENCY PLAN

Emergencies may include injury to personnel, fire or explosion, environmental release, or serious weather conditions.

The SSD systems are maintenance free. The fans should only stop operating in the event of a power outage, a severe blockage in the vent lines or total failure of the fan. In the event that one of the system alarms trips, the owner, owner's representative or Environmental Business Consultants should be contacted for repairs. In the event that the fan has failed a new fan will be immediately ordered from the manufacturer. The fans are in-stock items and delivery is expected in less than 1 week.

4.5.1 Emergency Telephone Numbers

In the event of any environmentally related situation or unplanned occurrence requiring assistance the Owner or Owner’s representative(s) should contact the appropriate party from the contact list below. For emergencies, appropriate emergency response personnel should be contacted. Prompt contact should also be made to Environmental Business Consultants. These emergency contact lists must be maintained in an easily accessible location at the Site.

Table 8 - Emergency Contact Numbers

Medical, Fire, and Police:	911
One Call Center:	(800) 272-4480 (3 day notice required for utility markout)
Poison Control Center:	(800) 222-1222
Pollution Toxic Chemical Oil Spills:	(800) 424-8802
NYSDEC Spills Hotline	1-800-457-7362

Table 9 - Site Contact Numbers

Owner	516-277-9300
Environmental Business Consultants	631-504-6000
NYSDEC Project Manager	718-482-4897
NYSDOH Project Manager	518-402-7860

* Note: Contact numbers subject to change and should be updated as necessary

4.5.2 Map and Directions to Nearest Health Facility

Site Location: 3035 White Plains Road, Bronx, NY

Nearest Hospital Name: Beth Abraham Hospital

Hospital Location: 612 Allerton Ave Bronx, New York

Hospital Telephone: (718) 519-0152

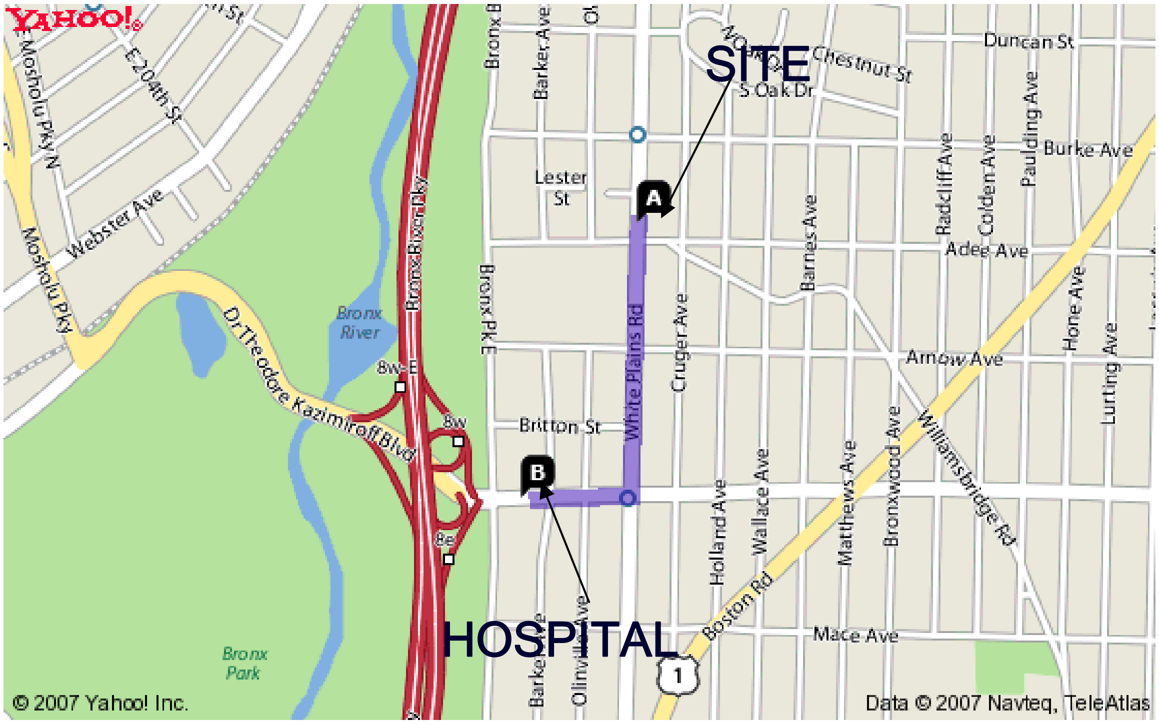
Directions to the Hospital:

1. Start at **3035 WHITE PLAINS RD** going south toward **ADEE AVE** go **0.3** mi
2. Turn **RIGHT** (west) on **ALLERTON AVE** go **0.1** mi

Total Distance: 0.4 miles

Total Estimated Time: 1 minute

Map Showing Route from the Site to the Hospital:



4.5.3 Response Procedures

4.5.3.1 Emergency Contacts/Notification System

As appropriate, the fire department and other emergency response group will be notified immediately by telephone of the emergency. The emergency telephone number list is found at the beginning of this Contingency Plan (Table 9). The list is also posted prominently at the Site and made readily available to all personnel at all times.

5.0 SITE MANAGEMENT REPORTING PLAN

5.1 INTRODUCTION

An annual Site Management Report will be submitted to NYSDEC following the calendar year reporting period, by March 1 of the following calendar year. The Site Management Report will be prepared in accordance with NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation requirements. This Site Management Reporting Plan and its requirements are subject to revision by NYSDEC.

This report will include the following:

- Identification of all required EC/ICs required by the Remedial Action Work Plan for the Site;
- An evaluation of the Engineering and Institutional Control Plan and the Monitoring Plan for adequacy in meeting remedial goals;
- Assessment of the continued effectiveness of all Institutional and Engineering Controls for the Site;
- Certification of the EC/ICs;
- Results of the required periodic Site Inspections; and
- All deliverables generated during the reporting period, as specified in Section 2 EC/IC Plan, Section 3 Monitoring Plan and Section 4 Operation and Maintenance Plan.

The Site Management Reporting Plan is subject to NYSDEC revision.

5.2 CERTIFICATION OF ENGINEERING AND INSTITUTIONAL CONTROLS

Information of EC/ICs can be found in the Engineering and Institutional Control Plan portion of the SMP. Inspection of the EC/ICs will occur at a frequency described in Section 3 Monitoring Plan and Section 4 Operation and Maintenance Plan. After the last inspection of the reporting period, a qualified environmental professional; Professional Engineer licensed to practice in New York Statewill sign and certify the document. The document will certify that:

- On-Site ECs/ICs are unchanged from the previous certification;
- They remain in-place and effective;
- The systems are performing as designed;

- Nothing has occurred that would impair the ability of the controls to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any operation and maintenance plan for such controls;
- Access is available to the Site by NYSDEC and NYSDOH to evaluate continued maintenance of such controls; and
- Site usage is compliant with the environmental easement.

The signed certification will be included in the Annual Site Management Report (see Section 5.3).

5.3 SITE INSPECTIONS

5.3.1 Inspection Frequency

All inspections will be conducted at the frequency specified in the schedules provided in Section 3 Monitoring Plan and Section 4 Operation and Maintenance Plan of this SMP. At a minimum, a Site-wide inspection will be conducted:

- Annually or more frequently;
- When a breakdown of the treatment systems has occurred; and
- Whenever a severe condition has taken place, such as an erosion or flooding event that may affect the ECs.

5.3.2 Inspection Forms, Sampling Data, and Maintenance Reports

All inspections and monitoring events will be recorded on the appropriate forms for their respective system (refer to Appendices G SSD System). Additionally, a general Site-wide inspection form will be completed during the Site-wide inspection (see **Appendix G**). These forms are subject to NYSDEC revision.

All applicable inspection forms and other records (including all sampling data of any media at the Site and system maintenance reports) generated for the Site during the calendar year will be included in the Annual Site Management Report.

5.3.3 Evaluation of Records and Reporting

The results of the inspection and Site monitoring data will be evaluated as part of the EC/IC certification to confirm that the:

- EC/ICs are in place, are performing properly, and remain effective;
- The Monitoring Plan is being implemented;
- Operation and maintenance activities are being conducted properly; and, based on the above items,
- The Site remedy continues to be protective of public health and the environment and is performing as designed in the RAWP and FER.

5.4 SITE MANAGEMENT REPORT

The Site Management Report will be submitted annually and will be submitted by March 1 of the calendar year following the reporting period. Other activities such as groundwater and SSDS inspection reports will be submitted quarterly (groundwater) and bi-annually (SSDS inspections) for the first year, and as determined by NYSDEC thereafter, with those results also incorporated into the Annual Site Management Report. The report will include:

- EC/IC certification;
- All applicable inspection forms and other records generated for the Site during the reporting period;
- A summary of any discharge monitoring data and/or information generated during the reporting period with comments and conclusions;
- Cumulative data summary tables and/or graphical representations of contaminants of concern by media [groundwater, soil vapor], which include a listing of all compounds analyzed along with the applicable standards, with all exceedances highlighted;
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables required for all points sampled during the calendar year (also to be submitted electronically in the NYSDEC-specified format);
- A performance summary for all treatment systems at the Site during the calendar year, including information such as:

  - The number of days the system was run for the reporting period;
  - The average, high, and low flows per day;
  - The contaminant mass removed;
  - A description of breakdowns and/or repairs along with an explanation for any significant downtime;
  - A summary of the performance and/or effectiveness monitoring;
  - Comments, conclusions, and recommendations based on data evaluation; and
  - Description of the resolution of performance problems.
- A Site evaluation, which will address the following:
  - The compliance of the remedy with the requirements of the Site-specific RAWP and FER;
  - The performance and effectiveness of the remedy;
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
  - Any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored; and
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan.
- A figure showing sampling and well locations, and significant analytical values at sampling locations; and
- Comments, conclusions, and recommendations, based on an evaluation of the information included in the report, regarding EC/ICs at the Site.

The Site Management Report will be submitted, in hard-copy format, to the Region 2 NYSDEC offices, located at 41-40 21st Street, Long Island City, New York, and in electronic format to NYSDEC and NYSDOH.

TABLES

TABLE 1A
RI Summary of Soil Results
3035 White Plains Road, Bronx, NY
Volatile Organic Compounds

COMPOUND	Track 1 Unrestricted Cleanup Objectives	SB1 (0-4FT)	SB1 (4-8FT)	SB1 (8-12FT)	SB2 (0-4FT)	SB2 (4-8FT)	SB3 (0-4FT)	SB4 (0-4FT)	SB4 (4-8FT)	SB4 (8-10FT)	SB5 (0-4FT)	SB5 (4-8FT)	SB5 (8-10FT)	SB6 (0-2FT)	SB7 (0-4FT)
Sample Results in µg/kg	*ug/kg*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*
1,1,1-Trichloroethane	680	2.7 U	2.3 U	2.3 U	2.4 U	2.4 U	2.3 U	2.3 U	2.4 U	2.2 U	2.3 U	2.1 U	2.3 U	2.4 U	2.3 U
1,1,2,2-Tetrachloroethane		2.0 U	1.7 U	1.7 U	1.8 U	1.8 U	1.7 U	1.7 U	1.8 U	1.7 U	1.7 U	1.6 U	1.7 U	1.7 U	1.7 U
1,1,2-Trichloroethane		1.9 U	1.6 U	1.6 U	1.7 U	1.7 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U	1.5 U	1.6 U	1.7 U	1.6 U
1,1,2-Trichlorotrifluoroethane		4.3 U	3.7 U	3.7 U	3.8 U	3.7 U	3.7 U	3.7 U	3.8 U	3.5 U	3.7 U	3.4 U	3.6 U	3.7 U	3.7 U
1,1-Dichloroethane	270	1.7 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.6 U	1.4 U	1.5 U	1.4 U	1.5 U	1.5 U	1.5 U
1,1-Dichloroethene	330	3.7 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U	3.2 U	3.3 U	3.1 U	3.2 U	2.9 U	3.1 U	3.2 U	3.2 U
1,2,4-Trichlorobenzene		4.4 U	3.8 U	3.8 U	3.9 U	3.8 U	3.8 U	3.8 U	3.9 U	3.6 U	3.8 U	3.5 U	3.7 U	3.8 U	3.8 U
1,2-Dibromo-3-Chloropropane		6.1 U	5.2 U	5.2 U	5.4 U	5.3 U	5.2 U	5.2 U	5.4 U	5.0 U	5.2 U	4.8 U	5.1 U	5.3 U	5.3 U
1,2-Dibromoethane		2.6 U	2.2 U	2.2 U	2.3 U	2.3 U	2.2 U	2.2 U	2.3 U	2.1 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
1,2-Dichlorobenzene	1,100	2.5 U	2.2 U	2.1 U	2.2 U	2.2 U	2.1 U	2.1 U	2.2 U	2.1 U	2.1 U	2.0 U	2.1 U	2.2 U	2.2 U
1,2-Dichloroethane	20	2.0 U	1.7 U	1.7 U	1.8 U	1.7 U	1.7 U	1.7 U	1.8 U	1.6 U	1.7 U	1.6 U	1.7 U	1.7 U	1.7 U
1,2-Dichloropropane		2.6 U	2.2 U	2.2 U	2.3 U	2.2 U	2.2 U	2.2 U	2.3 U	2.1 U	2.2 U	2.0 U	2.2 U	2.2 U	2.2 U
1,3-Dichlorobenzene	2,400	3.6 U	3.1 U	3.1 U	3.2 U	3.1 U	3.1 U	3.1 U	3.2 U	3.0 U	3.1 U	2.9 U	3.0 U	3.1 U	3.1 U
1,4-Dichlorobenzene	1,800	3.5 U	3.0 U	3.0 U	3.1 U	3.1 U	3.0 U	3.0 U	3.1 U	2.9 U	3.0 U	2.8 U	3.0 U	3.1 U	3.0 U
2-Butanone		18 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	15 U	16 U	14 U	15 U	16 U	33 J
2-Hexanone		23 U	20 U	20 U	21 U	20 U	20 U	20 U	21 U	19 U	20 U	18 U	20 U	20 U	20 U
4-Methyl-2-Pentanone		13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 U	11 U	11 U
Acetone	50	22 U	19 U	19 U	19 U	19 U	**140**	19 U	19 U	**130 J**	19 U	17 U	18 U	19 U	**210**
Benzene	60	2.6 U	2.2 U	2.2 U	2.3 U	2.2 U	2.2 U	2.2 U	2.3 U	2.1 U	2.2 U	2.0 U	2.2 U	**290**	2.2 U
Bromodichloromethane		2.2 U	1.9 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.7 U	1.8 U	1.9 U	1.9 U
Bromoform		2.0 U	1.7 U	1.7 U	1.8 U	1.7 U	1.7 U	1.7 U	1.8 U	1.7 U	1.7 U	1.6 U	1.7 U	1.7 U	1.7 U
Bromomethane		13 U	11 U	11 U	12 U	11 U	11 U	11 U	12 U	11 U	11 U	10 U	11 U	11 U	11 U
Carbon Disulfide		2.4 U	2.0 U	2.0 U	2.1 U	2.1 U	2.0 U	2.0 U	2.1 U	2.0 U	2.0 U	1.9 U	2.0 U	2.1 U	2.1 U
Carbon Tetrachloride	760	2.9 U	2.5 U	2.4 U	2.5 U	2.5 U	2.4 U	2.4 U	2.6 U	2.4 U	2.4 U	2.3 U	2.4 U	2.5 U	2.5 U
Chlorobenzene	1,100	2.3 U	2.0 U	2.0 U	2.1 U	2.0 U	2.0 U	2.0 U	2.1 U	1.9 U	2.0 U	1.8 U	2.0 U	2.0 U	2.0 U
Chloroethane		14 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	11 U	12 U	11 U	12 U	12 U	12 U
Chloroform	370	2.3 U	1.9 U	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U	2.0 U	1.9 U	1.9 U	1.8 U	1.9 U	2.0 U	1.9 U
Chloromethane		5.5 U	4.8 U	4.7 U	4.9 U	4.8 U	4.7 U	4.7 U	4.9 U	4.5 U	4.7 U	4.4 U	4.6 U	4.8 U	4.8 U
cis-1,2-Dichloroethene	250	2.1 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
cis-1,3-Dichloropropene		2.1 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.7 U	1.8 U	1.9 U	1.8 U
Cyclohexane		2.1 U	1.8 U	1.8 U	1.9 U	1.8 U	100	1.8 U	1.9 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
Dibromochloromethane		1.5 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.2 U	1.3 U	1.2 U	1.3 U	1.3 U	1.3 U
Dichlorodifluoromethane		5.5 U	4.8 U	4.7 U	4.9 U	4.8 U	4.7 U	4.7 U	4.9 U	4.6 U	4.7 U	4.4 U	4.7 U	4.8 U	4.8 U
Ethyl Benzene	1,000	2.3 U	2.0 U	1.9 U	2.0 U	2.0 U	70	2.0 U	2.0 U	36	2.0 U	1.8 U	1.9 U	**58000 D**	11 J
Isopropylbenzene		2.7 U	2.3 U	2.3 U	2.4 U	2.3 U	2.3 U	2.3 U	2.4 U	150	2.3 U	2.1 U	2.3 U	11000 JD	2.3 U
m/p-Xylenes	260	5.6 U	4.8 U	4.8 U	4.9 U	4.9 U	**7900 D**	4.8 U	5.0 U	4.6 U	4.8 U	4.4 U	4.7 U	**480000 D**	62
Methyl Acetate		5.6 U	4.8 U	4.8 U	4.9 U	4.9 U	60	4.8 U	5.0 U	4.6 U	4.8 U	4.4 U	4.7 U	4.9 U	4.8 U
Methyl tert-butyl Ether	930	2.4 U	2.0 U	2.0 U	2.1 U	2.1 U	2.0 U	2.0 U	2.1 U	2.0 U	2.0 U	1.9 U	2.0 U	2.1 U	2.1 U
Methylcyclohexane		2.7 U	2.3 U	2.3 U	2.4 U	2.4 U	100	2.3 U	2.4 U	2.2 U	2.3 U	2.1 U	2.3 U	**11000 JD**	2.3 U
Methylene Chloride	50	36	10 U	25 J	10 U	28 J	29	10 U	11 U	9.7 U	10 U	16 J	26 J	10 U	10 U
o-Xylene	260	2.5 U	2.1 U	2.1 U	2.2 U	2.2 U	**5000 D**	2.1 U	2.2 U	2.0 U	2.1 U	2.0 U	2.1 U	**230000 D**	24 J
Styrene		3.0 U	2.6 U	2.5 U	2.6 U	2.6 U	2.5 U	2.5 U	2.7 U	2.5 U	2.5 U	2.4 U	2.5 U	2.6 U	2.6 U
t-1,3-Dichloropropene		2.3 U	2.0 U	2.0 U	2.1 U	2.0 U	2.0 U	2.0 U	2.1 U	1.9 U	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U
Tetrachloroethene	1,300	4.7 U	4.1 U	4.0 U	4.2 U	4.1 U	4.0 U	4.0 U	4.2 U	3.9 U	4.0 U	3.7 U	4.0 U	4.1 U	4.1 U
Toluene	700	2.6 U	2.3 U	2.2 U	2.3 U	2.3 U	34	2.2 U	2.3 U	2.2 U	2.2 U	2.1 U	2.2 U	**75000 D**	36
trans-1,2-Dichloroethene	190	4.1 U	3.6 U	3.5 U	3.6 U	3.6 U	3.5 U	3.5 U	3.7 U	3.4 U	3.5 U	3.3 U	3.5 U	3.6 U	3.6 U
Trichloroethene	470	2.0 U	1.7 U	1.7 U	1.8 U	1.7 U	1.7 U	1.7 U	1.8 U	1.6 U	1.7 U	1.6 U	1.7 U	1.7 U	1.7 U
Trichlorofluoromethane		8.1 U	6.9 U	6.9 U	7.1 U	7.0 U	6.9 U	6.9 U	7.2 U	6.6 U	6.9 U	6.4 U	6.8 U	7.0 U	7.0 U
Vinyl Chloride	20	5.3 U	4.6 U	4.5 U	4.7 U	4.6 U	4.5 U	4.5 U	4.7 U	4.4 U	4.5 U	4.2 U	4.5 U	4.6 U	4.6 U
Total Confident Conc. VOC		36	0	25	0	28	13,433	0	0	316	0	16	26	865,290	376

Qualifiers

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero.
The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%.

D - A sample dilution was reuired to obtain the value.

NR - Not analyzed

Bold/highlighted- Indicated exceedance of the NYSDEC Track 1 Objective

TABLE 1A Continued
RI Summary of Soil Results
3035 White Plains Road, Bronx, NY
Volatile Organic Compounds

COMPOUND	Track 1 Unrestricted Cleanup Objectives	SB8 (0-2FT)	SB9 (0-2FT)	SB10 (0-2FT)	SB11 (0-4FT)	SB12 (0-2FT)	SB13 (0-4FT)	SB14 (0-2FT)	SB15 (0-3FT)	SB16 (0-3FT)	SB17 (0-4FT)	SB17 (4-6FT)	SB18 (0-4FT)	SB18 (4-6FT)
Sample Results in µg/kg	*ug/kg*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*
1,1,1-Trichloroethane	680	2.2 U	2.3 U	2.4 U	2.2 U	2.2 U	2.3 U	2.2 U	2.4 U	2.5 U	2.2 U	2.2 U	2.4 U	2.2 U
1,1,2,2-Tetrachloroethane		1.7 U	1.7 U	1.8 U	1.6 U	1.7 U	1.7 U	1.6 U	1.8 U	1.8 U	1.7 U	1.6 U	1.8 U	1.6 U
1,1,2-Trichloroethane		1.6 U	1.6 U	1.7 U	1.5 U	1.6 U	1.6 U	1.5 U	1.7 U	1.7 U	1.6 U	1.5 U	1.7 U	1.5 U
1,1,2-Trichlorotrifluoroethane		3.6 U	3.6 U	3.9 U	3.5 U	3.6 U	3.7 U	3.5 U	3.9 U	3.9 U	3.6 U	3.5 U	3.8 U	3.4 U
1,1-Dichloroethane	270	1.4 U	1.5 U	1.6 U	1.4 U	1.4 U	1.5 U	1.4 U	1.6 U	1.6 U	1.4 U	1.4 U	1.5 U	1.4 U
1,1-Dichloroethene	330	3.1 U	3.1 U	3.3 U	3.0 U	3.1 U	3.2 U	3.0 U	3.3 U	3.4 U	3.1 U	3.0 U	3.3 U	3.0 U
1,2,4-Trichlorobenzene		3.7 U	3.7 U	4.0 U	3.6 U	3.7 U	3.8 U	3.6 U	4.0 U	4.0 U	3.7 U	3.6 U	3.9 U	3.5 U
1,2-Dibromo-3-Chloropropane		5.1 U	5.1 U	5.5 U	4.9 U	5.1 U	5.2 U	4.9 U	5.5 U	5.5 U	5.1 U	5.0 U	5.3 U	4.9 U
1,2-Dibromoethane		2.2 U	2.2 U	2.3 U	2.1 U	2.2 U	2.2 U	2.1 U	2.3 U	2.4 U	2.2 U	2.1 U	2.3 U	2.1 U
1,2-Dichlorobenzene	1,100	2.1 U	2.1 U	2.2 U	2.0 U	2.1 U	2.1 U	2.0 U	2.2 U	2.3 U	2.1 U	2.0 U	2.2 U	2.0 U
1,2-Dichloroethane	20	1.7 U	1.7 U	1.8 U	1.6 U	1.7 U	1.7 U	1.6 U	1.8 U	1.8 U	1.7 U	1.6 U	1.7 U	1.6 U
1,2-Dichloropropane		2.1 U	2.1 U	2.3 U	2.1 U	2.1 U	2.2 U	2.1 U	2.3 U	2.3 U	2.1 U	2.1 U	2.3 U	2.0 U
1,3-Dichlorobenzene	2,400	3.0 U	3.0 U	3.2 U	2.9 U	3.0 U	3.1 U	2.9 U	3.2 U	3.3 U	3.0 U	2.9 U	3.2 U	2.9 U
1,4-Dichlorobenzene	1,800	2.9 U	2.9 U	3.2 U	2.8 U	2.9 U	3.0 U	2.8 U	3.2 U	3.2 U	2.9 U	2.9 U	3.1 U	2.8 U
2-Butanone		15 U	86 J	16 U	15 U	15 U	16 U	15 U	16 U	17 U	15 U	15 U	16 U	15 U
2-Hexanone		19 U	19 U	21 U	19 U	19 U	20 U	19 U	21 U	21 U	19 U	19 U	20 U	19 U
4-Methyl-2-Pentanone		11 U	11 U	11 U	10 U	11 U	11 U	10 U	11 U	12 U	11 U	10 U	11 U	10 U
Acetone	50	18 U	**290**	20 U	18 U	18 U	19 U	18 U	**94 J**	20 U	18 U	18 U	19 U	17 U
Benzene	60	2.1 U	2.2 U	2.3 U	2.1 U	2.1 U	2.2 U	2.1 U	2.3 U	2.3 U	2.1 U	2.1 U	2.3 U	2.1 U
Bromodichloromethane		1.8 U	1.8 U	2.0 U	1.7 U	1.8 U	1.9 U	1.7 U	1.9 U	2.0 U	1.8 U	1.8 U	1.9 U	1.7 U
Bromoform		1.7 U	1.7 U	1.8 U	1.6 U	1.7 U	1.7 U	1.6 U	1.8 U	1.8 U	1.7 U	1.6 U	1.8 U	1.6 U
Bromomethane		11 U	11 U	12 U	11 U	11 U	11 U	11 U	12 U	12 U	11 U	11 U	12 U	10 U
Carbon Disulfide		2.0 U	2.0 U	2.1 U	1.9 U	2.0 U	2.0 U	1.9 U	2.1 U	2.2 U	2.0 U	1.9 U	2.1 U	1.9 U
Carbon Tetrachloride	760	2.4 U	2.4 U	2.6 U	2.3 U	2.4 U	2.5 U	2.3 U	2.6 U	2.6 U	2.4 U	2.3 U	2.5 U	2.3 U
Chlorobenzene	1,100	1.9 U	2.0 U	2.1 U	1.9 U	1.9 U	2.0 U	1.9 U	2.1 U	2.1 U	1.9 U	1.9 U	2.1 U	1.9 U
Chloroethane		11 U	12 U	12 U	11 U	11 U	12 U	11 U	12 U	13 U	11 U	11 U	12 U	11 U
Chloroform	370	1.9 U	1.9 U	2.0 U	1.8 U	1.9 U	1.9 U	1.8 U	2.0 U	2.0 U	1.9 U	1.8 U	2.0 U	1.8 U
Chloromethane		4.6 U	4.6 U	5.0 U	4.5 U	4.6 U	4.7 U	4.5 U	5.0 U	5.0 U	4.6 U	4.5 U	4.8 U	4.4 U
cis-1,2-Dichloroethene	250	1.7 U	1.8 U	1.9 U	1.7 U	1.7 U	1.8 U	1.7 U	1.9 U	1.9 U	1.7 U	1.7 U	1.8 U	1.7 U
cis-1,3-Dichloropropene		1.8 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	1.7 U	1.9 U	1.9 U	1.8 U	1.7 U	1.9 U	1.7 U
Cyclohexane		1.7 U	23 J	1.9 U	1.7 U	1.7 U	1.8 U	1.7 U	1.9 U	1.9 U	1.7 U	1.7 U	1.8 U	1.7 U
Dibromochloromethane		1.2 U	1.2 U	1.3 U	1.2 U	1.2 U	1.3 U	1.2 U	1.3 U	1.4 U	1.2 U	1.2 U	1.3 U	1.2 U
Dichlorodifluoromethane		4.6 U	4.6 U	5.0 U	4.5 U	4.6 U	4.8 U	4.5 U	5.0 U	5.0 U	4.6 U	4.5 U	4.9 U	4.4 U
Ethyl Benzene	1,000	1.9 U	**1300 D**	2.1 U	1.8 U	1.9 U	2.0 U	1.8 U	2.1 U	2.1 U	1.9 U	1.9 U	2.0 U	1.8 U
Isopropylbenzene		2.2 U	460 JD	2.4 U	2.2 U	2.2 U	2.3 U	2.2 U	15 J	2.4 U	2.2 U	2.2 U	2.4 U	2.1 U
m/p-Xylenes	260	4.7 U	**760 JD**	5.0 U	4.5 U	4.7 U	4.8 U	4.5 U	16 J	5.1 U	4.7 U	4.6 U	4.9 U	4.5 U
Methyl Acetate		4.7 U	4.7 U	5.0 U	4.5 U	4.7 U	4.8 U	4.5 U	5.0 U	5.1 U	4.7 U	4.6 U	4.9 U	4.5 U
Methyl tert-butyl Ether	930	2.0 U	2.0 U	2.1 U	1.9 U	2.0 U	2.0 U	1.9 U	2.1 U	2.2 U	2.0 U	1.9 U	2.1 U	1.9 U
Methylcyclohexane		2.3 U	83	2.4 U	2.2 U	2.3 U	2.3 U	2.2 U	2.4 U	2.5 U	2.3 U	2.2 U	2.4 U	2.2 U
Methylene Chloride	50	9.8 U	9.8 U	11 U	23 J	17 J	10 U	9.5 U	11 U	11 U	9.8 U	9.6 U	10 U	9.4 U
o-Xylene	260	2.1 U	36	2.2 U	2.0 U	2.1 U	2.1 U	2.0 U	2.2 U	2.3 U	2.1 U	2.0 U	2.2 U	2.0 U
Styrene		2.5 U	2.5 U	2.7 U	2.4 U	2.5 U	2.6 U	2.4 U	2.7 U	2.7 U	2.5 U	2.4 U	2.6 U	2.4 U
t-1,3-Dichloropropene		2.0 U	2.0 U	2.1 U	1.9 U	2.0 U	2.0 U	1.9 U	2.1 U	2.1 U	2.0 U	1.9 U	2.1 U	1.9 U
Tetrachloroethene	1,300	3.9 U	3.9 U	4.3 U	3.8 U	3.9 U	4.1 U	3.8 U	4.2 U	4.3 U	3.9 U	3.8 U	4.1 U	3.8 U
Toluene	700	2.2 U	41	2.4 U	2.1 U	2.2 U	2.2 U	2.1 U	2.4 U	2.4 U	2.2 U	2.1 U	2.3 U	2.1 U
trans-1,2-Dichloroethene	190	3.4 U	3.4 U	3.7 U	3.3 U	3.4 U	3.6 U	3.3 U	3.7 U	3.8 U	3.4 U	3.4 U	3.6 U	3.3 U
Trichloroethene	470	1.7 U	1.7 U	1.8 U	1.6 U	1.7 U	1.7 U	1.6 U	1.8 U	1.8 U	1.7 U	1.6 U	1.7 U	1.6 U
Trichlorofluoromethane		6.7 U	6.7 U	7.3 U	6.5 U	6.7 U	6.9 U	6.5 U	7.2 U	7.3 U	6.7 U	6.6 U	7.1 U	6.4 U
Vinyl Chloride	20	4.4 U	4.4 U	4.8 U	4.3 U	4.4 U	4.6 U	4.3 U	4.8 U	4.8 U	4.4 U	4.3 U	4.7 U	4.2 U
Total Confident Conc. VOC		0	2,970	0	23	17	0	0	125	0	0	0	0	0

Qualifiers

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero.
The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%.

D - A sample dilution was reuired to obtain the value.

NR - Not analyzed

Bold/highlighted- Indicated exceedance of the NYSDEC Track 1 Objective

TABLE 1B
RI Summary of Soil Results
3035 White Plains Road, Bronx, NY
Semi-Volatile Organic Compounds

COMPOUND	Track 1 Unrestricted Cleanup Objectives	SB1 (0-4FT)	SB1 (4-8FT)	SB1 (8-12FT)	SB2 (0-4FT)	SB2 (4-8FT)	SB3 (0-4FT)	SB4 (0-4FT)	SB4 (4-8FT)	SB4 (8-10FT)	SB5 (0-4FT)	SB5 (4-8FT)	SB5 (8-10FT)	SB6 (0-2FT)	SB7 (0-4FT)
Sample Results in µg/kg	*ug/kg*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*
1,1-Biphenyl		73 U	62 U	310 U	64 U	63 U	60 U	310 U	64 U	87 J	62 U	57 U	300 U	960 J	65 J
2,2-oxybis(1-Chloropropane)		71 U	60 U	300 U	62 U	61 U	59 U	300 U	63 U	58 U	60 U	56 U	290 U	600 U	61 U
2,4-Dinitrotoluene		65 U	55 U	270 U	57 U	56 U	54 U	280 U	57 U	53 U	55 U	51 U	270 U	550 U	56 U
2,6-Dinitrotoluene		62 U	53 U	260 U	55 U	54 U	52 U	270 U	55 U	51 U	53 U	49 U	260 U	530 U	54 U
2-Chloronaphthalene		73 U	62 U	310 U	64 U	63 U	61 U	310 U	64 U	60 U	62 U	58 U	300 U	620 U	63 U
2-Methylnaphthalene		74 U	63 U	310 U	65 U	63 U	260 J	310 U	65 U	60 U	63 U	58 U	300 U	69000 D	250 J
2-Nitroaniline		56 U	48 U	240 U	49 U	48 U	47 U	240 U	49 U	46 U	48 U	44 U	230 U	470 U	48 U
3,3-Dichlorobenzidine		75 U	64 U	320 U	66 U	65 U	63 U	320 U	66 U	61 U	64 U	59 U	310 U	640 U	65 U
3-Nitroaniline		57 U	49 U	240 U	50 U	49 U	48 U	240 U	51 U	47 U	49 U	45 U	240 U	490 U	49 U
4-Bromophenyl-phenylether		66 U	56 U	280 U	58 U	57 U	55 U	280 U	58 U	54 U	56 U	52 U	270 U	560 U	57 U
4-Chloroaniline		52 U	45 U	220 U	46 U	45 U	44 U	220 U	46 U	43 U	45 U	41 U	220 U	440 U	45 U
4-Chlorophenyl-phenylether		70 U	59 U	290 U	61 U	60 U	58 U	300 U	61 U	57 U	59 U	55 U	290 U	590 U	60 U
4-Nitroaniline		75 U	64 U	320 U	66 U	65 U	63 U	320 U	66 U	61 U	64 U	59 U	310 U	640 U	65 U
Acenaphthene	20,000	78 U	67 U	330 U	69 U	68 U	65 U	330 U	69 U	64 U	67 U	62 U	320 U	660 U	190 J
Acenaphthylene	100,000	210 J	61 U	300 U	63 U	62 U	59 U	300 U	63 U	58 U	61 U	56 U	290 U	610 U	99 J
Acetophenone	100,000	64 U	55 U	270 U	57 U	56 U	54 U	270 U	57 U	52 U	55 U	51 U	260 U	550 U	55 U
Anthracene		330 J	56 U	280 U	58 U	57 U	55 U	280 U	59 U	54 U	56 U	52 U	270 U	560 U	400
Atrazine		67 U	57 U	280 U	59 U	58 U	56 U	290 U	60 U	55 U	57 U	53 U	280 U	570 U	58 U
Benzaldehyde		90 U	77 U	380 U	80 U	78 U	75 U	380 U	80 U	74 U	77 U	71 U	370 U	770 U	78 U
Benzo(a)anthracene	1,000	**1100**	52 U	260 U	82 J	53 U	51 U	260 U	54 U	50 U	120 J	49 U	250 U	520 U	730
Benzo(a)pyrene	1,000	**1100**	60 U	300 U	92 J	61 U	59 U	300 U	62 U	57 U	140 J	56 U	290 U	600 U	900
Benzo(b)fluoranthene	1,000	**1400**	41 U	200 U	120 J	42 U	40 U	210 U	49 J	39 U	180 J	38 U	200 U	410 U	**1100**
Benzo(g,h,i)perylene	100,000	700	62 U	310 U	64 U	63 U	61 U	310 U	64 U	59 U	110 J	57 U	300 U	620 U	680
Benzo(k)fluoranthene	800	540	82 U	410 U	85 U	84 U	81 U	410 U	85 U	79 U	82 U	76 U	400 U	820 U	340 J
bis(2-Chloroethoxy)methane		72 U	62 U	310 U	64 U	62 U	60 U	310 U	64 U	59 U	62 U	57 U	300 U	610 U	62 U
bis(2-Chloroethyl)ether		70 U	59 U	290 U	61 U	60 U	58 U	300 U	61 U	57 U	59 U	55 U	290 U	590 U	60 U
bis(2-Ethylhexyl)phthalate		84 U	72 U	360 U	74 U	73 U	70 U	360 U	75 U	71 J	72 U	67 U	350 U	720 U	73 U
Butylbenzylphthalate		71 U	61 U	300 U	63 U	61 U	59 U	300 U	63 U	58 U	61 U	56 U	290 U	600 U	61 U
Caprolactam		71 U	60 U	300 U	62 U	61 U	59 U	300 U	62 U	58 U	60 U	56 U	290 U	600 U	61 U
Carbazole		110 J	57 U	280 U	59 U	58 U	56 U	290 U	59 U	55 U	57 U	53 U	280 U	570 U	320 J
Chrysene	1,000	**1100**	67 U	330 U	100 J	68 U	66 U	340 U	70 U	64 U	130 J	62 U	320 U	670 U	750
Dibenz(a,h)anthracene	330	66 J	47 U	230 U	49 U	48 U	46 U	240 U	49 U	45 U	47 U	44 U	230 U	470 U	56 J
Dibenzofuran		73 U	62 U	310 U	64 U	63 U	61 U	310 U	64 U	59 U	62 U	57 U	300 U	620 U	370 J
Diethylphthalate		76 U	65 U	320 U	67 U	66 U	63 U	320 U	67 U	62 U	65 U	60 U	310 U	640 U	65 U
Dimethylphthalate		71 U	60 U	300 U	62 U	61 U	59 U	300 U	62 U	58 U	60 U	56 U	290 U	600 U	61 U
Di-n-butylphthalate		67 U	57 U	280 U	59 U	58 U	56 U	290 U	59 U	55 U	57 U	53 U	280 U	570 U	58 U
Di-n-octyl phthalate		75 U	64 U	320 U	66 U	65 U	62 U	320 U	66 U	61 U	64 U	59 U	310 U	630 U	64 U
Fluoranthene	100,000	2500	56 U	280 U	200 J	63 J	54 U	280 U	58 U	53 U	200 J	52 U	270 U	550 U	1700
Fluorene	30,000	120 J	63 U	310 U	65 U	64 U	62 U	320 U	66 U	75 J	63 U	59 U	310 U	630 U	610
Hexachlorobenzene		70 U	60 U	300 U	62 U	61 U	59 U	300 U	62 U	57 U	60 U	56 U	290 U	600 U	61 U
Hexachlorobutadiene		68 U	58 U	290 U	60 U	58 U	56 U	290 U	60 U	55 U	58 U	53 U	280 U	570 U	58 U
Hexachlorocyclopentadiene		70 U	60 U	300 U	62 U	61 U	58 U	300 U	62 U	57 U	60 U	55 U	290 U	600 U	60 U
Hexachloroethane		75 U	64 U	320 U	66 U	64 U	62 U	320 U	66 U	61 U	64 U	59 U	310 U	630 U	64 U
Indeno(1,2,3-cd)pyrene	500	**700**	48 U	240 U	50 J	48 U	47 U	240 U	49 U	46 U	100 J	44 U	230 U	470 U	670
Isophorone		66 U	56 U	280 U	58 U	57 U	55 U	280 U	58 U	54 U	56 U	52 U	270 U	560 U	57 U
Naphthalene	12,000	75 U	64 U	320 U	66 U	65 U	140 J	320 U	66 U	70 J	64 U	59 U	310 U	**59000** D	220 J
Nitrobenzene		96 U	82 U	400 U	85 U	83 U	80 U	410 U	85 U	78 U	82 U	76 U	390 U	810 U	83 U
N-Nitroso-di-n-propylamine		73 U	62 U	310 U	64 U	63 U	61 U	310 U	64 U	59 U	62 U	58 U	300 U	620 U	63 U
N-Nitrosodiphenylamine		73 U	62 U	310 U	64 U	63 U	60 U	310 U	64 U	59 U	62 U	57 U	300 U	610 U	62 U
Phenanthrene	100,000	1200	60 U	300 U	94 J	60 U	58 U	300 U	62 U	95 J	63 J	55 U	290 U	690 J	1700
Pyrene	100,000	2000	66 U	330 U	170 J	67 U	65 U	330 U	69 U	63 U	210 J	61 U	320 U	660 U	1400

Qualifiers

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero.
The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%.

D - A sample dilution was reuired to obtain the value.

NR - Not analyzed

Bold/highlighted- Indicated exceedance of the NYSDEC Track 1 Objective

TABLE 1B Continued
RI Summaruy of Soil Results
3035 White Plains Road, Bronx, NY
Semi-Volatile Organic Compounds

COMPOUND	**Track 1 Unrestricted Cleanup Objectives**	**SB8 (0-2FT)**	**SB9 (0-2FT)**	**SB10 (0-2FT)**	**SB11 (0-4FT)**	**SB12 (0-2FT)**	**SB13 (0-4FT)**	**SB14 (0-2FT)**	**SB15 (0-3FT)**	**SB16 (0-3FT)**	**SB17 (0-4FT)**	**SB17 (4-6FT)**	**SB18 (0-4FT)**	**SB18 (4-6FT)**
Sample Results in µg/kg	*ug/kg*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*
1,1-Biphenyl		58 U	60 U	64 U	58 U	59 U	60 U	58 U	250 J	63 U	58 U	59 U	61 U	57 U
2,2-oxybis(1-Chloropropane)		57 U	59 U	62 U	57 U	57 U	59 U	57 U	61 U	62 U	57 U	57 U	60 U	56 U
2,4-Dinitrotoluene		52 U	54 U	57 U	52 U	52 U	54 U	52 U	56 U	56 U	52 U	52 U	55 U	51 U
2,6-Dinitrotoluene		50 U	52 U	55 U	50 U	50 U	52 U	50 U	54 U	54 U	50 U	50 U	53 U	49 U
2-Chloronaphthalene		59 U	61 U	64 U	59 U	59 U	61 U	59 U	63 U	64 U	59 U	59 U	62 U	57 U
2-Methylnaphthalene		59 U	930	65 U	59 U	60 U	61 U	59 U	1000	64 U	59 U	59 U	62 U	58 U
2-Nitroaniline		45 U	47 U	49 U	45 U	45 U	46 U	45 U	48 U	49 U	45 U	45 U	47 U	44 U
3,3-Dichlorobenzidine		61 U	63 U	66 U	60 U	61 U	63 U	61 U	65 U	66 U	60 U	61 U	64 U	59 U
3-Nitroaniline		46 U	48 U	50 U	46 U	46 U	48 U	46 U	50 U	50 U	46 U	46 U	48 U	45 U
4-Bromophenyl-phenylether		53 U	55 U	58 U	53 U	53 U	55 U	53 U	57 U	57 U	53 U	53 U	55 U	52 U
4-Chloroaniline		42 U	44 U	46 U	42 U	43 U	44 U	42 U	45 U	46 U	42 U	42 U	44 U	41 U
4-Chlorophenyl-phenylether		56 U	58 U	61 U	56 U	56 U	58 U	56 U	60 U	61 U	56 U	56 U	59 U	55 U
4-Nitroaniline		61 U	63 U	66 U	60 U	61 U	62 U	60 U	65 U	66 U	60 U	61 U	63 U	59 U
Acenaphthene	20,000	63 U	65 U	69 U	63 U	64 U	65 U	63 U	260 J	160 J	63 U	63 U	66 U	62 U
Acenaphthylene	100,000	58 U	140 J	160 J	57 U	94 J	59 U	57 U	91 J	84 J	57 U	58 U	60 U	56 U
Acetophenone	100,000	52 U	54 U	57 U	52 U	52 U	53 U	52 U	56 U	56 U	52 U	52 U	54 U	51 U
Anthracene		54 U	130 J	240 J	75 J	120 J	55 U	53 U	550	440	53 U	54 U	56 U	52 U
Atrazine		54 U	56 U	59 U	54 U	55 U	56 U	54 U	58 U	59 U	54 U	54 U	57 U	53 U
Benzaldehyde		73 U	75 U	79 U	73 U	73 U	75 U	73 U	78 U	79 U	73 U	73 U	76 U	71 U
Benzo(a)anthracene	1,000	150 J	510	870	240 J	450	130 J	50 U	**1200**	**1900**	49 U	50 U	52 U	48 U
Benzo(a)pyrene	1,000	140 J	610	950	250 J	500	140 J	57 U	**1200**	**1800**	57 U	57 U	59 U	55 U
Benzo(b)fluoranthene	1,000	180 J	860	**1200**	340 J	660	160 J	39 U	**2200**	**2100 D**	39 U	39 U	41 U	38 U
Benzo(g,h,i)perylene	100,000	100 J	460	600	170 J	410	98 J	59 U	360 J	640	58 U	59 U	61 U	57 U
Benzo(k)fluoranthene	800	80 J	250 J	430	140 J	250 J	80 U	78 U	650	**860**	78 U	78 U	82 U	76 U
bis(2-Chloroethoxy)methane		58 U	60 U	64 U	58 U	59 U	60 U	58 U	63 U	63 U	58 U	58 U	61 U	57 U
bis(2-Chloroethyl)ether		56 U	58 U	61 U	56 U	56 U	58 U	56 U	60 U	61 U	56 U	56 U	59 U	55 U
bis(2-Ethylhexyl)phthalate		68 U	200 J	74 U	68 U	68 U	210 J	68 U	160 J	74 U	68 U	68 U	71 U	66 U
Butylbenzylphthalate		57 U	59 U	63 U	57 U	58 U	59 U	57 U	62 U	62 U	57 U	57 U	60 U	56 U
Caprolactam		57 U	59 U	62 U	57 U	57 U	59 U	57 U	61 U	62 U	57 U	57 U	60 U	56 U
Carbazole		54 U	56 U	86 J	54 U	54 U	56 U	54 U	150 J	170 J	54 U	54 U	57 U	53 U
Chrysene	1,000	150 J	570	910	290 J	490	130 J	64 U	**1400**	**2100**	63 U	64 U	67 U	62 U
Dibenz(a,h)anthracene	330	45 U	46 U	56 J	44 U	45 U	46 U	44 U	51 J	67 J	44 U	45 U	47 U	43 U
Dibenzofuran		59 U	61 U	64 U	58 U	59 U	60 U	59 U	110 J	110 J	58 U	59 U	61 U	57 U
Diethylphthalate		61 U	63 U	67 U	61 U	62 U	63 U	61 U	66 U	66 U	61 U	61 U	64 U	60 U
Dimethylphthalate		57 U	59 U	62 U	57 U	57 U	59 U	57 U	61 U	62 U	57 U	57 U	60 U	56 U
Di-n-butylphthalate		54 U	56 U	59 U	54 U	54 U	56 U	54 U	58 U	59 U	54 U	54 U	57 U	53 U
Di-n-octyl phthalate		60 U	62 U	66 U	60 U	61 U	62 U	60 U	65 U	65 U	60 U	60 U	63 U	59 U
Fluoranthene	100,000	310 J	1100	2000	720	930	190 J	53 U	2300	4000 D	53 U	53 U	55 U	51 U
Fluorene	30,000	60 U	62 U	65 U	60 U	60 U	62 U	60 U	350 J	210 J	60 U	60 U	63 U	58 U
Hexachlorobenzene		57 U	59 U	62 U	57 U	57 U	58 U	57 U	61 U	61 U	57 U	57 U	59 U	55 U
Hexachlorobutadiene		55 U	56 U	59 U	54 U	55 U	56 U	54 U	59 U	59 U	54 U	55 U	57 U	53 U
Hexachlorocyclopentadiene		57 U	59 U	62 U	56 U	57 U	58 U	56 U	61 U	61 U	56 U	57 U	59 U	55 U
Hexachloroethane		60 U	62 U	66 U	60 U	61 U	62 U	60 U	65 U	65 U	60 U	60 U	63 U	59 U
Indeno(1,2,3-cd)pyrene	500	85 J	470	610	160 J	380	98 J	45 U	180 J	**620**	45 U	45 U	47 U	44 U
Isophorone		53 U	55 U	58 U	53 U	54 U	55 U	53 U	57 U	58 U	53 U	53 U	56 U	52 U
Naphthalene	12,000	61 U	1600	66 U	60 U	61 U	62 U	60 U	320 J	66 U	60 U	61 U	63 U	59 U
Nitrobenzene		77 U	80 U	84 U	77 U	78 U	80 U	77 U	83 U	84 U	77 U	78 U	81 U	75 U
N-Nitroso-di-n-propylamine		59 U	61 U	64 U	59 U	59 U	61 U	59 U	63 U	64 U	59 U	59 U	62 U	57 U
N-Nitrosodiphenylamine		58 U	60 U	64 U	58 U	59 U	60 U	58 U	63 U	63 U	58 U	59 U	61 U	57 U
Phenanthrene	100,000	150 J	420	830	450	300 J	65 J	56 U	1900	2400 D	56 U	57 U	59 U	55 U
Pyrene	100,000	290 J	960	1600	600	810	200 J	63 U	2600 D	3600 D	63 U	63 U	66 U	61 U

Qualifiers

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero.
The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%.

D - A sample dilution was reuired to obtain the value.

NR - Not analyzed

Bold/highlighted- Indicated exceedance of the NYSDEC Track 1 Objective

TABLE 1C
RI Summary of Soil Results
3035 White Plains Road, Bronx, NY
Pesticides and PCBs

COMPOUND	Track 1 Unrestricted Cleanup Objectives	SB1 (0-4FT)	SB1 (4-8FT)	SB1 (8-12FT)	SB2 (0-4FT)	SB2 (4-8FT)	SB3 (0-4FT)	SB4 (0-4FT)	SB4 (4-8FT)	SB4 (8-10FT)	SB5 (0-4FT)	SB5 (4-8FT)	SB5 (8-10FT)	SB6 (0-2FT)	SB7 (0-4FT)
Sample Results in µg/kg	*ug/kg*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*
4,4-DDD	3.3	0.93 U	0.79 U	0.78 U	0.82 U	0.81 U	0.78 U	0.79 U	0.82 U	0.76 U	**240 D**	0.74 U	0.77 U	2.6 P	**11 P**
4,4-DDE	3.3	2.8	0.89 U	0.88 U	0.92 U	0.90 U	0.87 U	0.89 U	0.92 U	0.85 U	2.0	0.83 U	0.86 U	0.89 U	0.90 U
4,4-DDT	3.3	3.4	0.81 U	0.80 U	2.4 P	0.83 U	0.80 U	0.81 U	0.84 U	**5.1**	0.81 U	0.76 U	2.4 P	0.82 U	0.82 U
Aldrin	5.0	1.6 U	1.4 U	2.6	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.3 U	1.4 U	1.3 U	1.3 U	1.4 U	1.4 U
alpha-BHC	20	0.85 U	0.72 U	0.71 U	0.75 U	0.73 U	0.71 U	0.72 U	0.75 U	0.69 U	0.72 U	0.67 U	0.70 U	0.72 U	0.73 U
alpha-Chlordane	94	1.1 U	0.94 U	0.93 U	0.98 U	0.96 U	0.93 U	0.94 U	0.98 U	0.90 U	0.94 U	0.88 U	0.92 U	0.95 U	0.95 U
beta-BHC	36	1.2 U	0.99 U	0.98 U	1.0 U	1.0 U	0.97 U	0.99 U	1.0 U	0.95 U	0.98 U	0.92 U	0.96 U	0.99 U	1.0 U
delta-BHC	40	2.2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U	1.9 U
Dieldrin	5	1.1 U	0.93 U	0.92 U	0.97 U	0.95 U	0.91 U	0.93 U	0.97 U	0.89 U	0.93 U	0.87 U	0.91 U	0.93 U	0.94 U
Endosulfan I	2,400	1.2 U	0.99 U	0.98 U	1.0 U	1.0 U	0.97 U	0.99 U	1.0 U	0.95 U	0.99 U	0.93 U	0.97 U	1.0 U	1.0 U
Endosulfan II	2,400	1.3 U	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U	0.99 U	1.0 U	1.1 U	1.1 U
Endosulfan Sulfate	2,400	1.4 U	1.2 U	1.2 U	1.3 U	1.2 U	1.2 U	1.2 U	1.3 U	1.2 U	1.2 U	1.1 U	1.2 U	1.2 U	1.2 U
Endrin	14	1.1 U	0.96 U	0.95 U	1.0 U	0.98 U	0.94 U	0.96 U	1.0 U	0.92 U	0.96 U	0.90 U	0.93 U	0.96 U	0.97 U
Endrin aldehyde		1.3 U	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Endrin ketone		1.1 U	0.93 U	0.92 U	0.96 U	0.95 U	0.91 U	0.93 U	0.96 U	0.89 U	0.93 U	0.87 U	0.90 U	0.93 U	0.94 U
gamma-BHC		2.1 J	0.81 U	0.80 U	0.84 U	0.83 U	0.80 U	0.81 U	0.84 U	0.78 U	0.81 U	0.76 U	0.79 U	0.81 U	0.82 U
gamma-Chlordane		1.2 U	0.98 U	0.97 U	1.0 U	1.0 U	0.97 U	0.99 U	1.0 U	0.94 U	0.98 U	0.92 U	0.96 U	0.99 U	1.0 U
Heptachlor	42	1.2 U	1.0 U	1.0 U	1.1 U	1.1 U	1.0 U	1.0 U	1.1 U	1.0 U	1.0 U	0.98 U	1.0 U	1.1 U	1.1 U
Heptachlor epoxide		1.4 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.1 U	1.2 U	1.1 U	1.2 U	1.2 U	1.2 U
Methoxychlor		1.1 U	0.97 U	0.96 U	1.0 U	0.99 U	0.95 U	0.97 U	1.0 U	0.93 U	0.97 U	0.91 U	0.94 U	0.97 U	0.98 U
Toxaphene		4.7 U	4.0 U	4.0 U	4.2 U	4.1 U	4.0 U	4.0 U	4.2 U	3.9 U	4.0 U	3.8 U	3.9 U	4.1 U	4.1 U
Aroclor-1016	100	3.4 U	2.9 U	2.8 U	3.0 U	2.9 U	2.8 U	2.9 U	3.0 U	2.7 U	2.9 U	2.6 U	2.8 U	2.9 U	2.9 U
Aroclor-1221	100	5.2 U	4.5 U	4.4 U	4.6 U	4.5 U	4.3 U	4.5 U	4.6 U	4.3 U	4.5 U	4.1 U	4.3 U	4.5 U	4.5 U
Aroclor-1232	100	7.8 U	6.7 U	6.6 U	6.9 U	6.7 U	6.5 U	6.7 U	6.9 U	6.4 U	6.7 U	6.1 U	6.4 U	6.7 U	6.7 U
Aroclor-1242	100	6.9 U	5.9 U	5.9 U	6.1 U	6.0 U	5.8 U	5.9 U	6.1 U	5.7 U	5.9 U	5.5 U	5.7 U	5.9 U	6.0 U
Aroclor-1248	100	3.4 U	2.9 U	2.8 U	3.0 U	2.9 U	2.8 U	2.9 U	3.0 U	2.7 U	2.9 U	2.7 U	2.8 U	2.9 U	2.9 U
Aroclor-1254	100	2.2 U	1.9 U	1.9 U	1.9 U	1.9 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.9 U	1.9 U
Aroclor-1260	100	5.6 U	4.8 U	4.7 U	4.9 U	4.8 U	4.6 U	4.8 U	4.9 U	4.5 U	4.8 U	4.4 U	4.6 U	4.8 U	4.8 U

Qualifiers

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%.

D - A sample dilution was reuired to obtain the value.

NR - Not analyzed

Bold/highlighted- Indicated exceedance of the NYSDEC Track 1 Objective

TABLE 1C Continued
RI Summary of Soil Results
3035 White Plains Road, Bronx, NY
Pesticides and PCBs

COMPOUND	Track 1 Unrestricted Cleanup Objectives	SB8 (0-2FT)	SB9 (0-2FT)	SB10 (0-2FT)	SB11 (0-4FT)	SB12 (0-2FT)	SB13 (0-4FT)	SB14 (0-2FT)	SB15 (0-3FT)	SB16 (0-3FT)	SB17 (0-4FT)	SB17 (4-6FT)	SB18 (0-4FT)	SB18 (4-6FT)
Sample Results in µg/kg	*ug/kg*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*
4,4-DDD	3.3	0.75 U	**5.8**	0.82 U	0.75 U	**15**	**6.0**	0.68 U	0.74 U	0.74 U	0.69 U	0.68 U	0.71 U	0.67 U
4,4-DDE	3.3	0.84 U	0.87 U	0.92 U	0.84 U	0.85 U	**5.0**	0.94 U	1.0 U	1.0 U	0.94 U	0.94 U	0.98 U	0.92 U
4,4-DDT	3.3	0.77 U	0.80 U	0.84 U	0.77 U	1.8 J	**10**	1.7 U	1.9 U	1.9 U	1.7 U	1.7 U	1.8 U	1.7 U
Aldrin	5.0	1.3 U	1.4 U	1.4 U	1.3 U	1.3 U	1.4 U	0.77 U	0.83 U	0.83 U	0.77 U	0.77 U	0.80 U	0.75 U
alpha-BHC	20	0.69 U	0.71 U	0.75 U	0.68 U	0.69 U	0.71 U	1.0 U	1.1 U	1.1 U	1.0 U	0.99 U	1.0 U	0.97 U
alpha-Chlordane	94	0.90 U	0.93 U	0.98 U	0.89 U	0.91 U	0.92 U	1.3 U	1.4 U	1.4 U	1.3 U	1.3 U	1.4 U	1.3 U
beta-BHC	36	0.94 U	0.97 U	1.0 U	0.93 U	0.95 U	0.97 U	1.1 U	1.2 U	1.2 U	1.1 U	1.1 U	1.2 U	1.1 U
delta-BHC	40	1.7 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	0.94 U	1.0 U	1.0 U	0.94 U	0.94 U	0.98 U	0.92 U
Dieldrin	5	0.89 U	0.91 U	0.96 U	0.88 U	0.89 U	0.91 U	0.88 U	0.95 U	0.95 U	0.89 U	0.88 U	0.92 U	0.86 U
Endosulfan I	2,400	0.94 U	0.97 U	1.0 U	0.94 U	0.95 U	0.97 U	0.84 U	0.91 U	0.91 U	0.84 U	0.84 U	0.88 U	0.82 U
Endosulfan II	2,400	1.0 U	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	0.91 U	0.98 U	0.98 U	0.91 U	0.91 U	0.95 U	0.89 U
Endosulfan Sulfate	2,400	1.2 U	1.2 U	1.3 U	1.1 U	1.2 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.0 U	1.1 U	0.99 U
Endrin	14	0.91 U	0.94 U	1.0 U	0.91 U	0.92 U	0.94 U	0.75 U	**31**	0.81 U	0.75 U	0.75 U	0.78 U	0.73 U
Endrin aldehyde		1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.1 U
Endrin ketone		0.88 U	0.91 U	0.96 U	0.88 U	0.89 U	0.91 U	0.77 U	0.83 U	11	17	0.77 U	0.80 U	0.75 U
gamma-BHC		0.77 U	0.79 U	0.84 U	0.76 U	0.78 U	0.79 U	0.92 U	0.99 U	1.0 U	0.92 U	0.92 U	0.96 U	0.90 U
gamma-Chlordane		0.94 U	0.96 U	1.0 U	0.93 U	0.95 U	0.96 U	0.88 U	0.95 U	0.95 U	0.88 U	0.88 U	0.92 U	0.86 U
Heptachlor	42	1.0 U	1.0 U	1.1 U	0.99 U	1.0 U	1.0 U	1.1 U	1.2 U	1.2 U	1.1 U	1.1 U	1.1 U	1.1 U
Heptachlor epoxide		1.1 U	1.2 U	1.2 U	1.1 U	1.2 U	1.2 U	0.90 U	0.96 U	0.97 U	0.90 U	0.90 U	0.93 U	0.88 U
Methoxychlor		0.92 U	0.95 U	1.0 U	0.91 U	0.93 U	0.95 U	0.93 U	1.0 U	1.0 U	0.94 U	0.93 U	0.97 U	0.91 U
Toxaphene		3.8 U	4.0 U	4.2 U	3.8 U	3.9 U	4.0 U	3.8 U	4.1 U	4.1 U	3.8 U	3.8 U	4.0 U	3.7 U
Aroclor-1016	100	2.7 U	2.8 U	3.0 U	2.7 U	2.7 U	2.8 U	2.7 U	2.9 U	2.9 U	2.7 U	2.7 U	2.8 U	2.7 U
Aroclor-1221	100	4.2 U	4.4 U	4.6 U	4.2 U	4.3 U	4.4 U	4.2 U	4.5 U	4.6 U	4.2 U	4.2 U	4.4 U	4.1 U
Aroclor-1232	100	6.3 U	6.5 U	6.9 U	6.3 U	6.4 U	6.5 U	6.3 U	6.8 U	6.8 U	6.3 U	6.3 U	6.6 U	6.2 U
Aroclor-1242	100	5.6 U	5.8 U	6.1 U	5.6 U	5.7 U	5.8 U	5.6 U	6.0 U	6.1 U	5.6 U	5.6 U	5.8 U	5.5 U
Aroclor-1248	100	2.7 U	2.8 U	3.0 U	2.7 U	2.8 U	2.8 U	2.7 U	2.9 U	2.9 U	2.7 U	2.7 U	2.8 U	2.7 U
Aroclor-1254	100	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.9 U	1.7 U
Aroclor-1260	100	4.5 U	4.7 U	4.9 U	4.5 U	4.6 U	4.7 U	4.5 U	4.9 U	4.9 U	4.5 U	4.5 U	4.7 U	4.4 U

Qualifiers

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero.
The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%.

D - A sample dilution was reuired to obtain the value.

NR - Not analyzed

Bold/highlighted- Indicated exceedance of the NYSDEC Track 1 Objective

TABLE 1D
RI Summary of Soil Results
3035 White Plains Road, Bronx, NY
Metals

COMPOUND	Track 1 Unrestricted Cleanup Objectives	SB1 (0-4FT)	SB1 (4-8FT)	SB1 (8-12FT)	SB2 (0-4FT)	SB2 (4-8FT)	SB3 (0-4FT)	SB4 (0-4FT)	SB4 (4-8FT)	SB4 (8-10FT)	SB5 (0-4FT)	SB5 (4-8FT)	SB5 (8-10FT)	SB6 (0-2FT)	SB7 (0-4FT)
Sample Results in µg/kg	*ug/kg*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*
Aluminum		17100	9740	11100	13700	11100	7330	8290	10300	8250	11300	5550	5340	6880	12200
Antimony		0.301 U	0.258 U	0.255 U	0.267 U	0.258 U	0.253 U	0.258 U	0.266 U	0.247 U	0.254 U	0.236 U	0.250 U	0.256 U	0.260 U
Arsenic	13	9.850	0.423 J	3.820	2.500	1.590	1.120	2.780	1.790	0.146 U	1.870	0.139 U	0.147 U	3.130	3.770
Barium	350	235	44.7	103	121	66.7	107	109	116	59.4	120	32.8	45.4	240	307
Beryllium	7	0.806	0.346	0.501	0.683	0.376	0.410	0.340	0.376	0.555	0.363	0.196 J	0.185 J	0.339	0.477
Cadmium	2.5 c	**3.100**	1.140	1.550	1.470	0.968	1.520	1.510	1.520	1.650	1.060	0.392 J	0.685 J	1.890	1.990
Calcium		2630	576	5320	1400	832	2090	10200	9100	2980	1060	566	3930	4040	4540
Chromium	30 c	29.5	22.3	**34.5**	19.6	19.2	19.6	19.9	26.2	15.4	18.4	9.900	16.3	18.9	**38.6**
Cobalt		11.6	6.230	6.810	5.760	4.660	6.810	6.860	6.220	9.240	6.970	5.160	4.910	8.240	8.240
Copper	50	**85.9**	19.4	32.4	21.2	14.2	**73.2**	31.1	24.8	29.9	29.4	21.5	20.7	**62.8**	40.2
Iron		23900	15300	15200	14100	12900	10900	14300	16700	20100	13300	6800	8450	17200	19100
Lead	63 c	**346**	10.6	**98.9**	59.8	18.7	**92.2**	**115**	**89.9**	6.480	37.2	1.760	19.7	**335**	**364**
Magnesium		3580	2740	2590	2220	2140	2360	3160	3260	3280	2510	1840	2160	2410	2750
Manganese	1600 c	551	161	329	531	173	154	270	262	440	177	124	115	235	187
Mercury	0.18 c	**0.393**	0.017	0.056	0.078	0.030	0.081	0.106	0.099	0.006 J	0.097	0.009 J	0.018	0.180	0.156
Nickel	30	22.8	13.5	14.5	12.3	9.410	13.9	13.9	12.9	17.2	12.2	11.9	12.4	16.6	18.1
Potassium		1740	1190	1130	695	731	1390	1480	1480	2560	985	958	1170	1780	1290
Selenium	3.9c	0.347 J	0.137 U	0.135 U	0.142 U	0.137 U	0.195 J	0.136 U	0.141 U	0.131 U	0.134 U	0.125 U	0.132 U	0.136 U	0.138 U
Silver	2	0.239 J	0.137 U	0.135 U	0.142 U	0.137 U	0.134 U	0.136 U	0.141 U	0.131 U	0.134 U	0.125 U	0.132 U	0.136 U	0.138 U
Sodium		234	73.8 J	133	150	76.8	124	145	110	92.4	63.1 J	79.1	122	193	324
Thallium		1.670 U	1.430 U	1.420 U	1.490 U	1.430 U	1.400 U	1.430 U	1.480 U	1.380 U	1.410 U	1.310 U	1.390 U	1.430 U	1.450 U
Vanadium		50.2	27.3	31.2	30.4	26.9	20.5	24.5	30.2	25.0	27.7	14.2	15.5	35.0	35.5
Zinc	109 c	**478**	47.8	**148**	**146**	51.6	**180**	**159**	96.3	43.0	59.3	19.7	55.2	**258**	**231**
Hexavalent Chromium		0.530 U	0.455 U	0.450 U	0.472 U	0.458 U	0.446 U	0.455 U	0.469 U	0.437 U	0.454 U	0.419 U	0.442 U	0.452 U	0.459 U

U - The compound was not detected at the indicated concentration.
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero.
The concentration given is an approximate value.
B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%.
D - A sample dilution was reuired to obtain the value.
NR - Not analyzed
Bold/highlighted- Indicated exceedance of the NYSDEC Track 1 Objective

TABLE 1D Continued
RI Summary of Soil Results
3035 White Plains Road, Bronx, NY
Metals

COMPOUND	Track 1 Unrestricted Cleanup Objectives	SB8 (0-2FT)	SB9 (0-2FT)	SB10 (0-2FT)	SB11 (0-4FT)	SB12 (0-2FT)	SB13 (0-4FT)	SB14 (0-2FT)	SB15 (0-3FT)	SB16 (0-3FT)	SB17 (0-4FT)	SB17 (4-6FT)	SB18 (0-4FT)	SB18 (4-6FT)
Sample Results in µg/kg	*ug/kg*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*
Aluminum		13800	12600	11100	7280	11400	9440	6660	9510	11500	6140	8800	10200	13700
Antimony		0.243 U	0.251 U	0.265 U	0.244 U	0.246 U	0.251 U	0.245 U	0.261 U	0.262 U	0.244 U	0.245 U	0.254 U	0.238 U
Arsenic	13	1.530	3.810	2.130	0.884	2.920	2.130	0.700 J	4.410	1.990	0.410 J	0.144 U	1.210	0.256 J
Barium	350	114	361	247	87.4	173	130	63.1	147	90.5	67.5	76.8	51.6	88.5
Beryllium	7	0.498	0.395	0.433	0.285	0.380	0.348	0.284	0.364	0.453	0.196 J	0.325	0.491	0.310
Cadmium	2.5 c	1.980	2.650	1.680	0.908	2.100	1.340	1.060	**2.670**	1.340	0.772	1.270	1.230	1.510
Calcium		3060	3830	2770	1160	2300	2750	1200	14300	979	993	7890	1210	1180
Chromium	30 c	24.2	25.0	**40.8**	16.1	22.0	18.6	28.2	21.5	20.3	28.0	15.9	19.9	**47.2**
Cobalt		18.2	14.0	9.260	6.610	12.7	7.860	11.5	9.060	7.820	5.940	8.260	9.200	10.1
Copper	50	19.0	48.3	31.5	25.1	**61.5**	33.9	32.2	**103**	21.0	26.4	23.5	27.8	39.6
Iron		21400	26100	17800	11000	20900	14100	12900	21200	15500	10200	13500	16200	17700
Lead	63 c	**98.7**	**166**	**238**	96.0	188	**144**	52.4	**676**	51.8	**139**	26.0	8.780	3.440
Magnesium		5840	5000	2850	2460	4220	2760	3600	10200	2550	2340	7810	2760	6330
Manganese	1600 c	399	317	235	229	254	194	238	256	298	171	205	207	417
Mercury	0.18 c	0.048	**0.182**	0.063	0.091	**0.224**	**0.194**	0.041	**0.202**	0.077	0.028	0.036	0.023	0.01 J
Nickel	30	25.9	19.6	18.4	13.7	18.5	14.0	25.7	20.9	13.9	12.7	12.6	19.5	23.5
Potassium		6560	7180	1070	1140	5370	1790	862	3070	1030	1110	3970	1000	3140
Selenium	3.9c	0.129 U	0.133 U	0.141 U	0.129 U	0.130 U	0.133 U	0.130 U	0.138 U	0.138 U	0.129 U	0.130 U	0.135 U	0.126 U
Silver	2	0.129 U	0.133 U	0.141 U	0.129 U	0.130 U	0.133 U	0.130 U	0.138 U	0.138 U	0.129 U	0.130 U	0.135 U	0.126 U
Sodium		328	139	240	97.7	123	113	107	181	95.6	77.2	107	80.9	59.1 J
Thallium		1.350 U	1.400 U	1.480 U	1.350 U	1.370 U	1.400 U	1.360 U	1.450 U	1.450 U	1.360 U	1.360 U	1.410 U	1.320 U
Vanadium		36.6	34.5	40.8	22.9	32.2	27.4	25.1	34.5	29.3	19.4	23.8	29.0	35.4
Zinc	109 c	83.1	**313**	**188**	**124**	**170**	**132**	54.1	**237**	77.2	38.7	67.2	51.4	54.3
Hexavalent Chromium		0.43 U	0.446 U	0.468 U	0.43 U	0.434 U	0.443 U	0.432 U	0.467 U	0.465 U	0.431 U	0.432 U	0.452 U	0.420 U

U - The compound was not detected at the indicated concentration.
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero.
The concentration given is an approximate value.
B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%.
D - A sample dilution was reuired to obtain the value.
NR - Not analyzed

Bold/highlighted- Indicated exceedance of the NYSDEC Track 1 Objective

TABLE 2
3035 White Plains Road, Bronx, NY
Parameters Detected Above Track 1 Soil Cleanup Objectives

COMPOUND	Track 1 Unrestricted Cleanup Objectives	Range in Exceedances	SB1 (0-4FT)	SB1 (8-12FT)	SB2 (0-4FT)	SB3 (0-4FT)	SB4 (0-4FT)	SB4 (4-8FT)	SB4 (8-10FT)	SB5 (0-4FT)	SB6 (0-2FT)	SB7 (0-4FT)
Sample Results in µg/kg	*ug/kg*											
Acetone	50	94-290				**140**			**130 J**			**210**
Benzene	60	290									**290**	
m/p-Xylenes	260	7,60-480,000				**7900 D**					**480000 D**	
Methylcyclohexane		11,000									**11000 JD**	
o-Xylene	260	5,000-230,000				**5000 D**					**230000 D**	
Toluene	700	75,000									**75000 D**	
Benzo(a)anthracene	1,000	1100-1,900	**1100**									
Benzo(a)pyrene	1,000	1100-1,800	**1100**									
Benzo(b)fluoranthene	1,000	1,100-1,400	**1400**									**1100**
Benzo(k)fluoranthene	800	1,200-2,200										
Chrysene	1,000	620-1,100	**1100**									
Indeno(1,2,3-cd)pyrene	500	620-700	**700**									
Naphthalene	12,000	59,000									**59000 D**	
4,4-DDD	3.3	5.8-240								**240 D**		**11 P**
4,4-DDE	3.3	5.0										
4,4-DDT	3.3	5.1-10							**5.1**			
Endrin	14	31										
Sample Results in mg/kg	*mg/kg*											
Cadmium	2.5 c	2.67-3.10	**3.1**									
Chromium	30 c	34.5-47.2		**34.5**								**38.6**
Copper	50	62.8-103	**85.9**			**73.2**					**62.8**	
Lead	63 c	92.2-676	**346**	**98.9**		**92.2**	**115**	**89.9**			**335**	**364**
Mercury	0.18 c	0.182-0.393	**0.393**									
Zinc	109 c	124-478	**478**	**148**	**146**	**180**	**159**				**258**	**231**

COMPOUND	Track 1 Unrestricted Cleanup Objectives	Range in Exceedances	SB8 (0-2FT)	SB9 (0-2FT)	SB10 (0-2FT)	SB11 (0-4FT)	SB12 (0-2FT)	SB13 (0-4FT)	SB15 (0-3FT)	SB16 (0-3FT)	SB17 (0-4FT)	SB18 (4-6FT)
Sample Results in µg/kg	*ug/kg*											
Acetone	50	94-290		**290**					**94 J**			
Benzene	60	290										
m/p-Xylenes	260	7,60-480,000		**760 JD**								
Methylcyclohexane		11,000										
o-Xylene	260	5,000-230,000										
Toluene	700	75,000										
Benzo(a)anthracene	1,000	1100-1,900							**1200**	**1900**		
Benzo(a)pyrene	1,000	1100-1,800							**1200**	**1800**		
Benzo(b)fluoranthene	1,000	1,100-1,400			**1200**				**2200**	**2100 D**		
Benzo(k)fluoranthene	800	1,200-2,200								**860**		
Chrysene	1,000	620-1,100							**1400**	**2100**		
Indeno(1,2,3-cd)pyrene	500	620-700								**620**		
Naphthalene	12,000	59,000										
4,4-DDD	3.3	5.8-240		**5.8**			**15**	**6.0**				
4,4-DDE	3.3	5.0						**5.0**				
4,4-DDT	3.3	5.1-10						**10**				
Endrin	14	31							**31**			
Sample Results in mg/kg	*mg/kg*											
Cadmium	2.5 c	2.67-3.10							**2.670**			
Chromium	30 c	34.5-47.2			**40.8**							**47.2**
Copper	50	62.8-103					**61.5**		**103**			
Lead	63 c	92.2-676	**98.7**	**166**	**238**			**144**	**676**		**139**	
Mercury	0.18 c	0.182-0.393		**0.182**			**0.224**	**0.194**	**0.202**			
Zinc	109 c	124-478		**313**	**188**	**124**	**170**	**132**	**237**			

TABLE 3A
RI Summary of Groundwater Results
3035 White Plains Road, Bronx, NY
Volatile Organic Compounds

COMPOUND	NYSDEC Ambient Water Quality Standards	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16
(µg/L)	*(µg/L)*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*12/7/2007*	*12/7/2007*	*12/7/2007*	*12/7/2007*
1,1,1-Trichloroethane	1	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,1,2,2-Tetrachloroethane	5	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
1,1,2-Trichloroethane	1	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
1,1,2-Trichlorotrifluoroethane	5	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
1,1-Dichloroethane	4	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
1,1-Dichloroethene	5	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
1,2,4-Trichlorobenzene	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-Chloropropane	0.4	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromoethane		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,2-Dichlorobenzene	3	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U
1,2-Dichloroethane	0.6	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
1,2-Dichloropropane	5	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
1,3-Dichlorobenzene	3	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U
1,4-Dichlorobenzene	3	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U
2-Butanone		1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	16 J	1.6 U	1.6 U	1.6 U
2-Hexanone		1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
4-Methyl-2-Pentanone		1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Acetone	5	6.8 U	6.8 U	6.8 U	6.8 U	6.8 U	6.8 U	**40**	6.8 U	**60**	6.8 U	6.8 U	6.8 U	6.8 U	6.8 U	6.8 U
Benzene	1	**47**	**15**	**83**	0.35 U	**490 D**	0.35 U	**71**	0.35 U	0.35 U	0.35 U	0.35 U	**150**	0.35 U	**12**	**160**
Bromodichloromethane	50*	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U
Bromoform	50*	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
Bromomethane	5	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Carbon Disulfide		0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	6.5	4.0 J	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
Carbon Tetrachloride	5	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
Chlorobenzene	5	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Chloroethane	5	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Chloroform	7	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
Chloromethane	5	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
cis-1,2-Dichloroethene	5	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
cis-1,3-Dichloropropene	0.4	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
Cyclohexane		42	50	57	23	110	5.0 U	58	5.0 U	5.0 U	5.0 U	5.0 U	14	5.0 U	110	5.0 U
Dibromochloromethane		0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
Dichlorodifluoromethane	5	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U
Ethyl Benzene	5	**690 D**	**590 D**	**1000 D**	**160**	**1400 D**	0.50 U	**91**	0.50 U	3.1 J	0.50 U	0.50 U	**88**	0.50 U	**200**	**5.5**
Isopropylbenzene	NS	86	48	92	38	63	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	70	5.0 U
m/p-Xylenes	5	**1700 D**	**730 D**	**3100 D**	**250**	**5600 D**	1.1 U	**350**	1.1 U	**17**	1.1 U	1.1 U	**510 D**	1.1 U	**8200 D**	**200**
Methyl Acetate		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl Cyclohexane		36	29	54	31	69	5.0 U	35	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	130	5.0 U
Methyl tert-butyl Ether	10	**120**	**90**	**430 D**	**22**	**53**	4.4 J	0.23 U	9.6	**78**	0.23 U	0.23 U	**37**	0.23 U	0.23 U	6.1
Methylene Chloride	10	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U
o-Xylene	5	**500 D**	**130**	**940 D**	**35**	**2200 D**	0.47 U	**100**	0.47 U	**5.7**	0.47 U	0.47 U	**250 D**	0.47 U	**3300 D**	**120**
Styrene	5	0.45 U	0.45 U	0.45 U	0.45 U	**160**	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
t-1,3-Dichloropropene	0.4	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
Tetrachloroethene	5	0.74 U	0.74 U	0.74 U	0.74 U	0.74 U	0.74 U	0.74 U	0.74 U	0.74 U	0.74 U	0.74 U	0.74 U	0.74 U	0.74 U	0.74 U
Toluene	5	**110**	**24**	**270 D**	**5.4**	**1900 D**	0.38 U	**120**	0.38 U	4.3 J	0.38 U	0.38 U	**840 D**	0.38 U	**1700 D**	**170**
trans-1,2-Dichloroethene	0.4	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
Trichloroethene	0.4	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U
Trichlorofluoromethane	5	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U
Vinyl Chloride	NS	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U
Total Confident Conc. VOC		3331	1706	6026	564.4	12045	4.4	865	9.6	174.6	4	0	1905	0	13722	661.6
Total TICs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Qualifiers

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.

D - A sample dilution was reuired to obtain the value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%.

* - For dual column analysis, the lowest quantitated concentration is being reported due to coeluting interference.

NR - Not analyzed

TABLE 3B
RI Summary of Groundwater Results
3035 White Plains Road, Bronx, NY
Semi-Volatile Organic Compounds

COMPOUND	NYSDEC Ambient Water Quality Standards	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-9	MW-10	MW-11	MW-12
(µg/L)	*(µg/L)*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/3/2007*	*11/4/2007*
1,1-Biphenyl		2.2 J	0.670 J	1.6 J	0.24 U	0.910 J	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
2,2-oxybis(1-Chloropropane)		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.26 U	0.25 U	0.25 U	0.25 U	0.25 U
2,4-Dinitrotoluene	5	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U
2,6-Dinitrotoluene	5	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.25 U	0.24 U	0.24 U	0.24 U	0.24 U
2-Chloronaphthalene	10	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
2-Methylnaphthalene	NS	130 D	18	110 D	0.30 U	100 D	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U
2-Nitroaniline	5	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
3,3-Dichlorobenzidine	5	0.74 U	0.74 U	0.74 U	0.74 U	0.74 U	0.74 U	0.75 U	0.74 U	0.74 U	0.74 U	0.74 U
3-Nitroaniline	5	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.20 U	0.20 U	0.20 U
4-Bromophenyl-phenylether	NS	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
4-Chloroaniline	5	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
4-Chlorophenyl-phenylether	NS	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.24 U	0.23 U	0.23 U	0.23 U	0.23 U
Acenaphthene	20	0.550 J	0.22 U	0.440 J	0.22 U	0.22 U	0.22 U	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Acenaphthylene	20	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
Acetophenone		0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.27 U	0.26 U	0.26 U	0.26 U	0.26 U
Anthracene	50*	0.360 J	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
Atrazine		0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.37 U	0.36 U	0.36 U	0.36 U	0.36 U
Benzaldehyde		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.26 U	0.25 U	0.25 U	0.25 U	0.25 U
Benzo(a)anthracene	0.002	**0.400 J**	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
Benzo(a)pyrene	ND	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Benzo(b)fluoranthene	0.002	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Benzo(g,h,i)perylene	NS	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
Benzo(k)fluoranthene	0.002	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.39 U	0.38 U	0.38 U	0.38 U	0.38 U
bis(2-Chloroethoxy)methane	NS	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
bis(2-Chloroethyl)ether	1	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
bis(2-Ethylhexyl)phthalate	5	**9.1 B**	2.0 JB	0.350 JB	0.400 JB	**7.4 B**	4.9 B	0.390 JB	0.620 JB	4.4 B	1.1 JB	2.6 B
Butylbenzylphthalate		0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	1.5 J	0.26 U	0.26 U	0.26 U	0.26 U
Caprolactam		0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.500 J	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
Carbazole		0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Chrysene	0.002	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.32 U	0.31 U	0.31 U	0.31 U	0.31 U
Dibenz(a,h)anthracene	50	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.17 U	0.16 U	0.16 U	0.16 U	0.16 U
Dibenzofuran	NS	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.24 U	0.23 U	0.23 U	0.23 U	0.23 U
Diethylphthalate	50	0.19 U	0.360 J	0.550 J	0.19 U	1.3 J	0.19 U	0.20 U	0.19 U	0.250 J	0.19 U	0.19 U
Dimethylphthalate	50	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
Di-n-butylphthalate	50	0.25 U	0.25 U	0.25 U	0.25 U	0.290 J	0.25 U	0.670 J	0.25 U	0.310 J	0.25 U	0.25 U
Di-n-octyl phthalate	50*	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Fluoranthene	50	0.590 J	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
Fluorene	50	1.1 J	0.24 U	0.640 J	0.24 U	0.450 J	0.24 U	0.25 U	0.24 U	0.24 U	0.24 U	0.24 U
Hexachlorobutadiene	0.5	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
Hexachlorocyclopentadiene	5	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachloroethane	5	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.29 U	0.28 U	0.28 U	0.28 U	0.28 U
Indeno(1,2,3-cd)pyrene	0.002	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
Isophorone	50	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.45 U	0.44 U	0.44 U	0.44 U	0.44 U
Naphthalene	10	**200 D**	**90 D**	**250 D**	0.28 U	**170 D**	0.860 J	0.29 U	0.28 U	0.28 U	0.28 U	0.28 U
Nitrobenzene	0.04	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
n-Nitrosodimethylamine		0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.47 U	0.46 U	0.46 U	0.46 U	0.46 U
N-Nitroso-di-n-propylamine	NS	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.28 U	0.27 U	0.27 U	0.27 U	0.27 U
N-Nitrosodiphenylamine	50	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
Phenanthrene	50	1.5 J	0.24 U	0.440 J	0.24 U	0.730 J	0.24 U	0.25 U	0.24 U	0.500 J	0.24 U	0.24 U
Pyrene	50	0.770 J	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U

Qualifiers

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero.
The concentration given is an approximate value.

D - A sample dilution was reuired to obtain the value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

TABLE 3C
RI Summary of Groundwater Results
3035 White Plains Road, Bronx, NY
Pesticides and PCBs

COMPOUND	NYSDEC AMBIENT WATER QUALITY STANDARDS	MW-1	MW-5	MW-6	MW-10	MW-12
Pesticides and PCBs	*(µg/L)*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*
4,4-DDD	**0.3**	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U
4,4-DDE	**0.2**	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4,4-DDT	**0.2**	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U
Aldrin	**ND**	0.002 U	0.002 U	0.002 U	0.003 U	0.004 U
alpha-BHC	**0.01**	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
alpha-Chlordane	**0.05**	0.001 U	0.001 U	0.001 U	0.0022 U	0.002 U
beta-BHC	**0.04**	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U
delta-BHC	**0.04**	0.0018 U	0.0018 U	0.0018 U	0.001 U	0.0035 U
Dieldrin	**0.004**	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U
Endosulfan I	**NS**	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U
Endosulfan II	**NS**	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U
Endosulfan Sulfate	**NS**	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U
Endrin	**ND**	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U
Endrin aldehyde	**5**	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U
Endrin ketone	**5**	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U
gamma-BHC		0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
gamma-Chlordane	**0.05**	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U
Heptachlor	**0.04**	0.001 U	0.001 U	0.001 U	0.001 U	0.003 U
Heptachlor epoxide	**0.03**	0.002 U	0.002 U	0.002 U	0.004 U	0.003 U
Methoxychlor	**35**	0.003 U	0.003 U	0.003 U	0.001 U	0.006 U
Toxaphene	**0.06**	0.007 U	0.007 U	0.007 U	0.009 U	0.014 U
Aroclor-1016	**.09***	0.015 U	0.015 U	0.015 U	0.03 U	0.03 U
Aroclor-1221	**.09***	0.014 U	0.013 U	0.013 U	0.027 U	0.027 U
Aroclor-1232	**.09***	0.014 U	0.014 U	0.014 U	0.028 U	0.028 U
Aroclor-1242	**.09***	0.0052 U	0.0051 U	0.0051 U	0.01 U	0.01 U
Aroclor-1248	**.09***	0.0045 U	0.0044 U	0.0044 U	0.0088 U	0.0088 U
Aroclor-1254	**.09***	0.0036 U	0.0035 U	0.0035 U	0.007 U	0.007 U
Aroclor-1260	**.09***	0.012 U	0.012 U	0.012 U	0.024 U	0.024 U

Qualifiers

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the sample.

Notes:

** - NYSDEC Ambient Water Quality Standards and Guidance Values 6/1998

ND - Non-detect

* - Guidance Value

NS - No Standard

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 3D
RI Summary of Groundwater Results
3035 White Plains Road, Bronx, NY
Metals

COMPOUND	**NYSDEC AMBIENT WATER QUALITY STANDARDS**	**MW-1 TOTAL**	**MW-1 DISSOLVED**	**MW-5 TOTAL**	**MW-5 DISSOLVED**	**MW-6 TOTAL**	**MW-6 DISSOLVED**	**MW-10 TOTAL**	**MW-10 DISSOLVED**	**MW-12 TOTAL**	**MW-12 DISSOLVED**
Priority Pollutant Metals	*(mg/L)*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*	*11/2/2007*
Aluminum	**NS**	56800	61.0	7500	170	51000	60.1	4790	98.7	21900	205
Antimony	**3**	8.1 U	8.1 U	8.1 U	8.1 U	8.1 U	8.1 U	8.1 U	8.1 U	8.1 U	8.1 U
Arsenic	**25**	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U
Barium	**100**	**758**	**135**	**117**	54.6	**581**	49.6 J	**62.3**	18.4 J	**273**	41.9 J
Beryllium	**3**	**3.8**	0.91 J	1.3 J	0.93 J	2.2 J	0.86 J	1.2 J	0.93 J	1.4 J	0.87 J
Cadmium	**5**	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Calcium	**NS**	115000	113000	63500	64100	63700	58500	60300	62800	57800	58100
Chromium	**50**	**110**	1.1 U	17.3	1.1 U	**88.6**	1.1 U	11.7	1.1 U	45.1	1.3 J
Cobalt	**NS**	89.0	2.0 U	12.5 J	2.6 J	64.3	4.5 J	15.0	10.2 J	22.2	2.0 U
Copper	**200**	**279**	3.4 U	29.7	3.4 J	108	3.4 U	11.6	3.4 U	40.9	4.1 J
Iron	**300**	**111000**	**3580**	**17000**	**2410**	**82500**	**499**	**9500**	**1840**	**34700**	**316**
Lead	**25**	**66.2**	2.3 J	11.5	2.6 J	19.7	2.2 U	9.7 J	2.7 J	10.0	2.9 J
Magnesium	**3500**	**45900**	**27100**	**19400**	**17700**	**27600**	**9530**	**19800**	**19200**	**16000**	**8740**
Manganese	**300**	**6210**	**5200**	**1010**	**980**	**3900**	**3630**	**1030**	**1030**	283	118
Mercury	**0.7**	0.0800 U	0.0800 U	0.0800 U	0.0800 U	0.0800 U	0.0800 J	0.0800 U	0.0800 U	0.0800 U	0.0800 U
Nickel	**100**	**169**	6.2 J	31.1	7.6 J	93.6	5.6 J	24.0	17.7 J	35.5	6.0 J
Potassium	**NS**	45900	17100	18600	15900	38300	11900	16700	14100	25800	12200
Selenium	**10**	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U
Silver	**50**	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U
Sodium	**2000**	**53800**	**54300**	**59400**	**61900**	**27600**	**25500**	**39200**	**39800**	**59900**	**57700**
Thallium	**0.5**	8.1 U	8.1 U	8.1 U	8.1 U	8.1 U	8.1 U	8.1 U	8.1 U	8.1 U	8.1 U
Vanadium	**NS**	116	2.3 U	11.5 J	2.3 U	107	2.3 U	9.1 J	2.3 U	45.9	2.3 U
Zinc	**2000**	330	54.9	112	41.0	246	58.3	97.6	89.1	180	61.0
Hexavalent Chromimum	**50**	0.01 U		0.01 U		0.01 U		0.01 U		0.01 U	

Qualifiers

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

Notes:

** - NYSDEC Ambient Water Quality Standards and Guidance Values 6/1998

ND - Non-detect

* - Guidance Value

NS - No Standard

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 4
3035 White Plains Road, Bronx, NY
Parameters Detected Above Ambient Water Quality Standards

COMPOUND	NYSDEC Ambient Water Quality Standards	Range in Exceedance	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-10	MW-12	MW-13	MW-15	MW-16
Sample Results in (µg/L)	*(µg/L)*													
Acetone	5	40-60							40	60				
Benzene	1	12-490	47	15	83		490 D		71			150	12	160
Ethyl Benzene	5	5.5-1,400	690 D	590 D	1000 D	160	1400 D		91			88	200	5.5
m/p-Xylenes	5	17-8,200	1700 D	730 D	3100 D	250	5600 D		350	17		510 D	8200 D	200
Methyl tert-butyl Ether	10	37-430	120	90	430 D	22	53			78		37		
o-Xylene	5	5.7-3,300	500 D	130	940 D	35	2200 D		100	5.7		250 D	3300 D	120
Styrene	5	160					160							
Toluene	5	24-1,900	110	24	270 D	5.4	1900 D		120			840 D	1700 D	170
Benzo(a)anthracene	0.002	0.4	0.4 J											
bis(2-Ethylhexyl)phthalate	5	7.4-9.1	9.1 B					7.4 B						
Naphthalene	10	90-250	200 D	90 D	250 D			170 D						
Sample Results in (mg/L)	*(mg/L)*													
Barium	100	135	135											
Iron	300	316-3,580	3580				2410	499		1840	316			
Magnesium	3500	8,740-27,100	27100				17700	9530		19200	8740			
Manganese	300	980-5,200	5200				980	3630		1030				
Sodium	2000	25,500-61,900	54300				61900	25500		39800	57700			

TABLE 5
RI Summary of Soil Gas Results
3035 White Plains Road, Bronx, NY
VOCs TO15

COMPOUND	NYSDOH* 2003 Background Study Outdoor Air - Upper Fence	USEPA** 2002 Target Shallow Soil Gas Conc. R=10^{-6}	SG1	SG2	SG3	SG4	SG5	SG6	SG7	SG8	SG9	SG10	SG11	SG12
Sample Results in mg/m ^{3}			*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*	*10/2/2007*
1,1,1-Trichloroethane	0.6	22000	**2.39**	0.48 U	**2.61**	1.2 U	0.24 U	**3.05**	0.48 U	**3.05**	**2.83**	2.39 U	**3.7**	**3.05**
1,1,2,2-Tetrachloroethane	0.4	0.42	1.79 U	1.79 U	1.79 U	4.47 U	0.89 U	1.79 U	1.79 U	1.79 U	1.79 U	8.93 U	1.79 U	1.79 U
1,1,2-Trichloroethane	0.3	1.5	1.2 U	1.2 U	1.2 U	2.94 U	0.6 U	1.2 U	1.2 U	1.2 U	1.2 U	5.98 U	1.2 U	1.2 U
1,1,2-Trichlorotrifluoroethane	2.5	300000	0.76 U	0.76 U	0.76 U	1.91 U	0.38 U	0.76 U	0.76 U	0.76 U	0.76 U	3.82 U	0.76 U	0.76 U
1,1-Dichloroethane	NC	5000	0.57 U	0.57 U	0.57 U	1.38 U	0.28 U	0.57 U	0.57 U	0.57 U	0.57 U	2.75 U	0.57 U	0.57 U
1,1-Dichloroethene	0.4	2000	0.48 U	0.48 U	0.48 U	1.23 U	0.25 U	0.48 U	0.48 U	0.48 U	0.48 U	2.46 U	0.48 U	0.48 U
1,2,4-Trichlorobenzene	0.4	2000	1.41 U	1.41 U	1.41 U	3.48 U	0.7 U	1.41 U	1.41 U	1.41 U	1.41 U	6.96 U	1.41 U	1.41 U
1,2,4-Trimethylbenzene	1.9	60	**78.3**	**53.6**	**82.7**	**110**	**7.46**	**64**	**35.5**	**66.6**	**53**	**26.5**	**58.3**	**92.5**
1,2-Dibromoethane	0.4	0.11	1.08 U	1.08 U	1.08 U	2.61 U	0.52 U	1.08 U	1.08 U	1.08 U	1.08 U	5.23 U	1.08 U	1.08 U
1,2-Dichlorobenzene	0.4	2000	1.02 U	1.02 U	1.02 U	2.53 U	0.51 U	1.02 U	1.02 U	1.02 U	1.02 U	5.05 U	1.02 U	1.02 U
1,2-Dichloroethane	0.4	0.94	0.49 U	0.49 U	0.49 U	1.21 U	0.24 U	0.49 U	0.49 U	0.49 U	0.49 U	2.43 U	0.49 U	0.49 U
1,2-Dichloropropane	0.4	40	0.92 U	0.92 U	0.92 U	2.26 U	0.45 U	0.92 U	0.92 U	0.92 U	0.92 U	4.53 U	0.92 U	0.92 U
1,3,5-Trimethylbenzene	0.7	60	**16.7**	**16.3**	**19.6**	**23.6**	**1.87**	**11.4**	**8.05**	**12.8**	**12.4**	2.36 U	**14.1**	**16.5**
1,3-Butadiene	NA	0.087	0.35 U	0.35 U	0.35 U	0.88 U	0.18 U	0.35 U	0.35 U	0.35 U	0.35 U	1.77 U	0.35 U	0.35 U
1,3-Dichlorobenzene	0.4	1100	0.53 U	0.53 U	0.53 U	1.32 U	0.26 U	0.53 U	0.53 U	0.53 U	0.53 U	2.65 U	0.53 U	0.53 U
1,4-Dichlorobenzene	0.5	8000	0.84 U	0.84 U	**3.37**	2.04 U	**245**	**3.61**	**4.81**	**3.61**	**4.33**	4.09 U	**2.89**	**8.66**
1,4-Dioxane	NA	NA	0.79 U	0.79 U	0.79 U	1.94 U	0.4 U	0.79 U	0.79 U	0.79 U	0.79 U	3.96 U	0.79 U	0.79 U
2,2,4-Trimethylpentane	NA	NA	**8.58**	**8.02**	**12.5**	**111**	**2.33**	**2.98**	**16.2**	**8.21**	**13.4**	**16.8**	**13.4**	**8.77**
2-Butanone	NA	NA	**26.7**	**14.8**	**31**	**59.8**	**4.42**	**11**	**13.1**	**23.6**	**34**	**114**	**29.8**	**27.1**
2-Hexanone	NA	NA	**9**	0.36 U	**8.34**	0.9 U	**2.29**	**3.6**	0.36 U	**10.5**	**16.4**	1.8 U	**8.02**	0.36 U
4-Ethyltoluene	NA	NA	**13.9**	**5.69**	**14.7**	**21.6**	**1.47**	**9.62**	**7.46**	**11.6**	**10.2**	1.47 U	**10**	**15.1**
4-Methyl-2-Pentanone	NA	NA	**11.6**	**5.4**	**8.34**	**31.1**	**2.21**	**3.76**	3.11 J	**18**	**16.2**	**38.4**	**9.82**	**20.1**
Acetone	30	3500	**138**	**131**	**232**	**280**	**19.3**	**74.6**	**158**	**94.3**	**185**	**779**	**211**	**113**
Benzene	4.8	3.1	**7.91**	**3.83**	**11.5**	**16.9**	**1.28**	**2.68**	**9.57**	**7.15**	**7.27**	**22.3**	**7.91**	**8.8**
Benzyl Chloride	NA	0.5	0.58 U	0.58 U	0.58 U	1.44 U	0.29 U	0.58 U	0.58 U	0.58 U	0.58 U	2.88 U	0.58 U	0.58 U
Bromodichloromethane	NA	1.4	1.07 U	1.07 U	1.07 U	2.68 U	0.54 U	1.07 U	1.07 U	1.07 U	1.07 U	5.37 U	1.07 U	1.07 U
Bromoethene	NA	NA	0.44 U	0.44 U	0.44 U	1.14 U	0.23 U	0.44 U	0.44 U	0.44 U	0.44 U	2.28 U	0.44 U	0.44 U
Bromoform	NA	22	0.99 U	0.99 U	0.99 U	2.48 U	0.5 U	0.99 U	0.99 U	0.99 U	0.99 U	4.97 U	0.99 U	0.99 U
Bromomethane	0.5	NA	0.54 U	0.54 U	0.54 U	1.32 U	0.26 U	0.54 U	0.54 U	0.54 U	0.54 U	2.64 U	0.54 U	0.54 U
Carbon Disulfide	NA	7000	0.3 U	0.3 U	0.3 U	0.75 U	0.15 U	**2.74**	**2.74**	0.3 U	**6.09**	1.49 U	**20.8**	0.3 U
Carbon Tetrachloride	1.2	1.6	0.76 U	0.76 U	0.76 U	1.89 U	0.38 U	0.76 U	0.76 U	0.76 U	0.76 U	3.78 U	0.76 U	0.76 U
Chlorobenzene	NC	600	1.2 U	1.2 U	1.2 U	3.05 U	0.6 U	1.2 U	1.2 U	1.2 U	1.2 U	6.01 U	1.2 U	1.2 U
Chloroethane	0.4	100000	0.4 U	0.4 U	0.4 U	1.01 U	0.2 U	0.4 U	0.4 U	0.4 U	0.4 U	2.02 U	0.4 U	0.4 U
Chloroform	0.5	1.1	**160**	0.47 U	0.47 U	1.17 U	**2.24**	**161**	0.47 U	0.47 U	0.47 U	2.34 U	0.47 U	**27.8**
Chloromethane	4.3	NA	0.29 U	0.29 U	0.29 U	0.74 U	**1.02**	0.29 U	**1.39**	0.29 U	0.29 U	1.47 U	0.29 U	0.29 U
cis-1,2-Dichloroethene	0.4	350	0.56 U	0.56 U	0.56 U	1.35 U	0.27 U	0.56 U	0.56 U	0.56 U	0.56 U	2.7 U	0.56 U	0.56 U
cis-1,3-Dichloropropene	0.4	NA	0.54 U	0.54 U	0.54 U	1.41 U	0.28 U	0.54 U	0.54 U	0.54 U	0.54 U	2.81 U	0.54 U	0.54 U
Cyclohexane	0.4	NA	**2.82**	**3.49**	**3.35**	**7.38**	0.21 U	0.4 U	**2.68** J	**3.62**	**3.89**	**16.1**	**4.02**	**3.62**
Dibromochloromethane	NA	NA	1.28 U	1.28 U	1.28 U	3.23 U	0.65 U	1.28 U	1.28 U	1.28 U	1.28 U	6.47 U	1.28 U	1.28 U
Dichlorodifluoromethane	NA	2000	**2.77**	**51.5**	**3.17**	1.78 U	**2.97**	**3.96**	**16.4**	**4.75**	**25.1**	**199**	**223**	**4.75**
Dichlorotetrafluoroethane	10.0	NA	0.84 U	0.84 U	0.84 U	2.17 U	0.43 U	0.84 U	0.84 U	0.84 U	0.84 U	4.34 U	0.84 U	0.84 U
Ethyl Acetate	NA	32000	0.32 U	0.32 U	0.32 U	0.79 U	0.16 U	0.32 U	0.32 U	0.32 U	0.32 U	1.58 U	0.32 U	0.32 U
Ethyl Benzene	1.0	22	**18.6**	**7.63**	**20.5**	**28.6**	**2.25**	**9.54**	**8.15**	**14.7**	**11.8**	**20.8**	**12.8**	**41.3**
Heptane	NA	NA	**28.6**	**16.9**	**29.4**	**58.9**	**3.76**	**8.18**	**11.8**	**26.2**	**21.9**	**46.6**	**21.9**	**48.4**
Hexachloro-1,3-Butadiene	0.5	1.1	1.81 U	1.81 U	1.81 U	4.48 U	0.9 U	1.81 U	1.81 U	1.81 U	1.81 U	8.97 U	1.81 U	1.81 U
Hexane	NA	2000	**12.7**	**9.29**	**19.1**	**23.6**	**2.6**	**17.4**	**20.4**	**12.9**	**16.5**	**57**	**17.2**	**11.8**
Isopropyl Alcohol	NA	NA	0.12 U	0.12 U	0.12 U	0.29 U	0.06 U	0.12 U	0.12 U	0.12 U	0.12 U	0.59 U	0.12 U	0.12 U
m/p-Xylene	1.0	70000	**59.3**	**21**	**67.6**	**86.3**	**6.16**	**35**	**27.6**	**47**	**37.3**	**46**	**40.6**	**98.5**
Methyl tert-Butyl Ether	NA	30000	0.35 U	0.35 U	7.92	0.86 U	0.17 U	**72.7**	**3.17**	0.35 U	**6.19**	1.73 U	13.8	0.35 U
Methylene Chloride	1.6	52	**11.7**	**9.73**	**13.3**	**279**	**1.67**	**35.5**	**90.4**	**24.2**	**32.4**	**4718 D**	26.6	**19.7**
o-Xylene	1.5	70000	**22.2**	**10.6**	**24.6**	**32.1**	**2.6**	**13.2**	**10.9**	**17.5**	**15.6**	**16.5**	**15.4**	**31**
Propene	NA	NA	0.34 U	0.34 U	0.34 U	0.88 U	0.17 U	0.34 U	0.34 U	0.34 U	0.34 U	1.72 U	0.34 U	0.34 U
Styrene	0.5	10000	**2.55**	**1.87**	**2.89**	1.87 U	**1.11**	**1.87**	0.77 U	0.77 U	**2.21**	**9.36**	0.77 U	**3.06**
t-1,3-Dichloropropene	NC	NA	0.45 U	0.45 U	0.45 U	1.13 U	0.23 U	0.45 U	0.45 U	0.45 U	0.45 U	2.27 U	0.45 U	0.45 U
Tetrachloroethene	0.7	8.1	**14.1**	**15.5**	**14.1**	**35.3**	**8.01**	**301**	**9.78**	**12.5**	**9.78**	**517**	**10**	**16.3**
Tetrahydrofuran	0.4	NA	0.71 U	0.71 U	0.71 U	1.74 U	0.35 U	0.71 U	0.71 U	0.71 U	0.71 U	3.53 U	0.71 U	0.71 U
Toluene	5.1	4000	**284**	**122**	**317**	**1096**	**23**	**86.1**	**137**	**259**	**180**	**477**	**189**	**2166 D**
trans-1,2-Dichloroethene	NA	700	0.56 U	0.56 U	0.56 U	1.35 U	0.27 U	0.56 U	0.56 U	0.56 U	0.56 U	2.7 U	0.56 U	0.56 U
Trichloroethene	0.4	0.22	0.75 U	0.75 U	0.75 U	1.93 U	0.39 U	18.9	0.75 U	0.75 U	0.75 U	3.86 U	0.75 U	0.75 U
Trichlorofluoromethane	5.1	7000	0.62 U	**2.47**	0.62 U	1.57 U	**1.46**	0.62 U	0.62 U	0.62 U	0.62 U	3.14 U	**4.48**	0.62 U
Vinyl Acetate	NA	2000	0.56 U	0.56 U	0.56 U	1.41 U	0.28 U	0.56 U	0.56 U	0.56 U	0.56 U	2.81 U	0.56 U	0.56 U
Vinyl Chloride	0.4	2.8	0.31 U	0.31 U	0.31 U	0.77 U	0.15 U	0.31 U	0.31 U	0.31 U	0.31 U	1.53 U	0.31 U	0.31 U
Total BTEX			392.01	165.06	441.2	1,259.90	35.29	146.52	193.22	345.35	251.97	582.60	265.71	2,345.60
Total Confident Conc. VOC			932.42	511.93	949.59	2,301.18	346.48	957.39	595.10	681.79	723.79	7,120.36	968.54	2,785.81

Qualifiers

U - The compound was not detected at the indicated concentration.

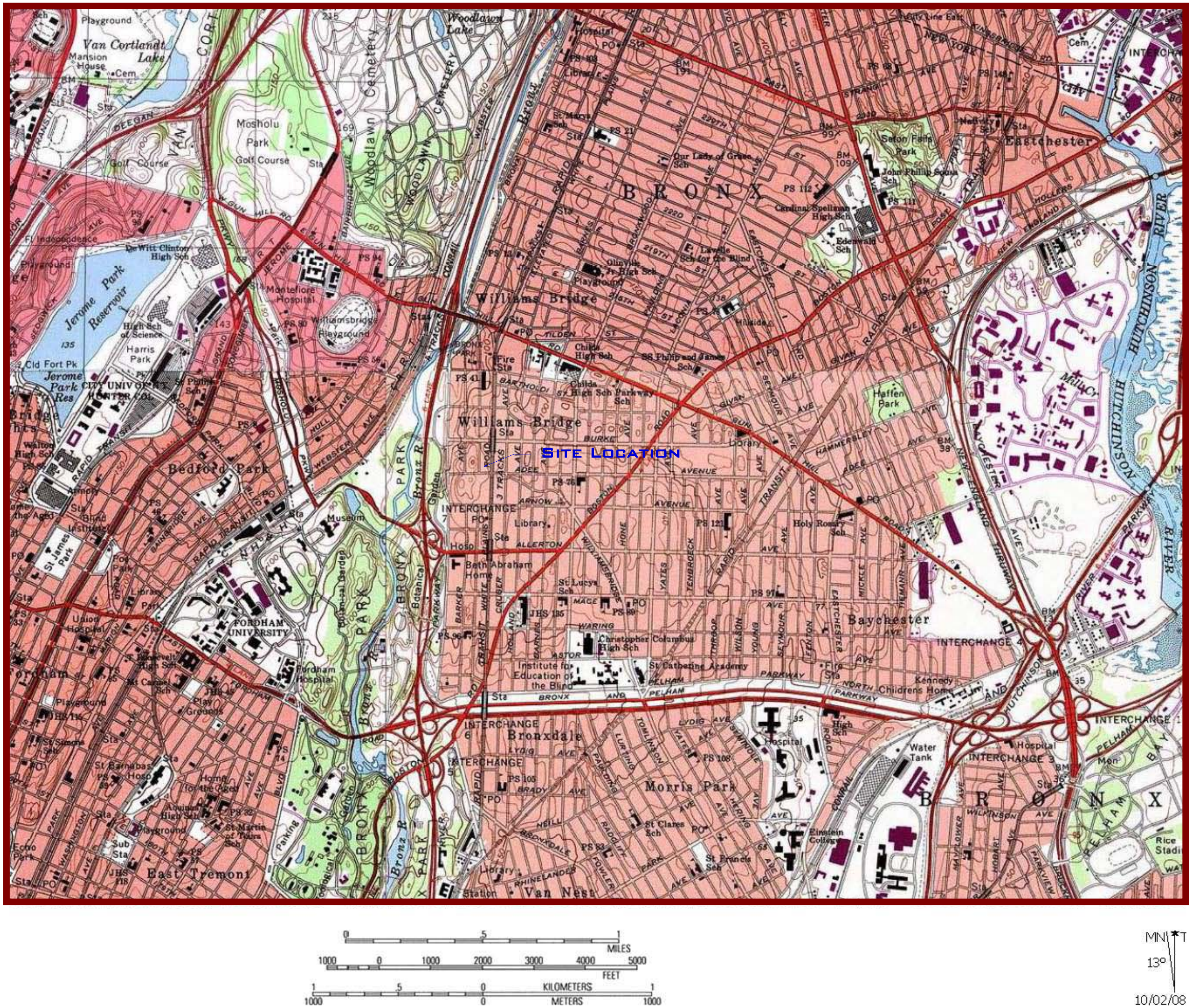
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero.
The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

NA - No value available

NR - Not analyzed

FIGURES



USGS Mount Vernon, NY Quadrangle, 1995

Contour Interval = 10 ft

EBC

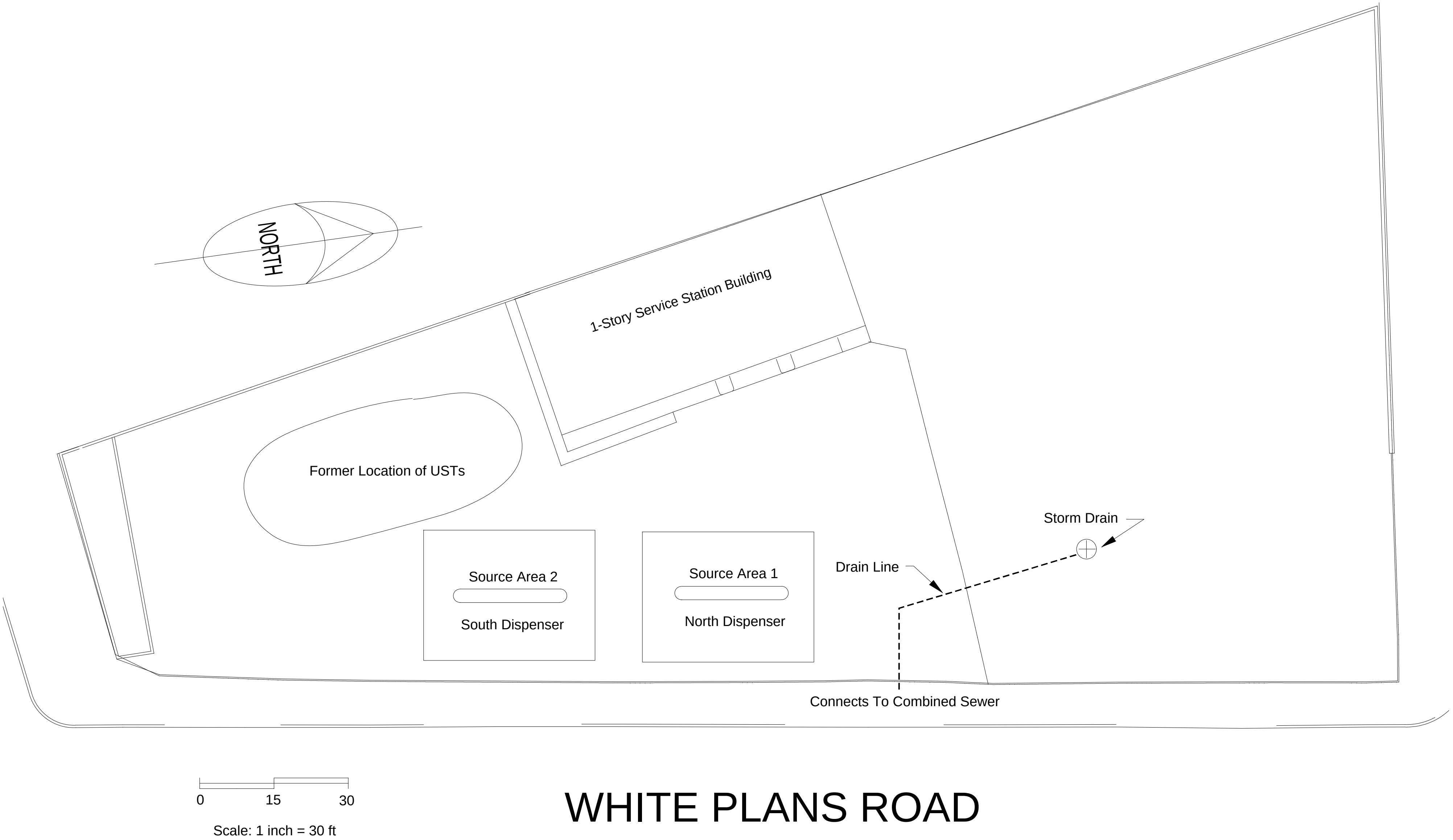
Environmental Business Consultants

Phone	631.924.0870
Fax	631. 924 .2870

3035 White Plains road, Bronx, NY

Former Dico G Auto & Truck Repair

FIGURE 1 - Location Map



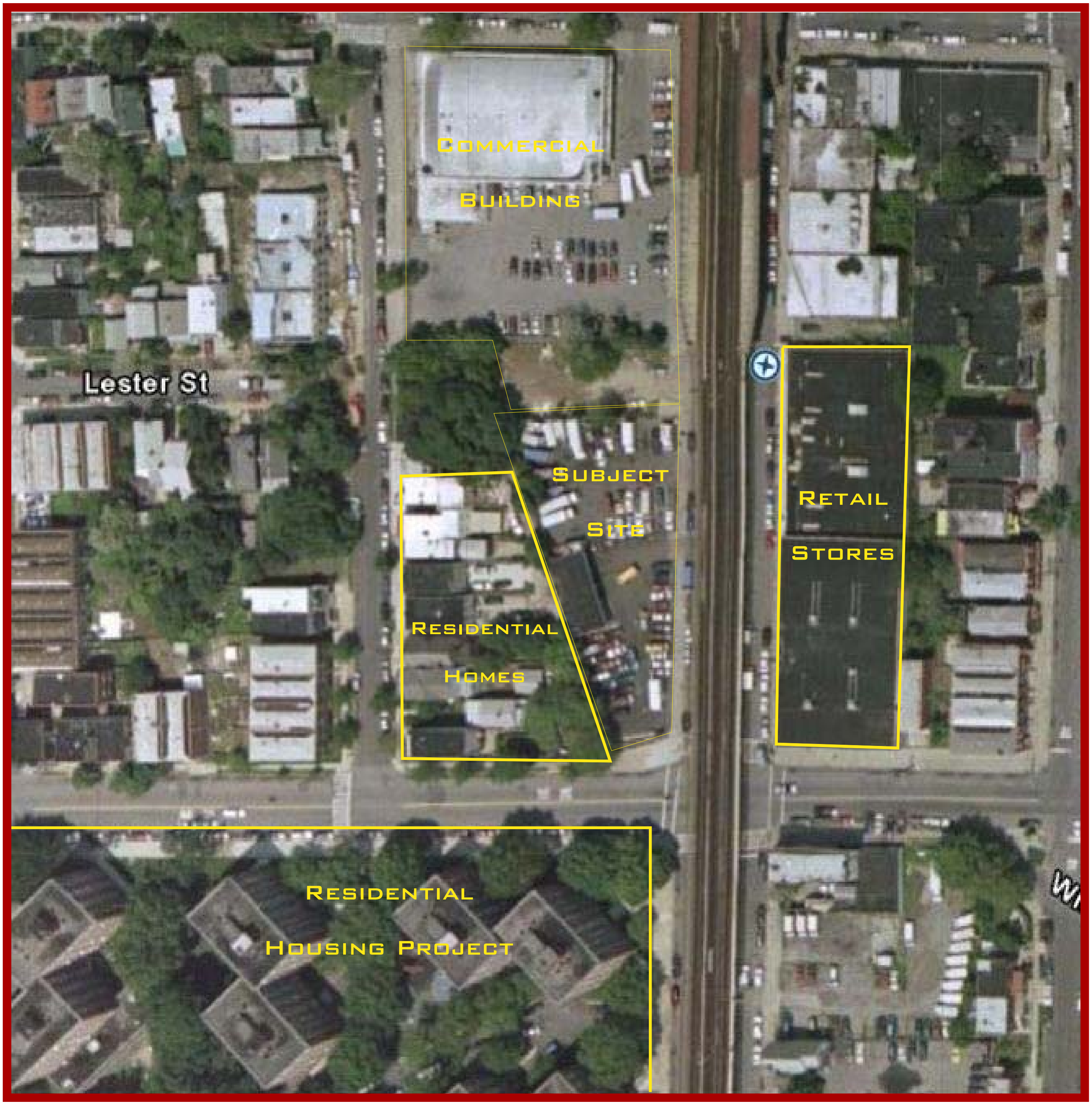
EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

Phone	*631.504.6000*
Fax	*631.924.2870*

3035 WHITE PLAINS ROAD, BRONX, NY
FORMER DICO G AUTO & TRUCK REPAIR

FIGURE 2 - SITE PLAN



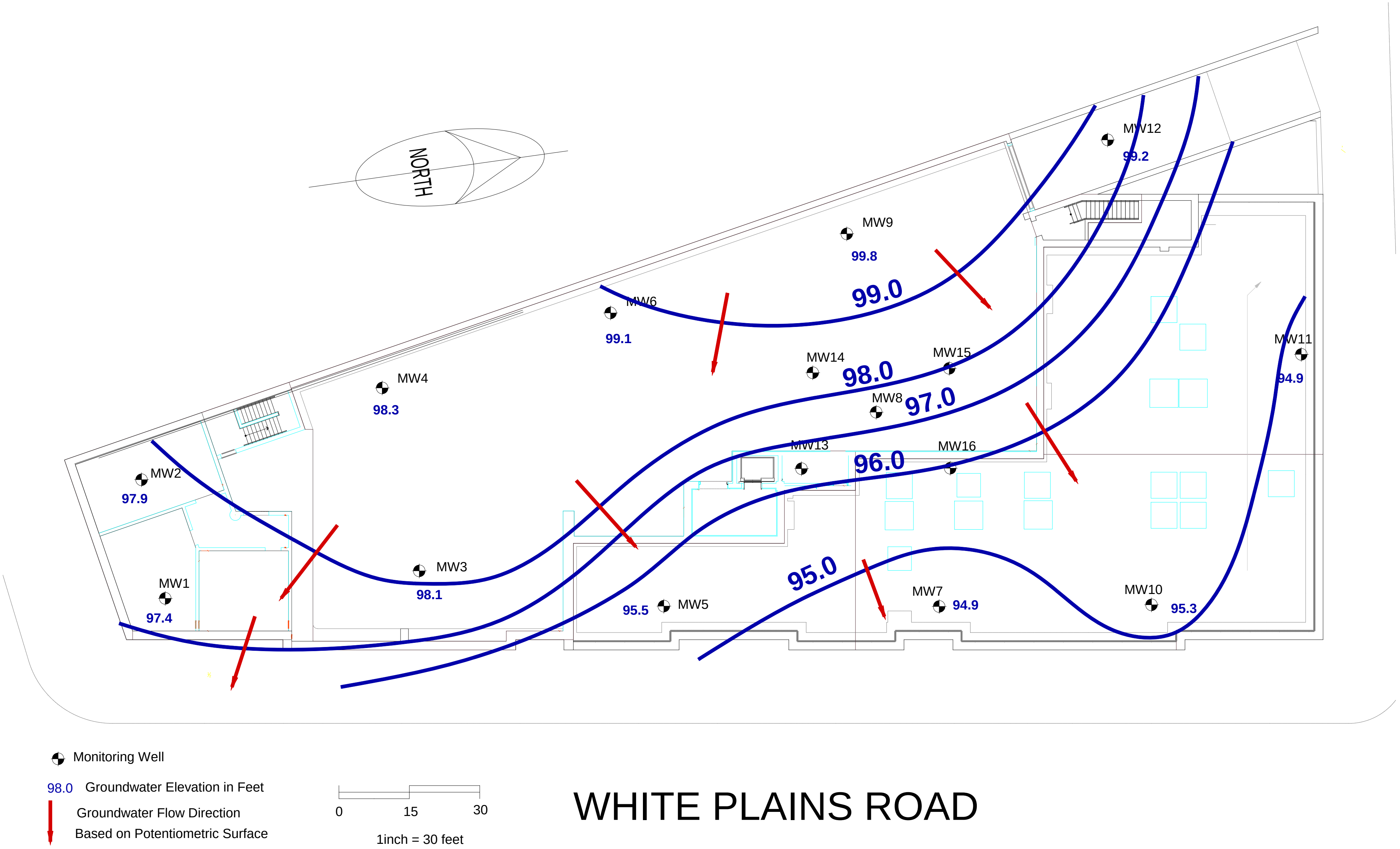
Environmental Business Consultants

1808 Middle Country Road
Ridge, NY 11961

Phone 631.504.6000
Fax 631. 924 .2870

Surrounding Property Map
Former Dico-G Auto & Truck Repair
3035 White Plains Road, Bronx, NY

FIGURE 3



● Monitoring Well

98.0 Groundwater Elevation in Feet

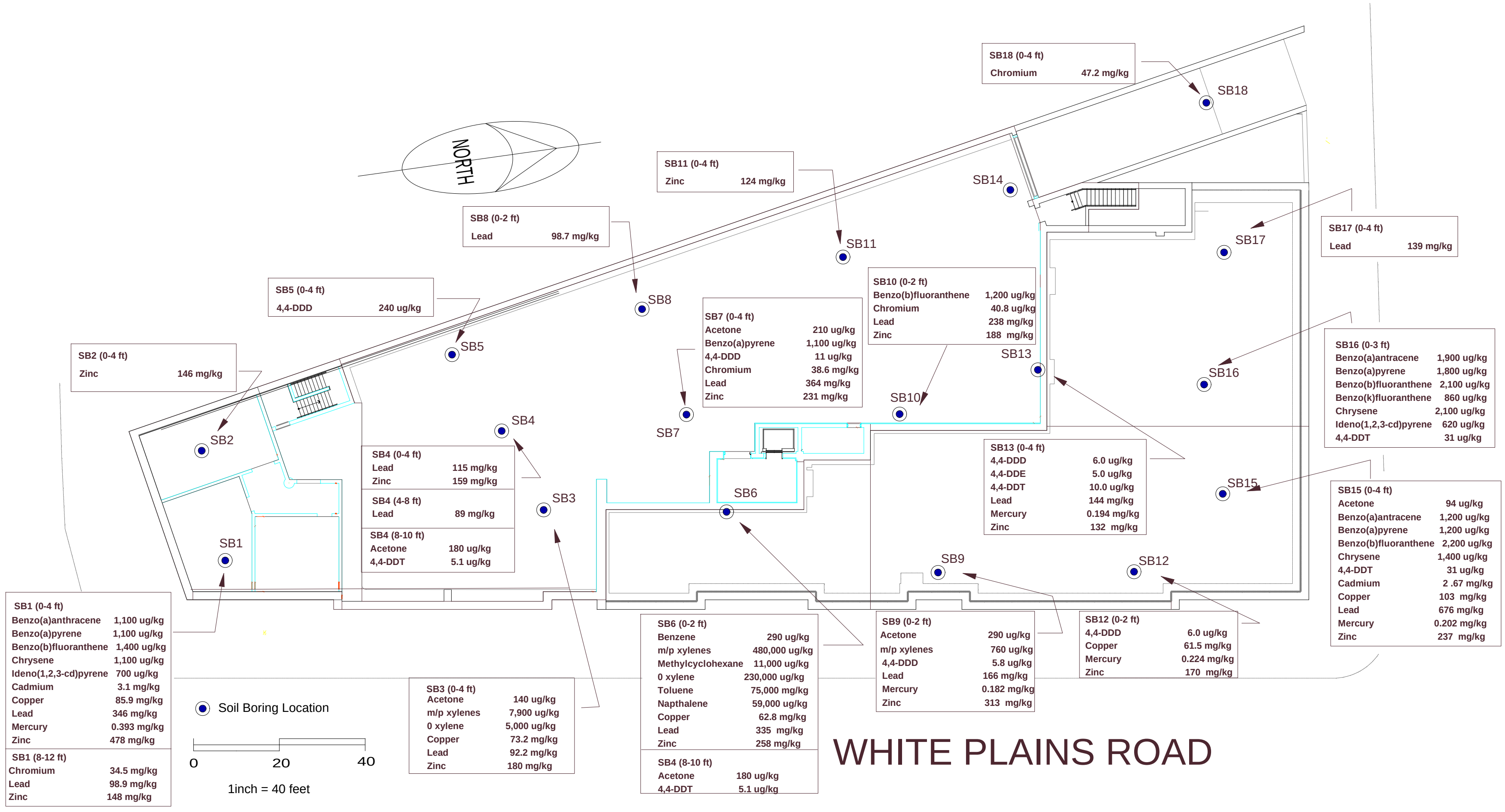
Groundwater Flow Direction
Based on Potentiometric Surface

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

Phone 631.504.6000
Fax 631. 924 .2870

FORMER DICO G AUTO & TRUCK REPAIR
3035 WHITE PLAINS ROAD, BRONX, NY

FIGURE 5
GROUNDWATER ELEVATION MAP - 12/5/07



SB18 (0-4 ft)	
Chromium	47.2 mg/kg

SB11 (0-4 ft)	
Zinc	124 mg/kg

SB17 (0-4 ft)	
Lead	139 mg/kg

SB8 (0-2 ft)	
Lead	98.7 mg/kg

SB5 (0-4 ft)	
4,4-DDD	240 ug/kg

SB10 (0-2 ft)	
Benzo(b)fluoranthene	1,200 ug/kg
Chromium	40.8 ug/kg
Lead	238 mg/kg
Zinc	188 mg/kg

SB7 (0-4 ft)	
Acetone	210 ug/kg
Benzo(a)pyrene	1,100 ug/kg
4,4-DDD	11 ug/kg
Chromium	38.6 mg/kg
Lead	364 mg/kg
Zinc	231 mg/kg

SB2 (0-4 ft)	
Zinc	146 mg/kg

SB16 (0-3 ft)	
Benzo(a)antracene	1,900 ug/kg
Benzo(a)pyrene	1,800 ug/kg
Benzo(b)fluoranthene	2,100 ug/kg
Benzo(k)fluoranthene	860 ug/kg
Chrysene	2,100 ug/kg
Ideno(1,2,3-cd)pyrene	620 ug/kg
4,4-DDT	31 ug/kg

SB13 (0-4 ft)	
4,4-DDD	6.0 ug/kg
4,4-DDE	5.0 ug/kg
4,4-DDT	10.0 ug/kg
Lead	144 mg/kg
Mercury	0.194 mg/kg
Zinc	132 mg/kg

SB4 (0-4 ft)	
Lead	115 mg/kg
Zinc	159 mg/kg
SB4 (4-8 ft)	
Lead	89 mg/kg
SB4 (8-10 ft)	
Acetone	180 ug/kg
4,4-DDT	5.1 ug/kg

SB15 (0-4 ft)	
Acetone	94 ug/kg
Benzo(a)antracene	1,200 ug/kg
Benzo(a)pyrene	1,200 ug/kg
Benzo(b)fluoranthene	2,200 ug/kg
Chrysene	1,400 ug/kg
4,4-DDT	31 ug/kg
Cadmium	2 .67 mg/kg
Copper	103 mg/kg
Lead	676 mg/kg
Mercury	0.202 mg/kg
Zinc	237 mg/kg

SB1 (0-4 ft)	
Benzo(a)anthracene	1,100 ug/kg
Benzo(a)pyrene	1,100 ug/kg
Benzo(b)fluoranthene	1,400 ug/kg
Chrysene	1,100 ug/kg
Ideno(1,2,3-cd)pyrene	700 ug/kg
Cadmium	3.1 mg/kg
Copper	85.9 mg/kg
Lead	346 mg/kg
Mercury	0.393 mg/kg
Zinc	478 mg/kg
SB1 (8-12 ft)	
Chromium	34.5 mg/kg
Lead	98.9 mg/kg
Zinc	148 mg/kg

SB3 (0-4 ft)	
Acetone	140 ug/kg
m/p xylenes	7,900 ug/kg
0 xylene	5,000 ug/kg
Copper	73.2 mg/kg
Lead	92.2 mg/kg
Zinc	180 mg/kg

SB6 (0-2 ft)	
Benzene	290 ug/kg
m/p xylenes	480,000 ug/kg
Methylcyclohexane	11,000 ug/kg
0 xylene	230,000 ug/kg
Toluene	75,000 mg/kg
Napthalene	59,000 ug/kg
Copper	62.8 mg/kg
Lead	335 mg/kg
Zinc	258 mg/kg
SB4 (8-10 ft)	
Acetone	180 ug/kg
4,4-DDT	5.1 ug/kg

SB9 (0-2 ft)	
Acetone	290 ug/kg
m/p xylenes	760 ug/kg
4,4-DDD	5.8 ug/kg
Lead	166 mg/kg
Mercury	0.182 mg/kg
Zinc	313 mg/kg

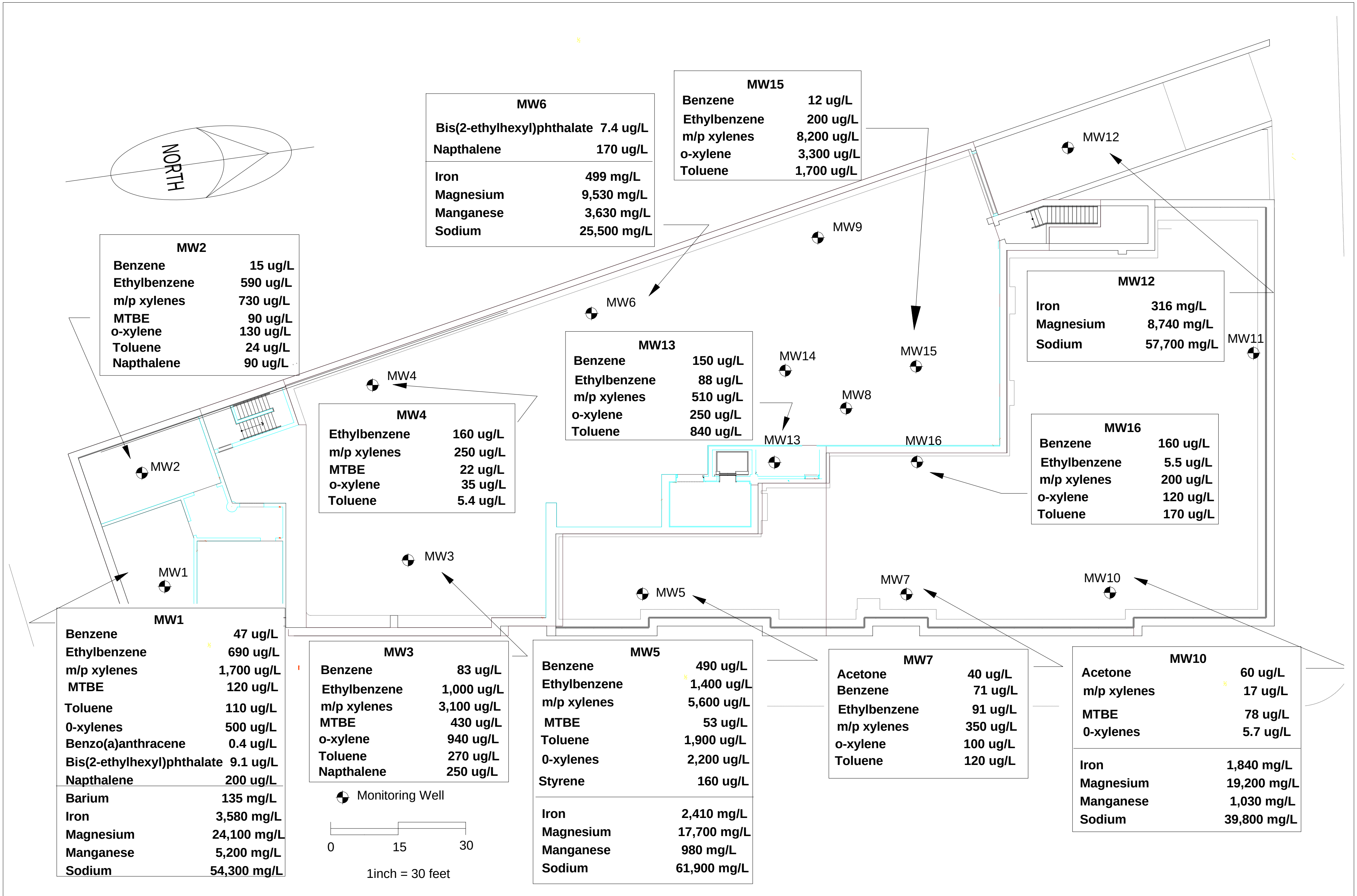
SB12 (0-2 ft)	
4,4-DDD	6.0 ug/kg
Copper	61.5 mg/kg
Mercury	0.224 mg/kg
Zinc	170 mg/kg

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

Phone 631.504.6000
Fax 631. 924 .2870

FORMER DICO G AUTO & TRUCK REPAIR
3035 WHITE PLAINS ROAD, BRONX, NY

FIGURE 6
PARAMETERS ABOVE TRACK 1 OBJECTIVES



MW6

Bis(2-ethylhexyl)phthalate	7.4 ug/L
Napthalene	170 ug/L
Iron	499 mg/L
Magnesium	9,530 mg/L
Manganese	3,630 mg/L
Sodium	25,500 mg/L

MW15

Benzene	12 ug/L
Ethylbenzene	200 ug/L
m/p xylenes	8,200 ug/L
o-xylene	3,300 ug/L
Toluene	1,700 ug/L

MW2

Benzene	15 ug/L
Ethylbenzene	590 ug/L
m/p xylenes	730 ug/L
MTBE	90 ug/L
o-xylene	130 ug/L
Toluene	24 ug/L
Napthalene	90 ug/L

MW12

Iron	316 mg/L
Magnesium	8,740 mg/L
Sodium	57,700 mg/L

MW13

Benzene	150 ug/L
Ethylbenzene	88 ug/L
m/p xylenes	510 ug/L
o-xylene	250 ug/L
Toluene	840 ug/L

MW4

Ethylbenzene	160 ug/L
m/p xylenes	250 ug/L
MTBE	22 ug/L
o-xylene	35 ug/L
Toluene	5.4 ug/L

MW16

Benzene	160 ug/L
Ethylbenzene	5.5 ug/L
m/p xylenes	200 ug/L
o-xylene	120 ug/L
Toluene	170 ug/L

MW1

Benzene	47 ug/L
Ethylbenzene	690 ug/L
m/p xylenes	1,700 ug/L
MTBE	120 ug/L
Toluene	110 ug/L
0-xylenes	500 ug/L
Benzo(a)anthracene	0.4 ug/L
Bis(2-ethylhexyl)phthalate	9.1 ug/L
Napthalene	200 ug/L
Barium	135 mg/L
Iron	3,580 mg/L
Magnesium	24,100 mg/L
Manganese	5,200 mg/L
Sodium	54,300 mg/L

MW3

Benzene	83 ug/L
Ethylbenzene	1,000 ug/L
m/p xylenes	3,100 ug/L
MTBE	430 ug/L
o-xylene	940 ug/L
Toluene	270 ug/L
Napthalene	250 ug/L

MW5

Benzene	490 ug/L
Ethylbenzene	1,400 ug/L
m/p xylenes	5,600 ug/L
MTBE	53 ug/L
Toluene	1,900 ug/L
0-xylenes	2,200 ug/L
Styrene	160 ug/L
Iron	2,410 mg/L
Magnesium	17,700 mg/L
Manganese	980 mg/L
Sodium	61,900 mg/L

MW7

Acetone	40 ug/L
Benzene	71 ug/L
Ethylbenzene	91 ug/L
m/p xylenes	350 ug/L
o-xylene	100 ug/L
Toluene	120 ug/L

MW10

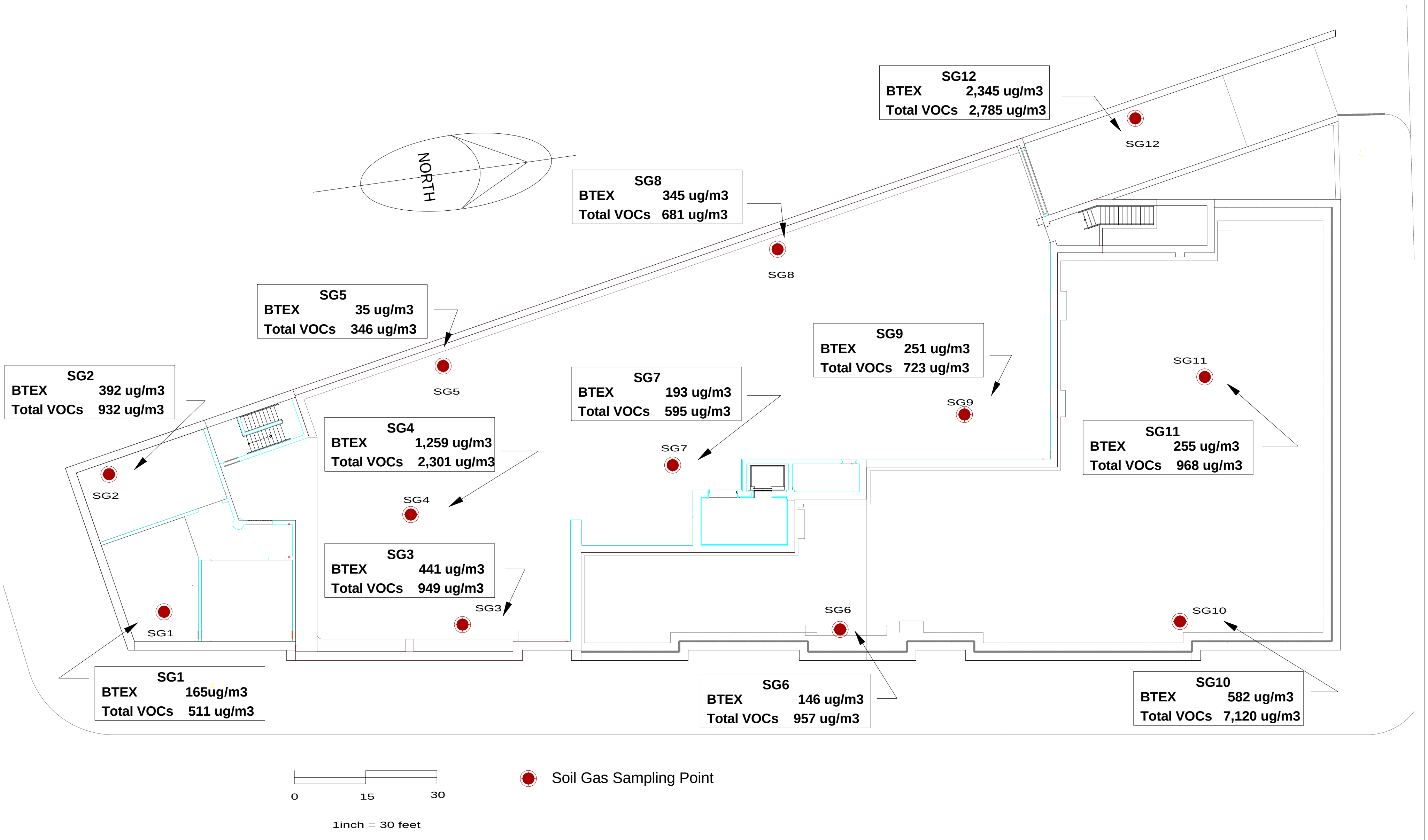
Acetone	60 ug/L
m/p xylenes	17 ug/L
MTBE	78 ug/L
0-xylenes	5.7 ug/L
Iron	1,840 mg/L
Magnesium	19,200 mg/L
Manganese	1,030 mg/L
Sodium	39,800 mg/L

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

Phone *631.504.6000*
Fax *631. 924 .2870*

FORMER DICO G AUTO & TRUCK REPAIR
3035 WHITE PLAINS ROAD, BRONX, NY

FIGURE 7 EXCEEDANCES IN GROUNDWATER STANDARDS



EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

Phone *631.924.0870*
Fax *631. 924 .2870*

FORMER DICO G AUTO & TRUCK REPAIR
3035 WHITE PLAINS ROAD, BRONX, NY

FIGURE 8 *SOIL GAS RESULTS*

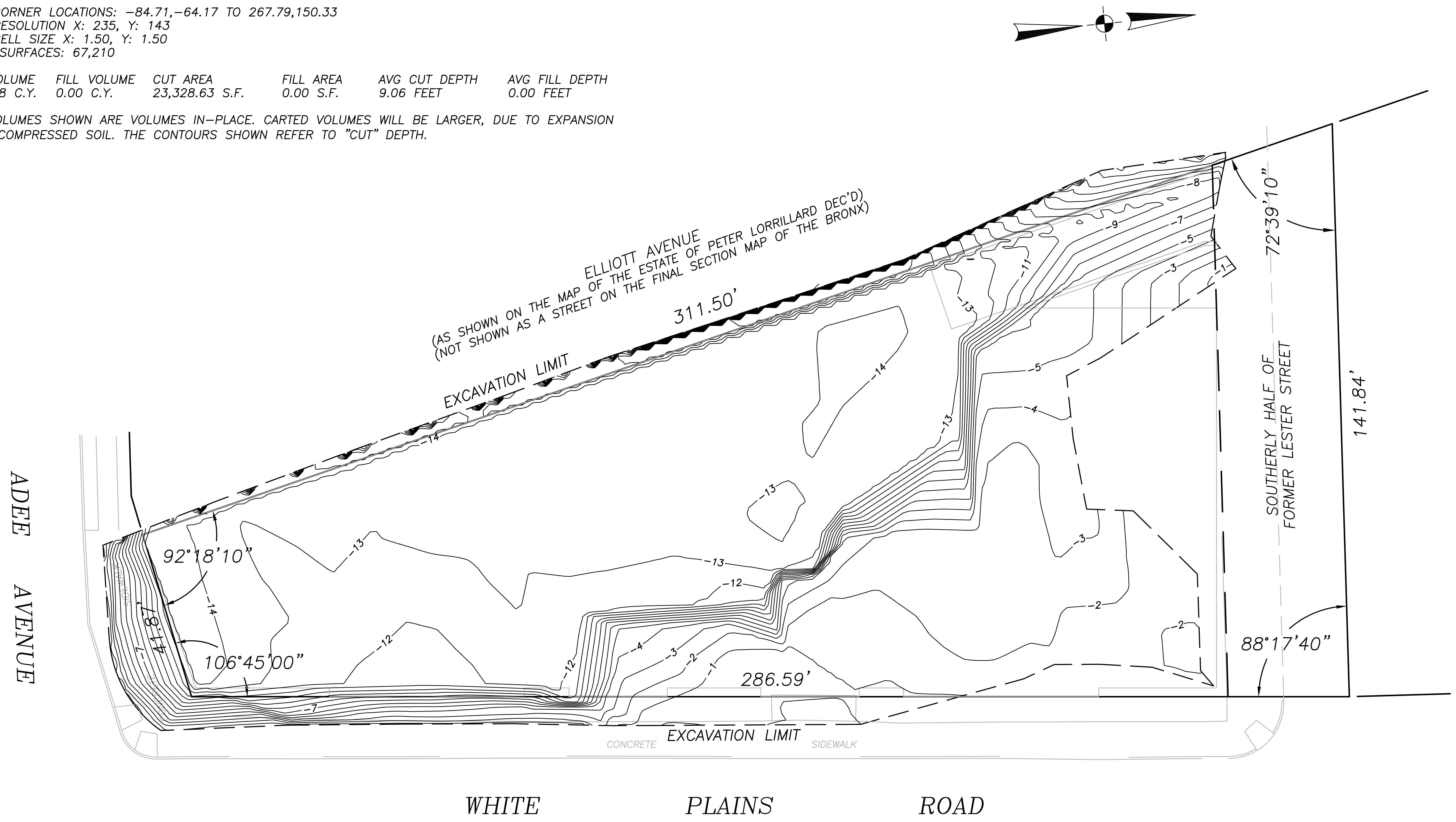
EXCAVATION VOLUME REPORT

THE EXCAVATION VOLUME WAS CALCULATED BY COMPARING VOLUMETRIC GRID FILES GENERATED FROM FIELD SURVEY DATA. THE PRE-EXCAVATION SURVEY WAS PERFORMED JANUARY 4, 2007. THE EXCAVATION SURVEY WAS PERFORMED MAY 5, 2008.

GRID CORNER LOCATIONS: -84.71,-64.17 TO 267.79,150.33
GRID RESOLUTION X: 235, Y: 143
GRID CELL SIZE X: 1.50, Y: 1.50
TOTAL SURFACES: 67,210

CUT VOLUME	FILL VOLUME	CUT AREA	FILL AREA	AVG CUT DEPTH	AVG FILL DEPTH
7824.68 C.Y.	0.00 C.Y.	23,328.63 S.F.	0.00 S.F.	9.06 FEET	0.00 FEET

THE VOLUMES SHOWN ARE VOLUMES IN-PLACE. CARTED VOLUMES WILL BE LARGER, DUE TO EXPANSION OF UNCOMPRESSED SOIL. THE CONTOURS SHOWN REFER TO "CUT" DEPTH.



Date	Revisions

"Unauthorized alteration or addition to a survey map bearing a licensed Land Surveyor's seal is a violation of Article 134, Section 7209, Subdivision 2, of the New York State Education Law."
"Copies from the original of this survey map not marked with an original of the Land Surveyor's inked seal or his embossed seal shall not be considered a valid true copy."
"Certification indicated hereon signify that this survey was prepared in accordance with the existing Code of Practice for Land Surveys adopted by the New York State Association of Professional Land Surveyors. Said Certifications shall run only to the person for whom the survey is prepared and on his behalf to the title company, governmental agency, and lending institution. Certifications are not transferable to additional institutions or subsequent owners."
"The offsets (or dimensions) shown hereon from the structures to the property lines are for a specific purpose and use and therefore are not intended to guide the erection of fences, retaining walls, pools, patios, planting areas, additions to buildings or any other construction."
"Easements in existence or of record, if any, not shown."

JOHN J. TOSCANO
NO. 049872

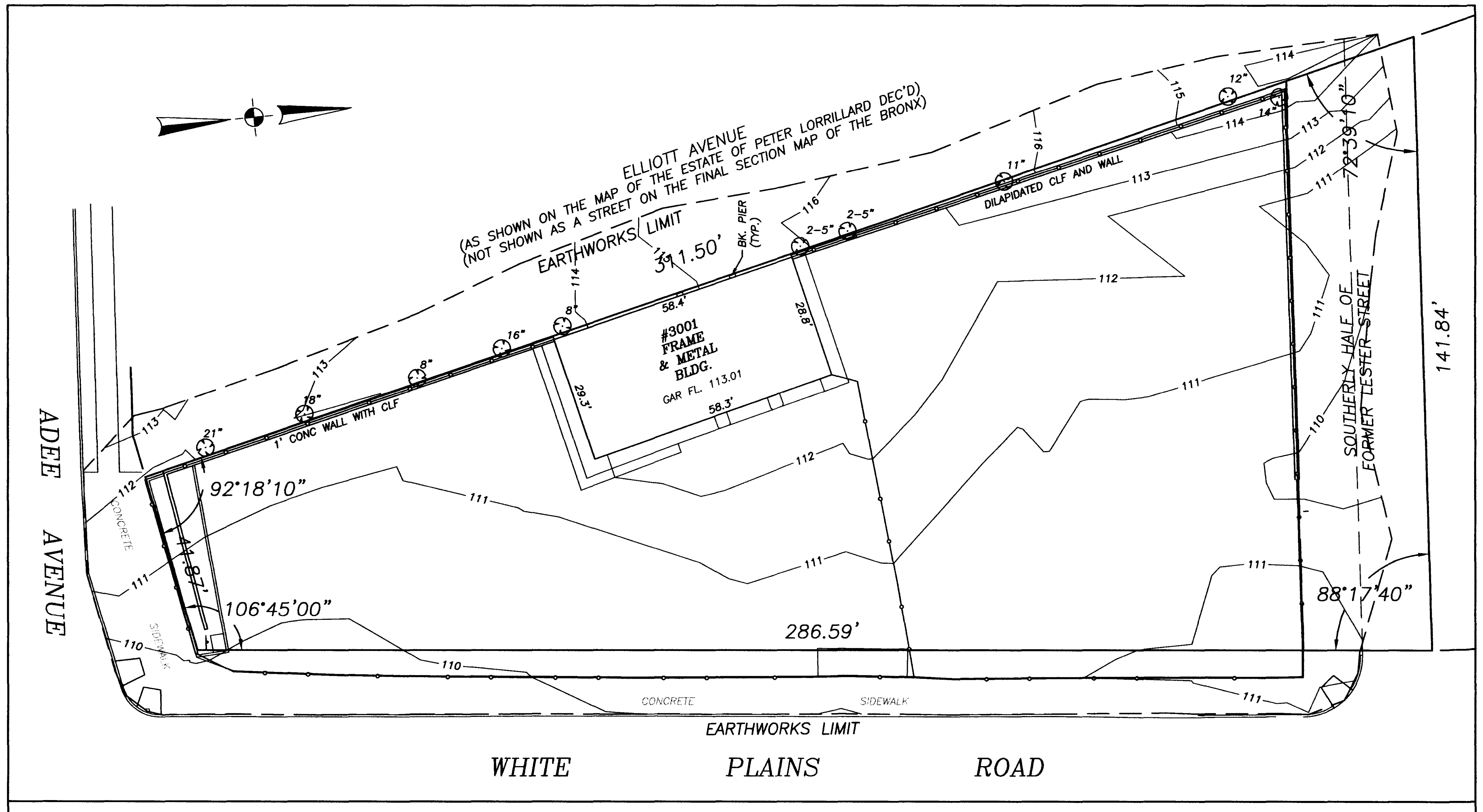
John J. Toscano P.L.S. 049872

MAP SHOWING EXCAVATION VOLUME OF PROPERTY IN THE BRONX, NEW YORK
SHOWN AS BLOCK 4545, LOT 14
AND THE SOUTHERLY HALF OF FORMER LESTER STREET
ON THE CITY OF NEW YORK TAX ASSESSMENT MAP

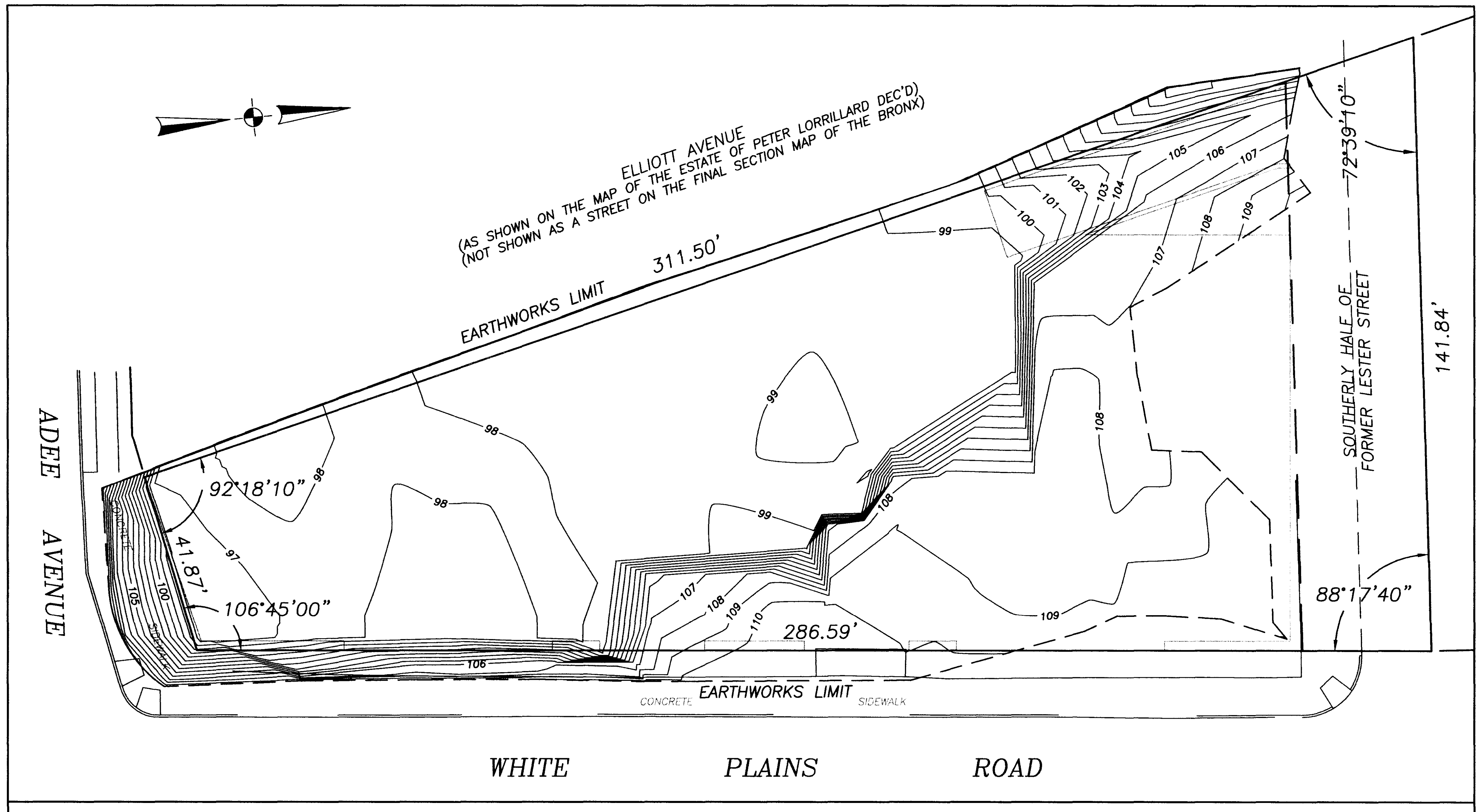
CARMAN-DUNNE, P.C.
CONSULTING ENGINEERS & SURVEYORS
2 Lakeview Avenue, Lynbrook, New York 11563
TEL. (516) 599-5563 FAX (516) 593-4873

Date: MAY 5, 2007
File: ...\2006\2006372\WKS_Volume_Calc.dwg
Palette: LegacyCDunne
Plate No.: 187
Project No.: 2006372.00
Scale: 1"=20'
Sheet 1 of 1

FIGURE 9



PRE–CONSTRUCTION



MID–CONSTRUCTION

EARTHWORK VOLUMES REPORT

THE EARTHWORK VOLUMES WAS CALCULATED BY COMPARING VOLUMETRIC GRID FILES GENERATED FROM FIELD SURVEY DATA. THE PRE–CONSTRUCTION SURVEY WAS PERFORMED JANUARY 4, 2007. THE MID–CONSTRUCTION SURVEY WAS PERFORMED MAY 5, 2008. THE POST–CONSTRUCTION SURVEY WAS PERFORMED DECEMBER 20, 2008.

GRID CORNER LOCATIONS: –84.71,–64.17 TO 267.79,150.33
GRID RESOLUTION X: 235, Y: 143
GRID CELL SIZE X: 1.50, Y: 1.50
TOTAL SURFACES: 67,210

MID–CONSTRUCTION VOLUMES

CUT VOLUME	FILL VOLUME	CUT AREA	FILL AREA	AVG CUT DEPTH	AVG FILL DEPTH
7824.7 C.Y.	0.0 C.Y.	23,328.6 S.F.	0.0 S.F.	9.1 FEET	0.0 FEET

POST CONSTRUCTION VOLUMES

CUT VOLUME	FILL VOLUME	CUT AREA	FILL AREA	AVG CUT DEPTH	AVG FILL DEPTH
82.7 C.Y.	3,002.4 C.Y.	1,030.9 S.F	28,069.8 S.F	2.2 FEET	2.9 FEET

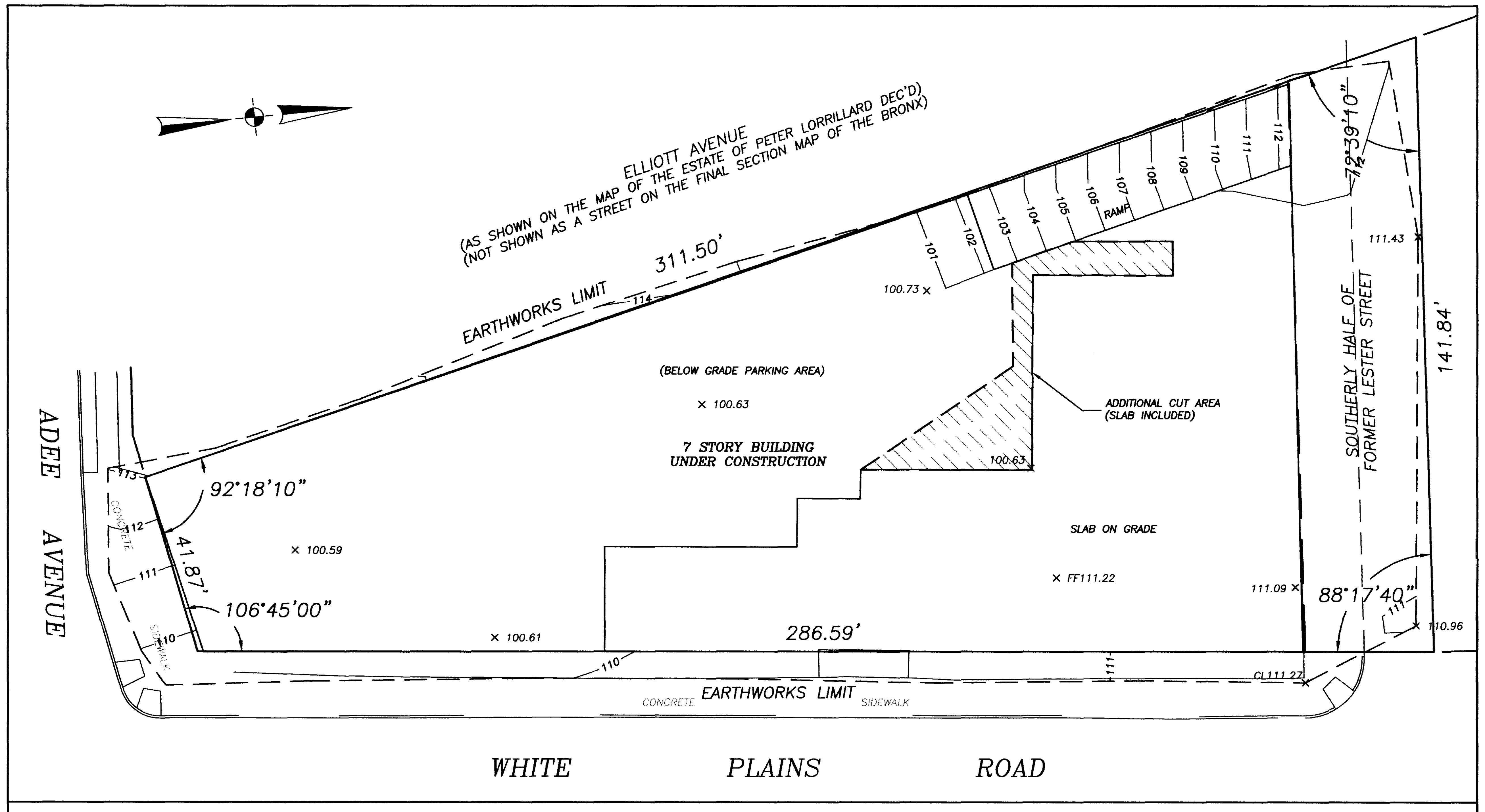
SLAB VOLUMES

CUT VOLUME	FILL VOLUME
49.0 C.Y.	–1,033.3 C.Y.

TOTAL VOLUMES

CUT VOLUME	FILL VOLUME
7,956.4 C.Y.	1,969.1 C.Y.

THE VOLUMES SHOWN ARE VOLUMES IN–PLACE. CARTED VOLUMES WILL HAVE BEEN LARGER, DUE TO EXPANSION OF UNCOMPRESSED SOIL.



POST–CONSTRUCTION

Date	Revisions

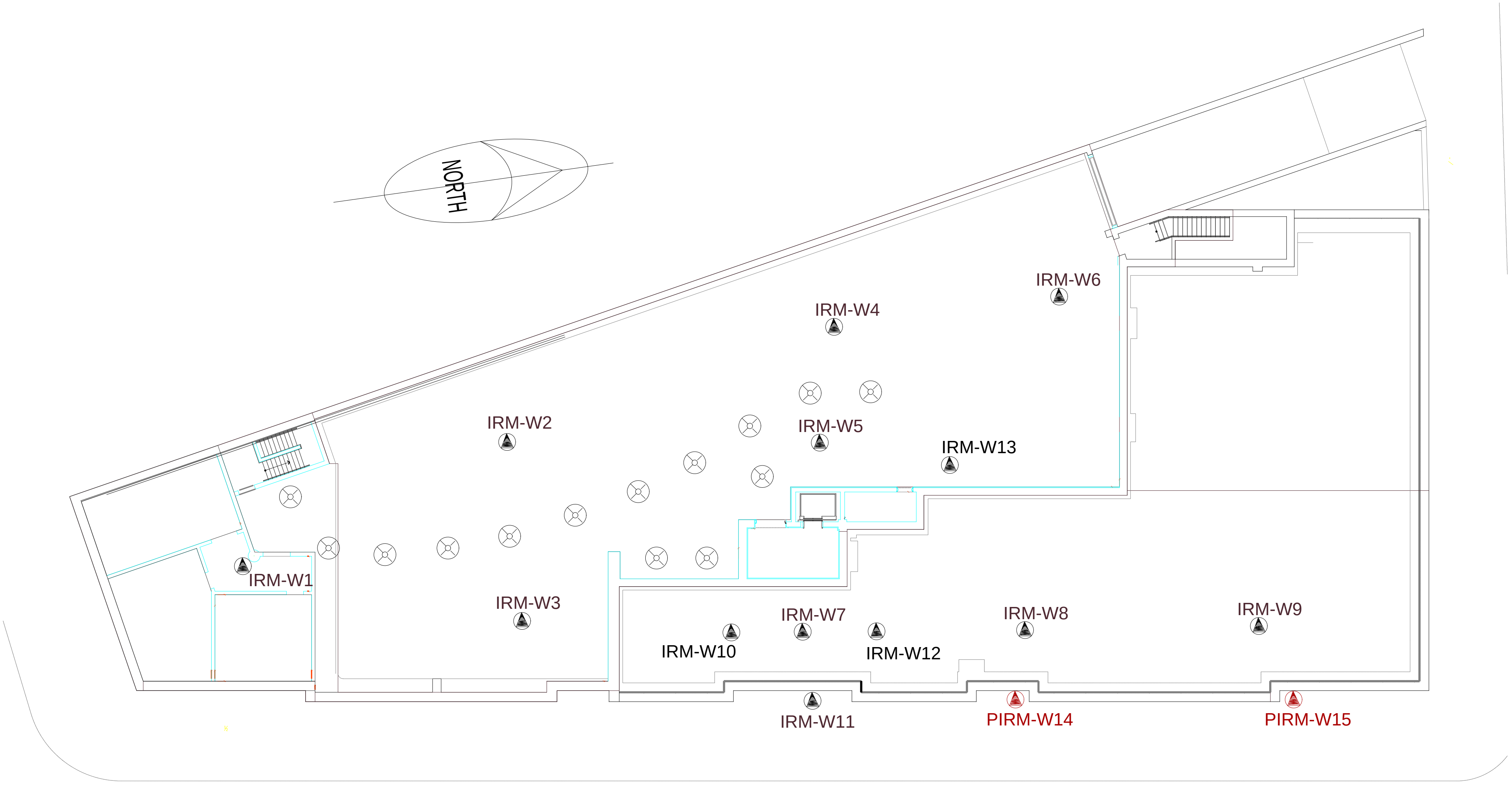
John J. Toscano P.L.S. 049872

MAP SHOWING EARTHWORK VOLUMES
OF PROPERTY IN THE BRONX, NEW YORK
SHOWN AS BLOCK 4545, LOT 14
AND THE SOUTHERLY HALF OF FORMER LESTER STREET
ON THE CITY OF NEW YORK TAX ASSESSMENT MAP

CARMAN–DUNNE, P.C.
CONSULTING ENGINEERS & SURVEYORS
2 Lakeview Avenue, Lynbrook, New York 11563
TEL. (516) 599–5563 FAX (516) 593–4873

Date: DEC. 20, 2008
File: ...\2006\2006372\2006372_Fill_Calc.dwg
Palette: LegacyCDunne
Plate No.: 187
Project No.: 2006372.00
Scale: 1"=20'
Sheet 1 of 1

FIGURE 10



▲ Groundwater Monitoring Well

▲ Proposed Replacement Wells for IRM-W8
PIRM-W14 and IRM-W9 if lost due to building occupancy

⊗ Chemical Oxidant Injection Well

Note: IRM-W10, 11, 12 and 13 installed for LPH delineation.
IRM-W10, 12 and 13 may also be used for LPH recovery or as chemical oxidant injection wells

WHITE PLAINS ROAD

0 15 30

1inch = 30 feet

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

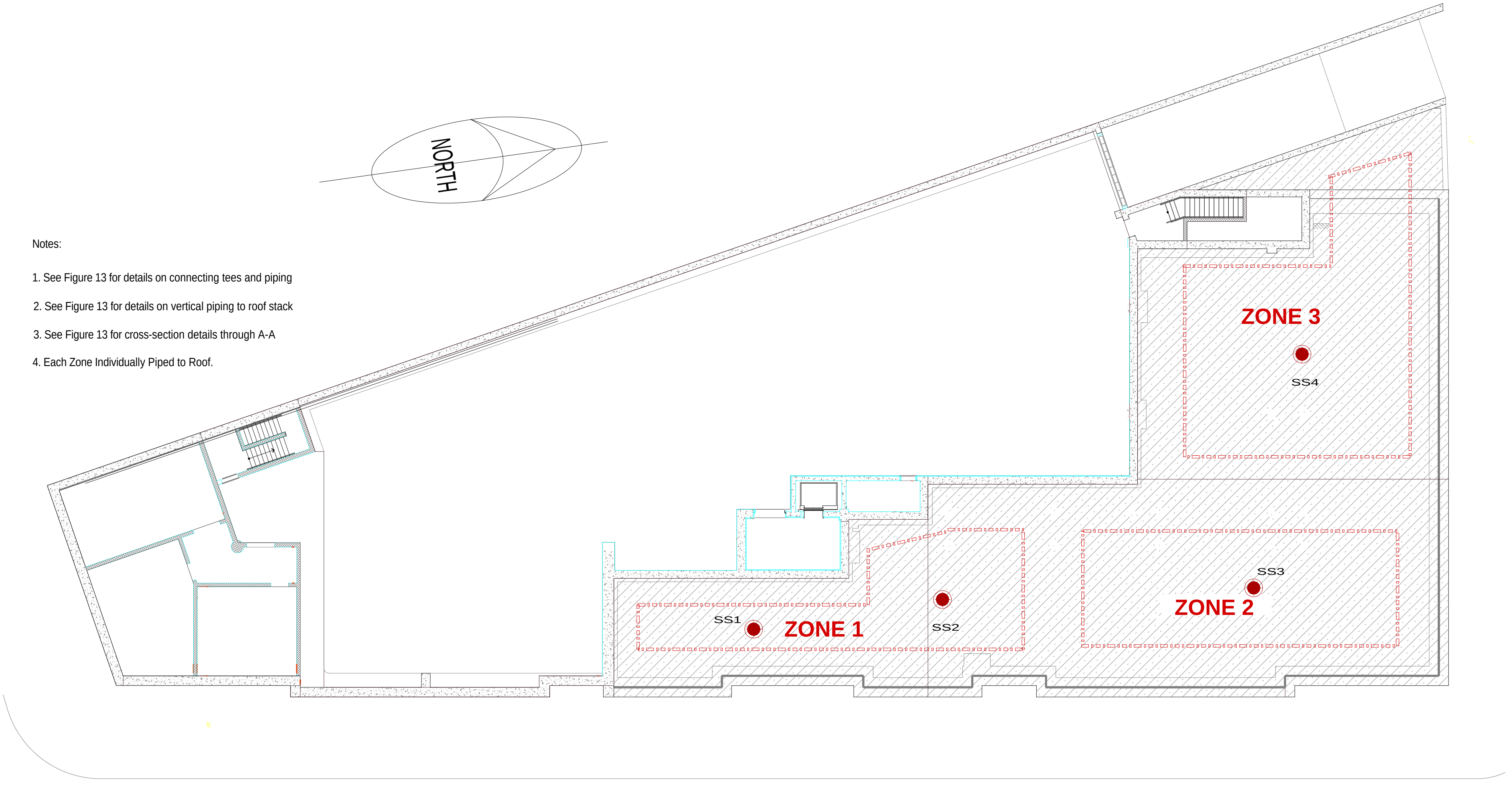
Phone	631.504.6000
Fax	631.924.2870

FORMER DICO G AUTO & TRUCK REPAIR
3035 WHITE PLAINS ROAD, BRONX, NY

FIGURE 1 1 INJECTION AND MONITORING WELL LOCATIONS

Notes:

1. See Figure 13 for details on connecting tees and piping
2. See Figure 13 for details on vertical piping to roof stack
3. See Figure 13 for cross-section details through A-A
4. Each Zone Individually Piped to Roof.



WHITE PLAINS ROAD

SS1 ● Sub-Slab Sampling Location

- · - · - · - 4" Perforated HDPE vent line w / filter sock

0 15 30

1inch = 30 feet

EBC

Environmental Business Consultants

Phone 631.504.6000
Fax 631. 924 .2870

Former Dico G Auto & Truck Repair
3035 White Plains Road, Bronx, NY

FIGURE 12 Sub-Slab Sampling Locations

APPENDIX - A

Metes and Bounds Description of Property

METES AND BOUNDS DESCRIPTION OF PROPERTY

ALL THAT CERTAIN PLAT OR PARCEL OF LAND,.SITUATE LYING AND BEING IN THE BOROUGH AND COUNTY OF BRONX, CITY AND STATE OF NEW YORK AND BEING BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER FORMED BY THE INTERSECTION OF THE WESTERLY SIDE OF WHITE PLAINS ROAD AND THE SOUTHERLY SIDE OF LESTER STREET (FORMERLY WILSON PLACE);

THENCE SOUTHERLY ALONG THE WESTERLY Slope OF WHITE PLAINS ROAD TWO HUNDRED AND SIXTY-FOUR AND NINETY-NINE ONE-HUNDREDTHS FEET TO THE NORTHERLY SIDE OF ADEE AVENUE;

THENCE WESTERLY ALONG THE NORTHERLY SIDE OF ADEE AVENUE TO A POINT WHERE SAID NORTHERLY SIDE OF ADEE AVENUE IS INTERSECTED BY THE EASTERLY LINE OF ELLIOTT AVENUE AS SAID ELIOTT AVENUE IS LAID DOWN UPON A MAP OF PROPERTY BELONGING TO THE ESTATES OF PETER LORILLARD KNOWN AS MAP NUMBER 448, FILED APRIL 20, 1871;

THENCE NORTHWESTERLY ALONG SAID EASTERLY LINE OF ELLIOTT AVENUE ABOUT TWO HUNDRED AND EIGHTY FEET TO THE POINT OF INTERSECTION OF SAID EASTERLY UNE OF ELLIOTT AVENUE WITH THE SOUTHERLY LINE OF LESTER STREET;

THENCE EASTERLY ALONG THE SAID SOUTHERLY SIDE OF LESTER STREET ONE HUNDRED AND THIRTY-ONE AND FORTY-SIX ONE-HUNDREDTHS FEET, MORE OR LESS, TO THE WESTERLY SIDE OF WHITE PLAINS ROAD TO THE POINT OR PLACE OF BEGINNING.

EXCEPTINGTHERE FROM SO MUCH THEREOF AS HAS BEEN TAKEN BY THE CITY OF NEW YORK FOR THE WIDENING OF ADEE AVENUE AT A POINT WHERE IT INTERSECTS THE WESTERLY SIDE OF WHITE PLAINS ROAD.

APPENDIX – B

Sanborn Maps

EDR® Environmental
Data Resources Inc

"Linking Technology with Tradition"®

Sanborn® Map Report

Ship To: Charles Sosik
Env. Business Consultants
25 Central Avenue
Hauppauge, NY 11788

Order Date: 12/29/2006 **Completion Date:** 1/2/2007
Inquiry #: 1826090.3S
P.O. #: NA
Site Name: 3035 White Plains Road
Address: 3035 White Plains Road
City/State: Bronx, NY 10467
Cross Streets:

Customer Project: ARK0602
9013314MIL 631-234-4280

Based on client-supplied information, fire insurance maps for the following years were identified

1897 - 1 Map
1908 - 1 Map
1918 - 1 Map
1935 - 1 Map
1950 - 1 Map
1976 - 1 Map
1978 - 1 Map
1981 - 1 Map
1983 - 1 Map
1986 - 1 Map
1989 - 1 Map
1991 - 1 Map
1992 - 1 Map
1993 - 1 Map
1995 - 1 Map
1996 - 1 Map

Limited Permission to Photocopy Total Maps: 16

Env. Business Consultants (the client) is permitted to make up to THREE photocopies of this Sanborn Map transmittal and each fire insurance map accompanying this report solely for the limited use of its customer. No one other than the client is authorized to make copies. Upon request made directly to an EDR Account Executive, the client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT. Purchaser accepts this Report AS IS. Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

Copyright 2007 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission. EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

USER'S GUIDE

This User's Guide provides guidelines for accessing Sanborn Map® images and for transferring them to your Word Processor.

Reading Sanborn Maps

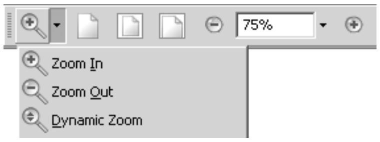
- Sanborn Maps document historical property use by displaying property information through words, abbreviations, and map symbols. The Sanborn Map Key provides information to help interpret the symbols and abbreviations used on Sanborn Maps. The Key is available from EDR's Web Site at: http://www.edrnet.com/reports/samples/key.pdf

Organization of Electronic Sanborn Image File

- Sanborn Map Report, listing years of coverage
- User's Guide
- Oldest Sanborn Map Image
- Most recent Sanborn Map Image

Navigating the Electronic Sanborn Image File

1. Open file on screen.
2. Identify TP (Target Property) on the most recent map.
3. Find TP on older printed images.
4. Using Acrobat® Reader®, zoom to 250% in order to view more clearly. (200-250% is the approximate equivalent scale of hardcopy Sanborn Maps.)
    A. On the menu bar, click "View" and then "Zoom to..."
    B. Or, use the magnifying tool and drag a box around the TP

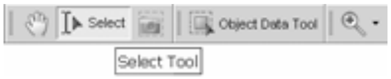


Printing a Sanborn Map From the Electonic File

- EDR recommends printing images at 300 dpi (300 dpi prints faster than 600 dpi)
- To print only the TP area, cut and paste from Acrobat to your word processor application.

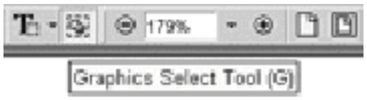
Acrobat Versions 6 and 7

1. Go to the menu bar
2. Click the "Select Tool"
3. Draw a box around the area selected
4. "Right click" on your mouse
5. Select "Copy Image to Clipboard"
6. Go to Word Processor such as Microsoft Word, paste and print.



Acrobat Version 5

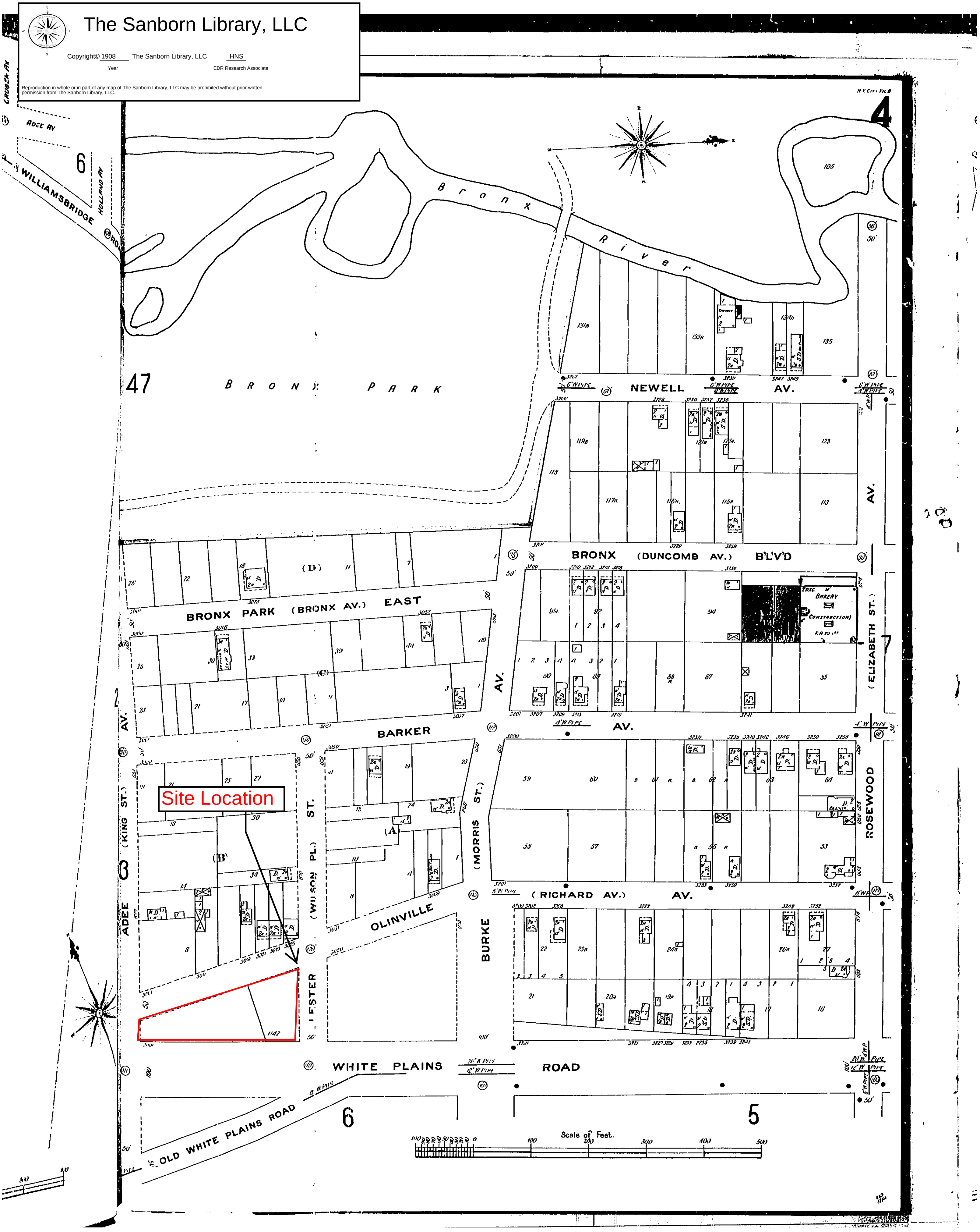
1. Go to the menu bar
2. Click the "Graphics Select Tool"
3. Draw a box around the area selected
4. Go to "Menu"
5. Highlight "Edit"
6. Highlight "Copy"
7. Go to Word Processor such as Microsoft Word, paste and print.

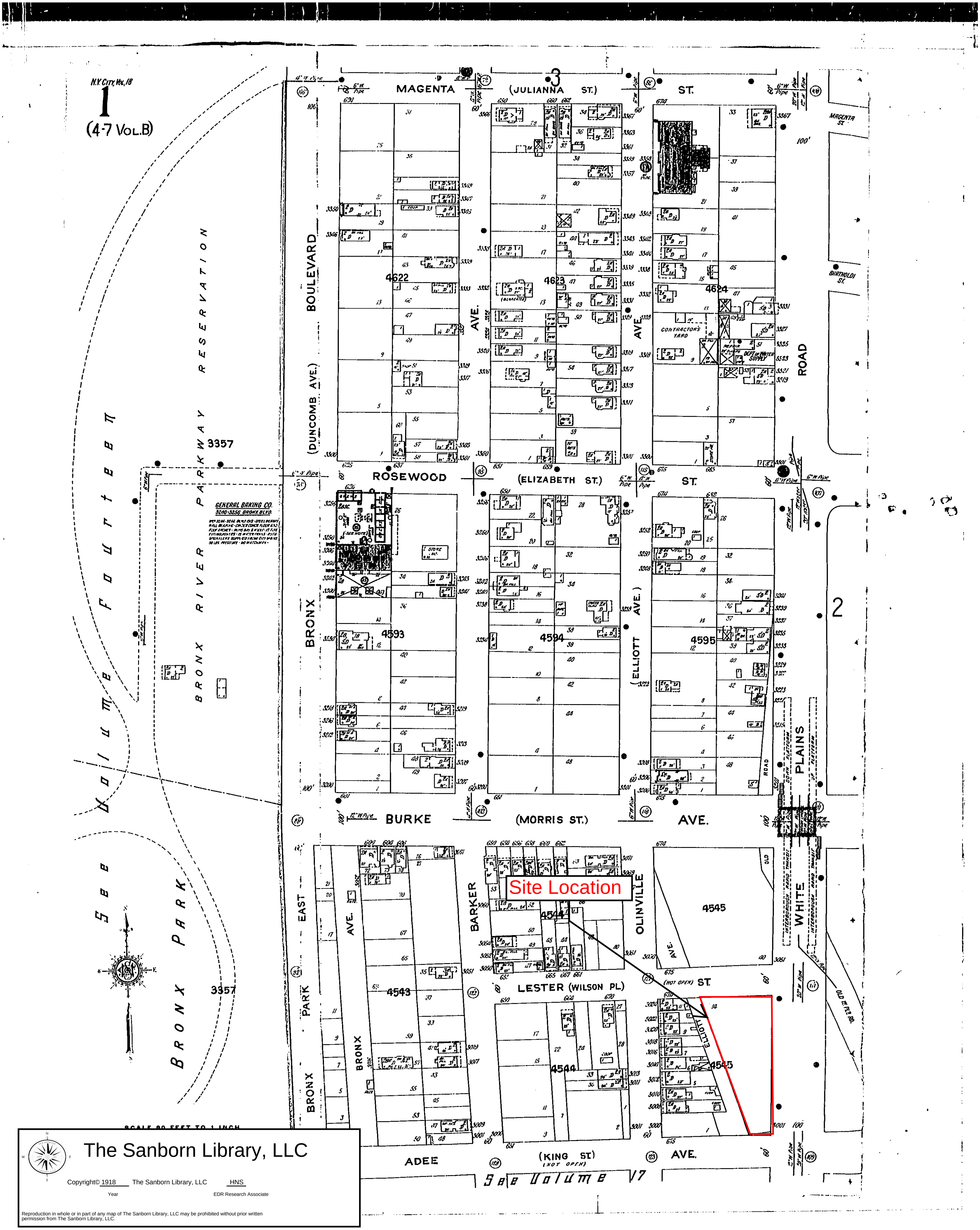


Important Information about Email Delivery of Electronic Sanborn Map Images

- Images are grouped intro one file, up to 2MB.
- In cases where in excess of 6-7 map years are available, the file size typically exceeds 2MB. In these cases, you will receive multiple files, labeled as "1 of 3", "2 of 3", etc. including all available map years.
- Due to file size limitations, certain ISPs, including AOL, may occasionally delay or decline to deliver files. Please contact your ISP to identify their specific file size limitations.

The Sanborn Library, LLC

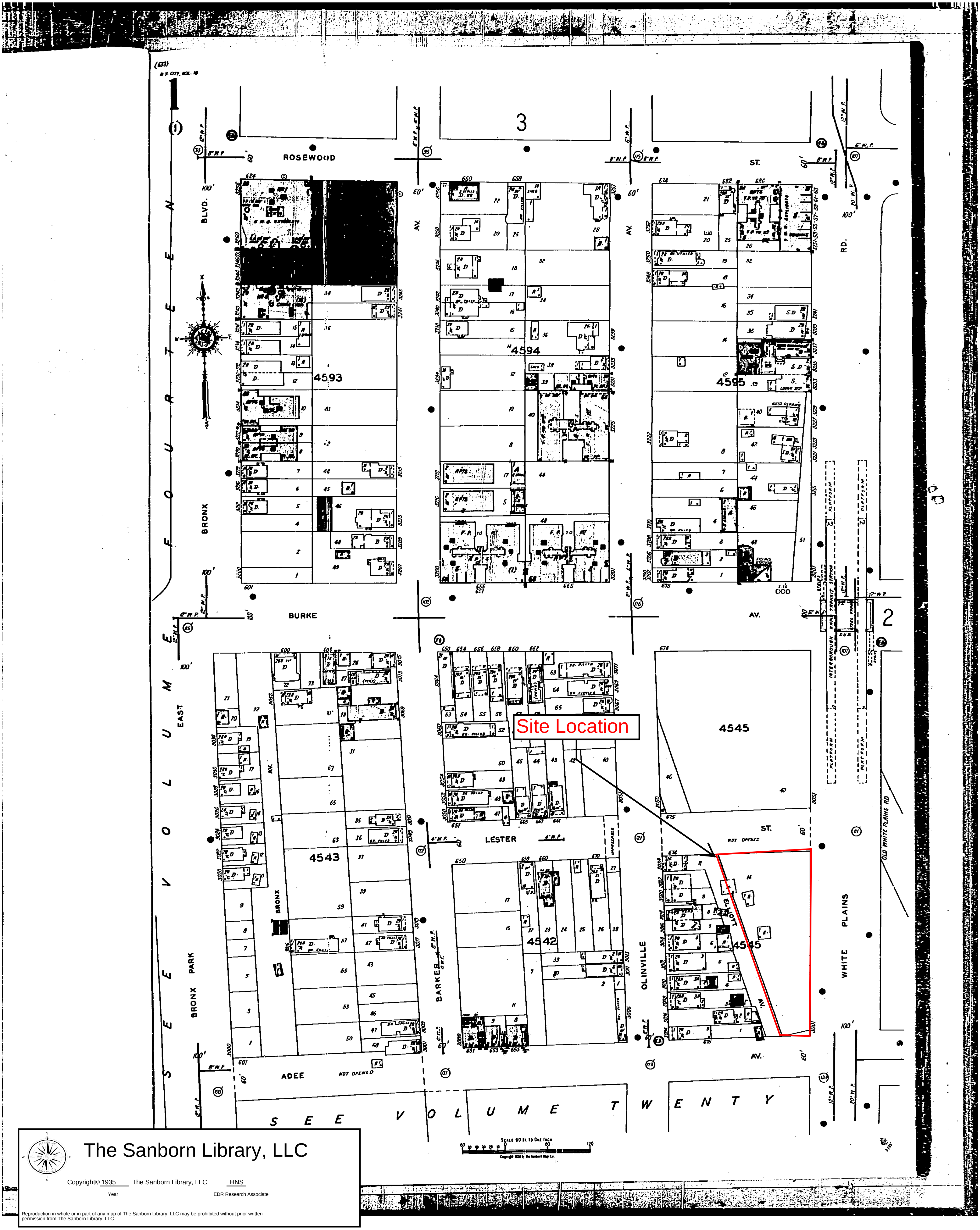




The Sanborn Library, LLC

Copyright© 1918 The Sanborn Library, LLC HNS
Year EDR Research Associate

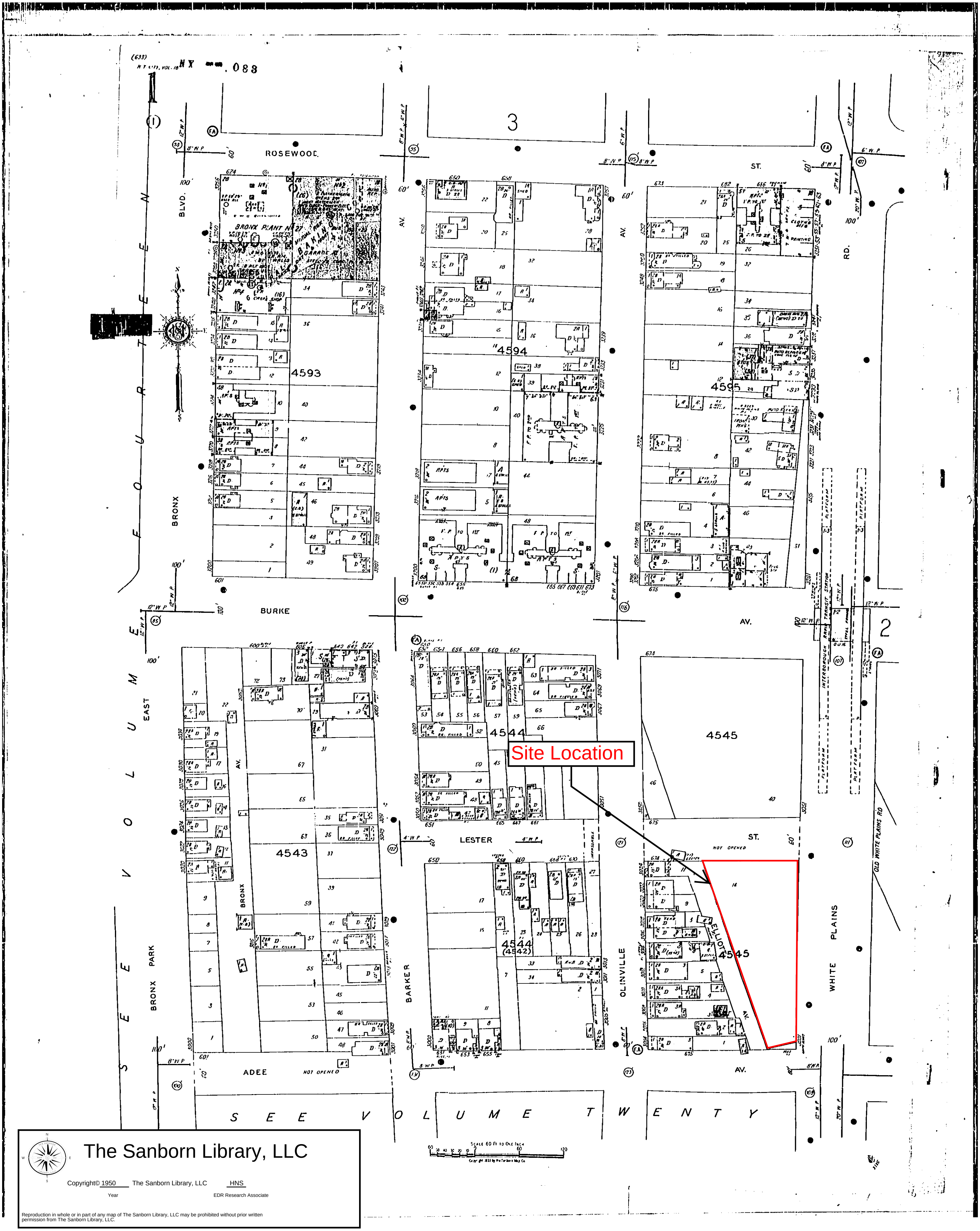
Reproduction in whole or in part of any map of The Sanborn Library, LLC may be prohibited without prior written permission from The Sanborn Library, LLC.



The Sanborn Library, LLC

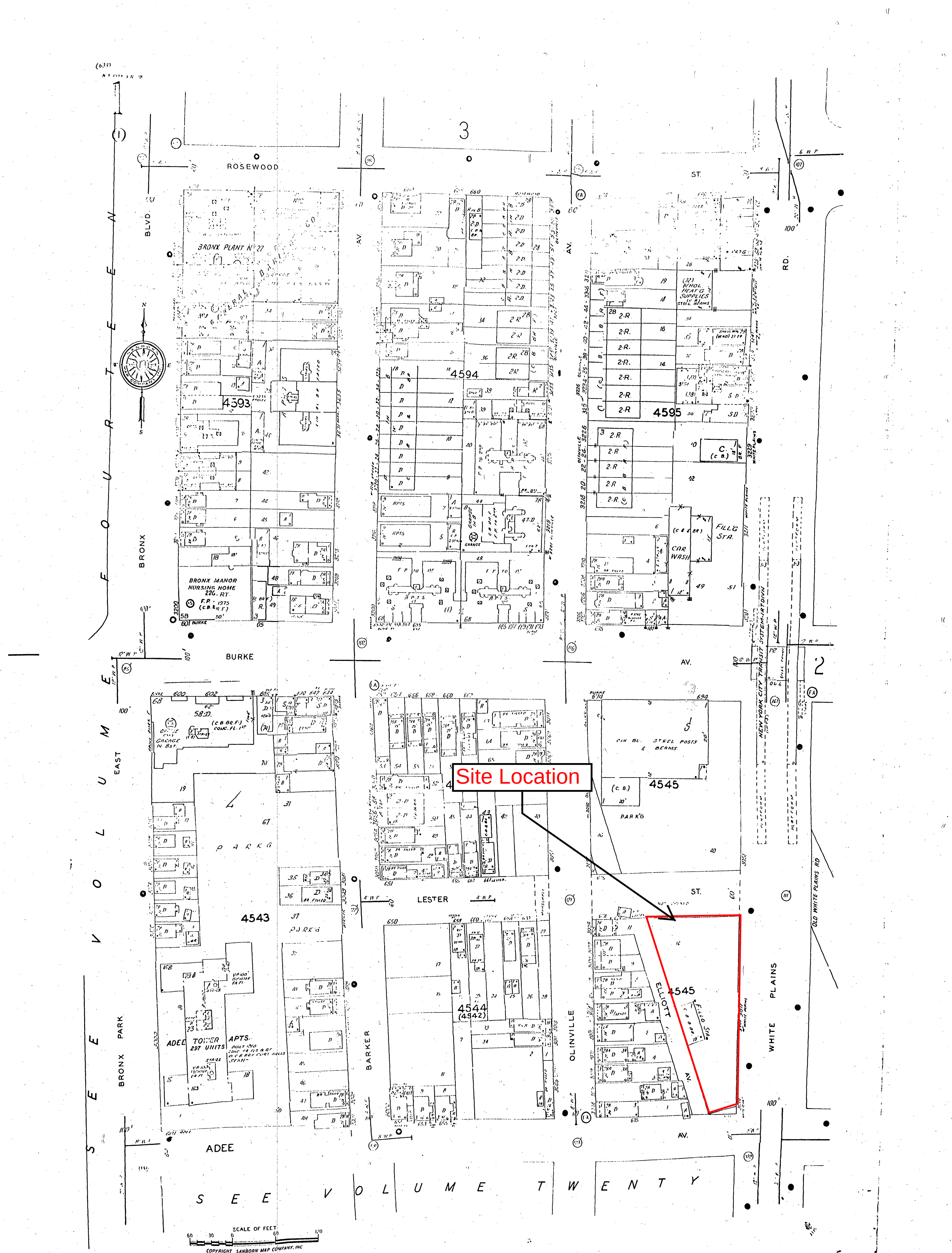
Copyright© 1935 The Sanborn Library, LLC HNS

Year EDR Research Associate



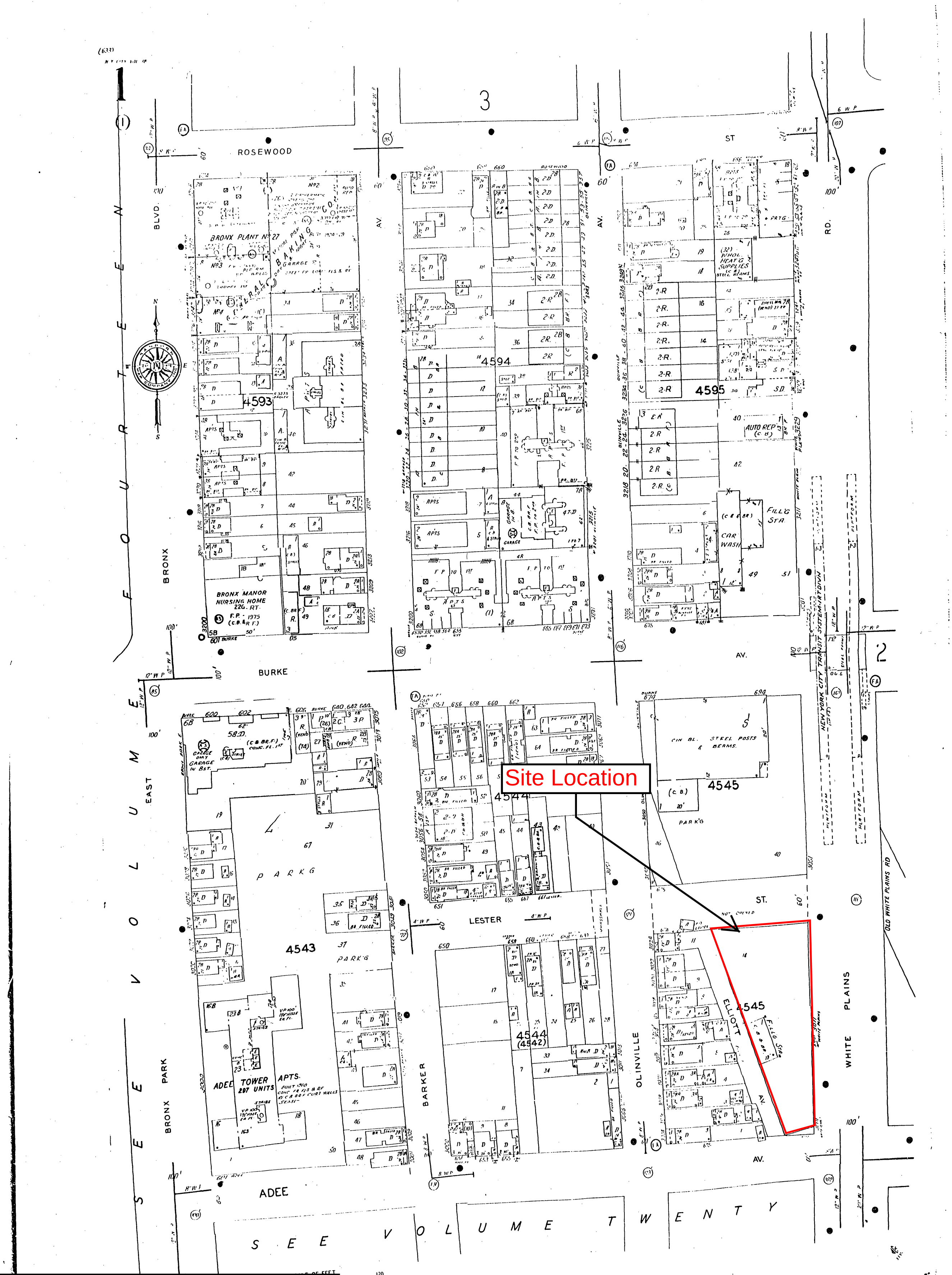
The Sanborn Library, LLC

Copyright© 1950 The Sanborn Library, LLC HNS
Year EDR Research Associate



The Sanborn Library, LLC

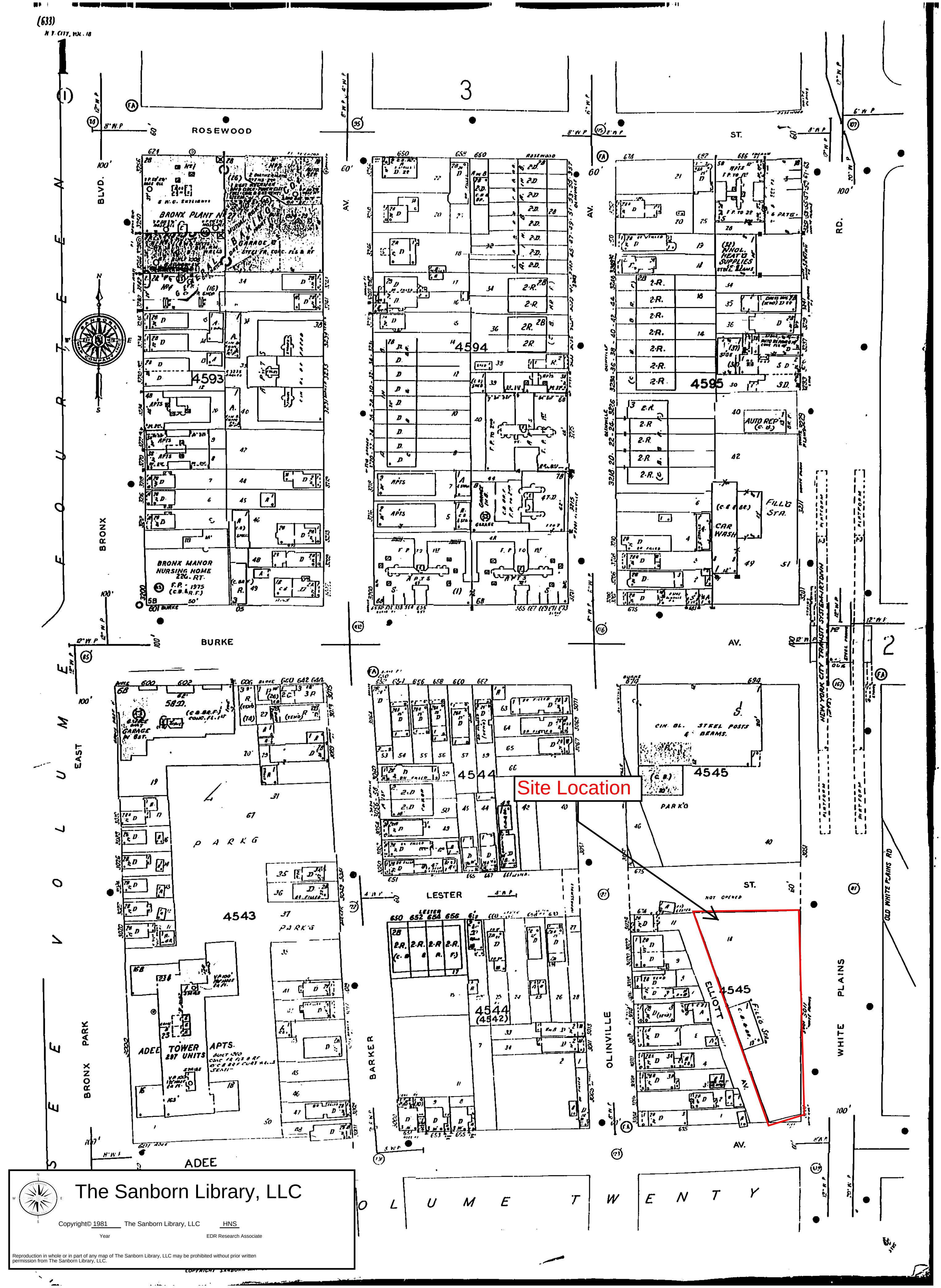
Copyright© 1976 The Sanborn Library, LLC HNS
Year EDR Research Associate



The Sanborn Library, LLC

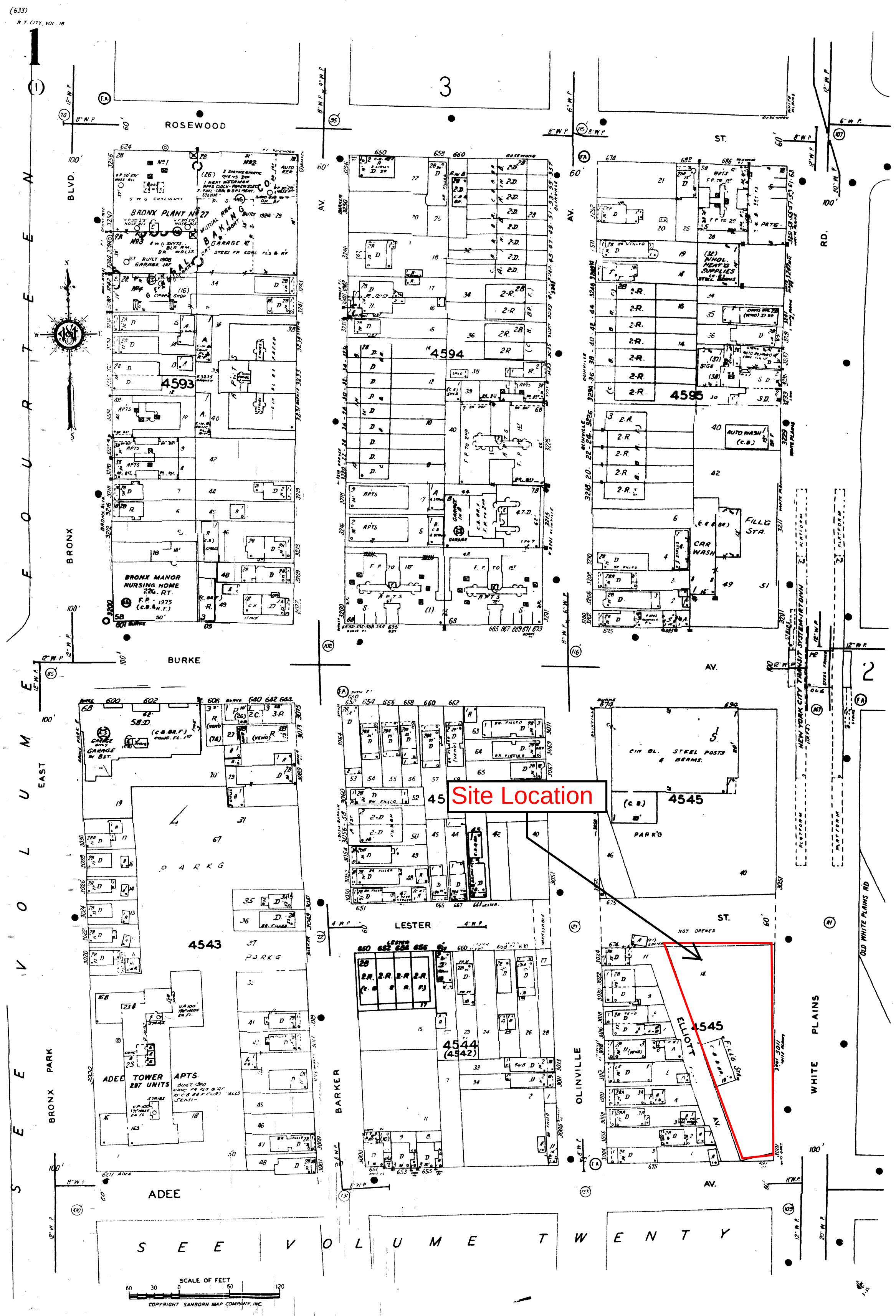
Copyright© 1978 The Sanborn Library, LLC HNS

Year EDR Research Associate



The Sanborn Library, LLC

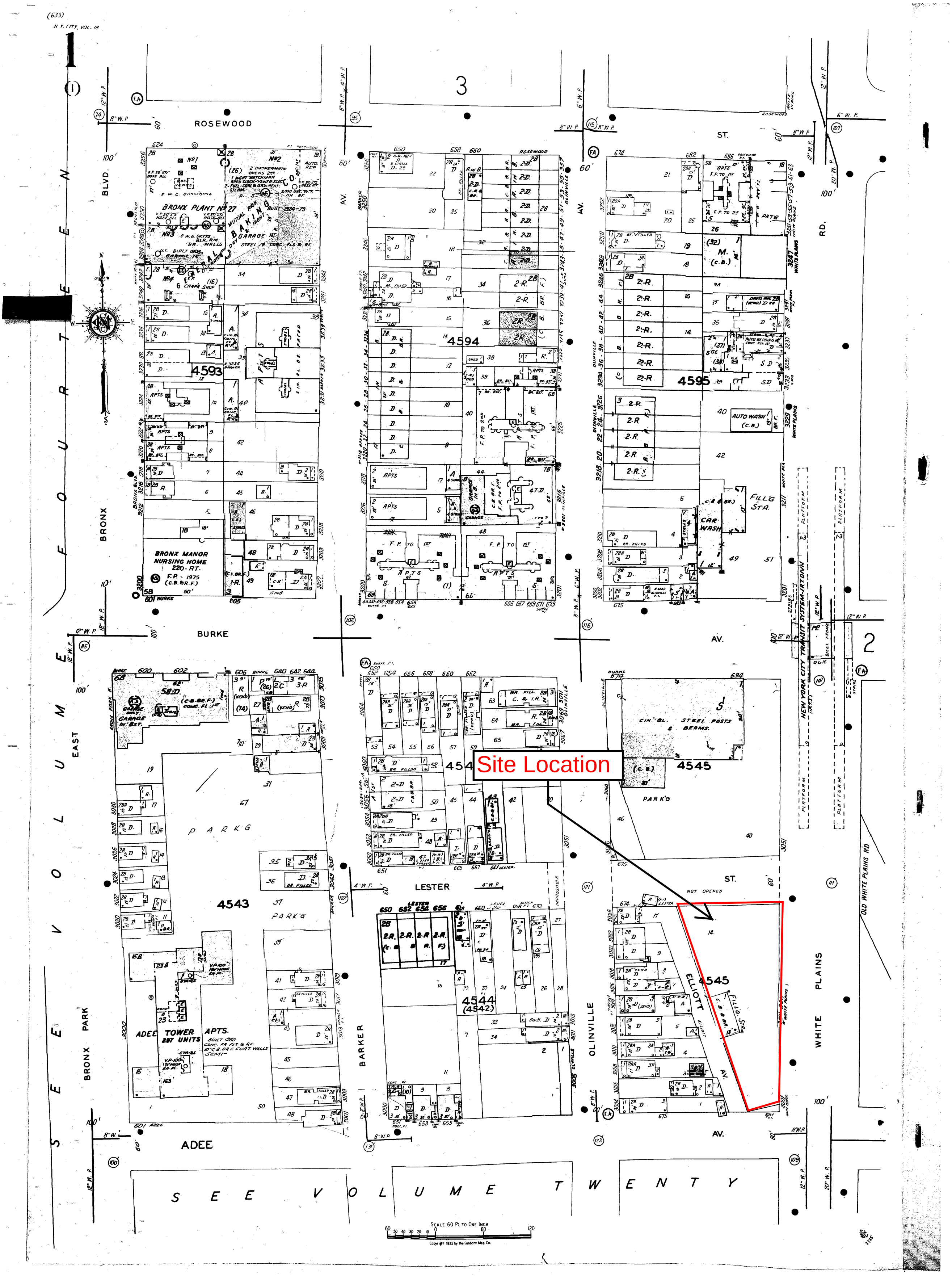
Copyright© 1981 The Sanborn Library, LLC HNS
Year EDR Research Associate



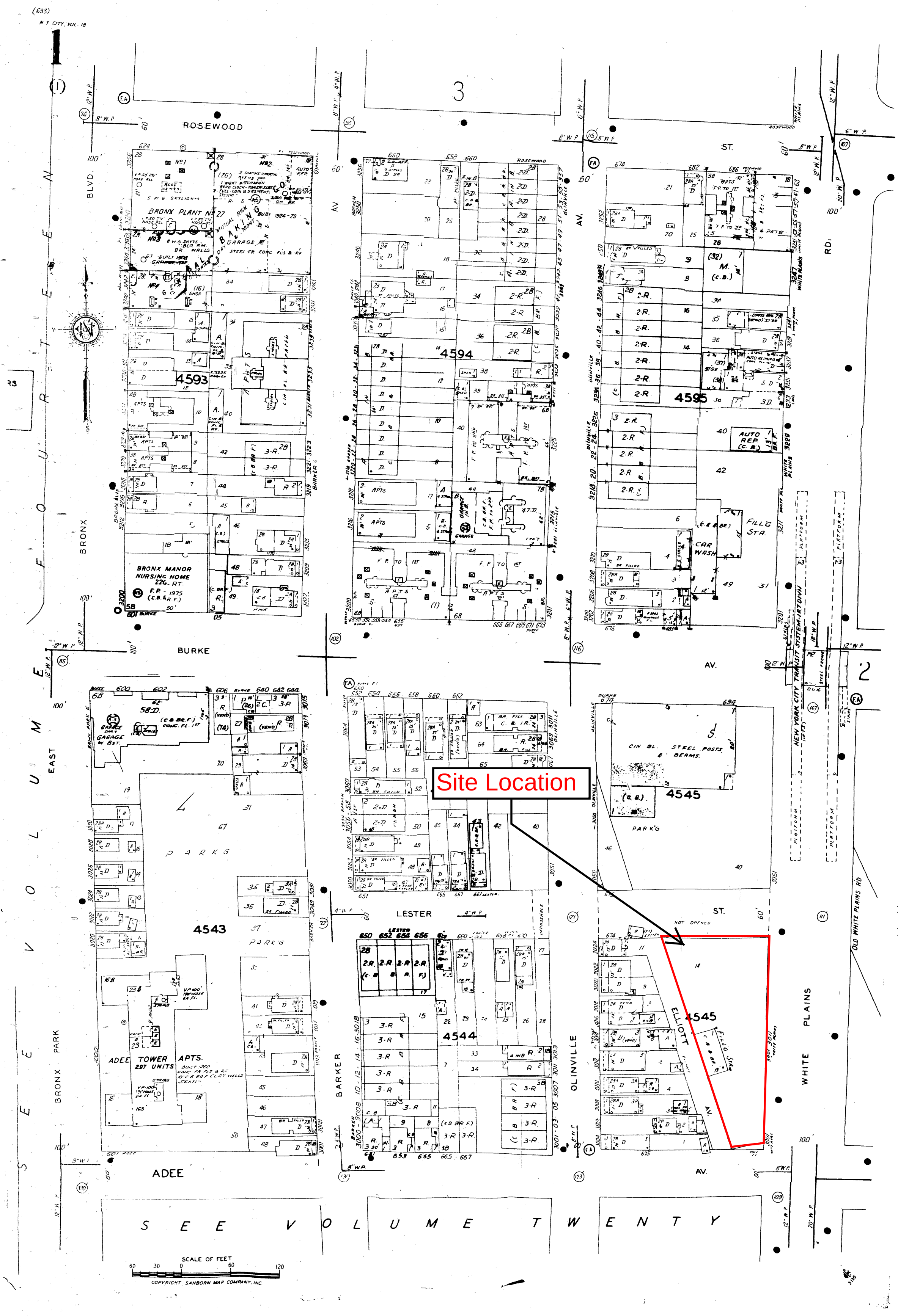
The Sanborn Library, LLC

Copyright© 1983 The Sanborn Library, LLC HNS

Year EDR Research Associate

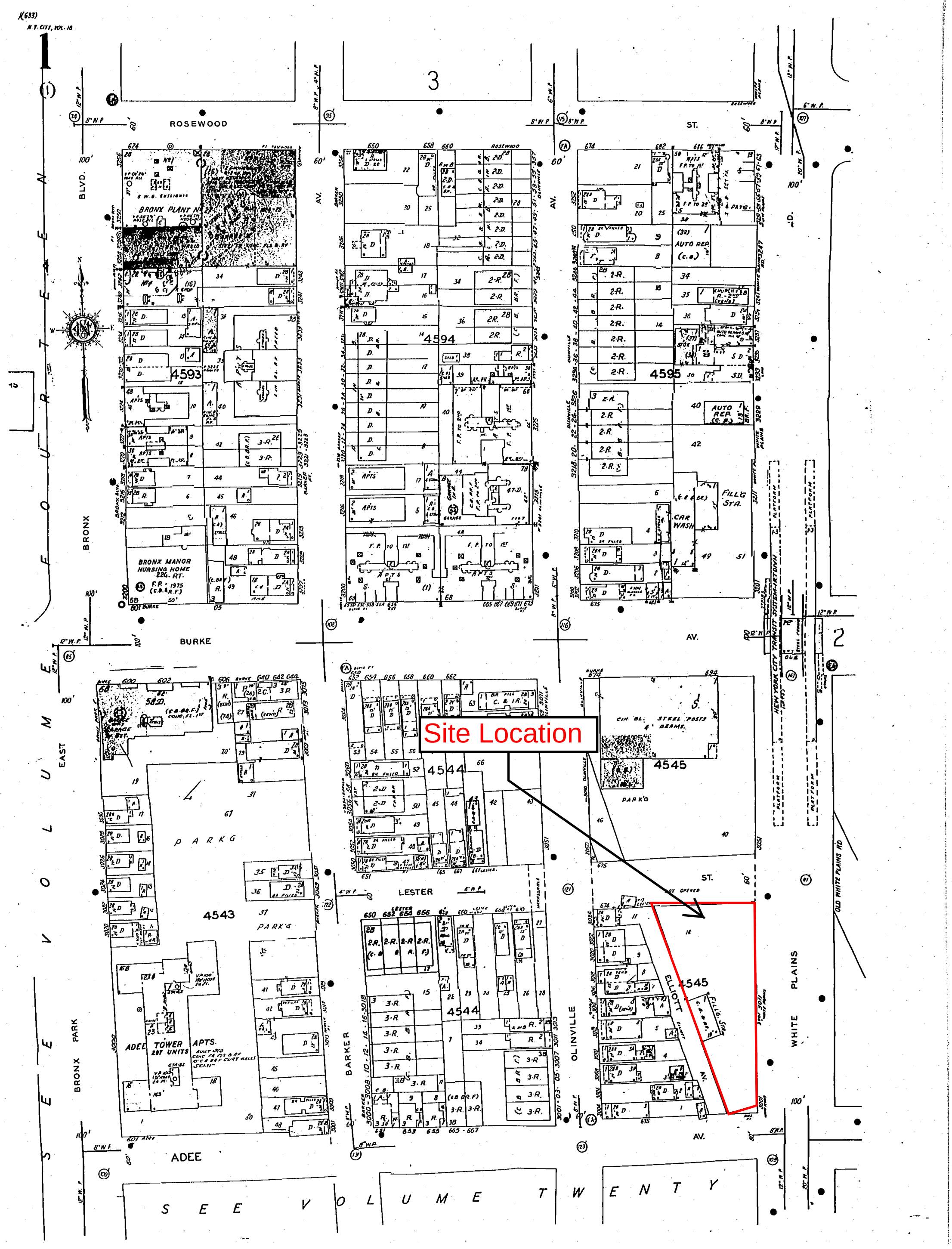


The Sanborn Library, LLC



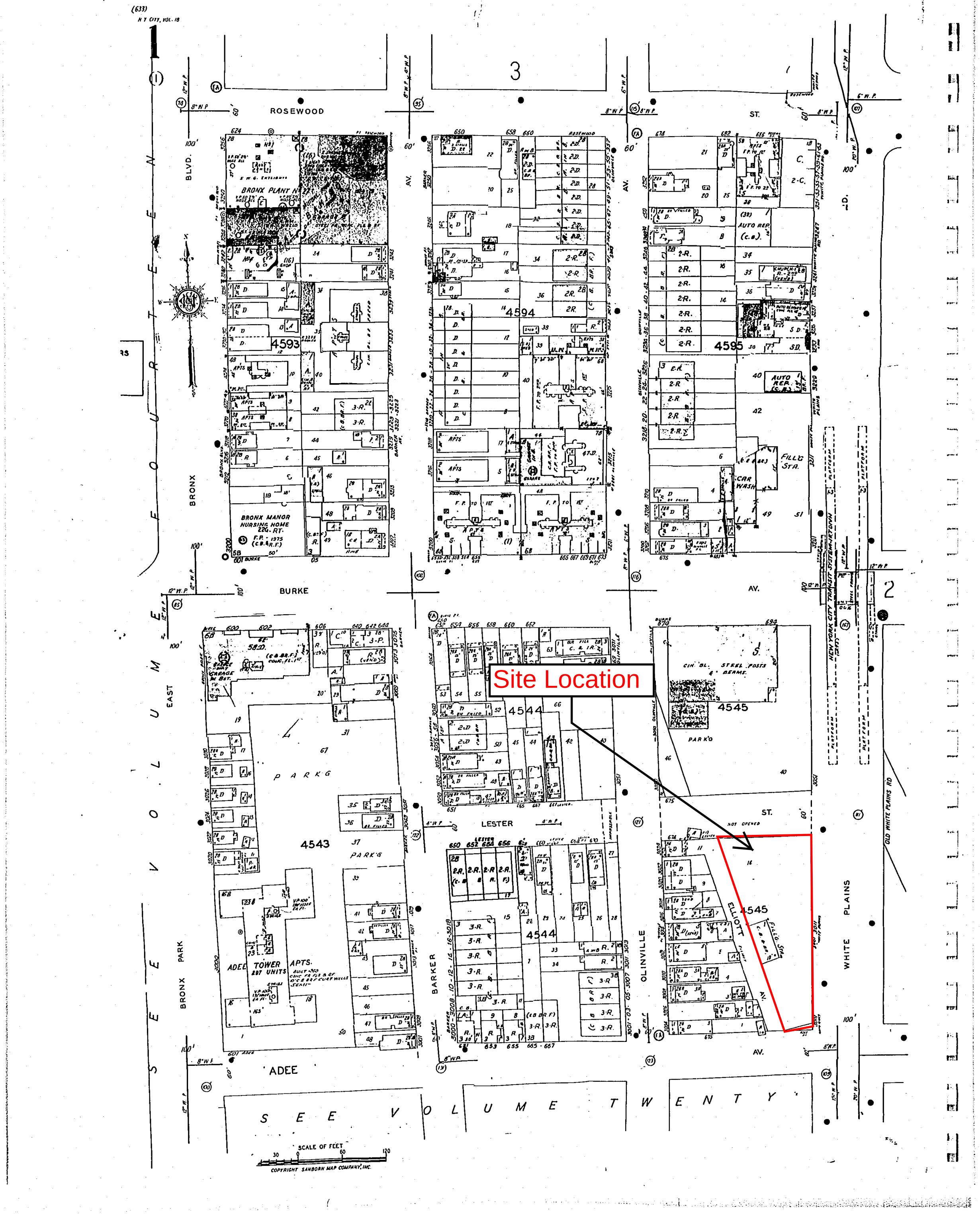
The Sanborn Library, LLC

Copyright© 1989 The Sanborn Library, LLC HNS
Year EDR Research Associate

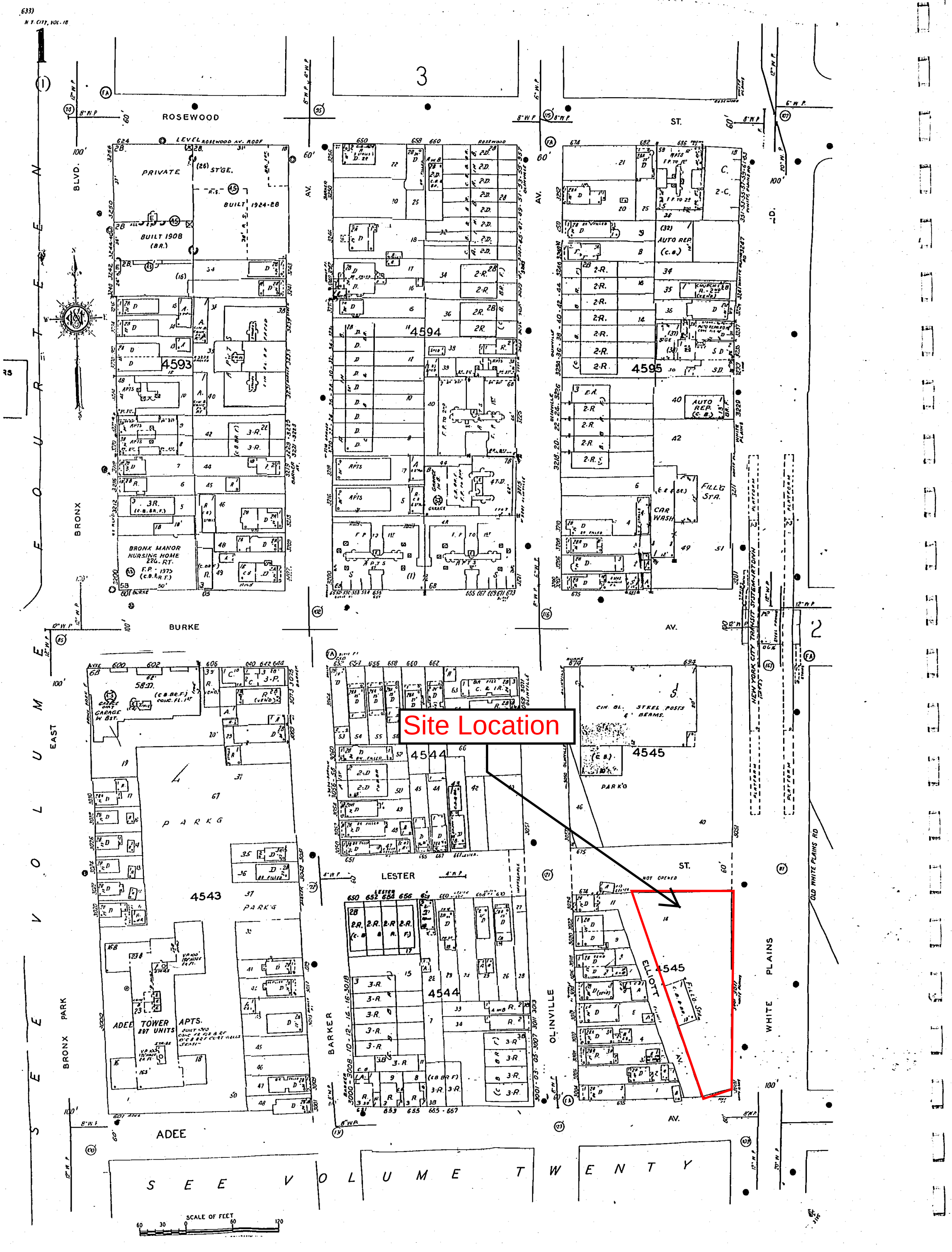


©1991 Sanborn Co., EDR Sanborn, Inc.

The Sanborn Library, LLC

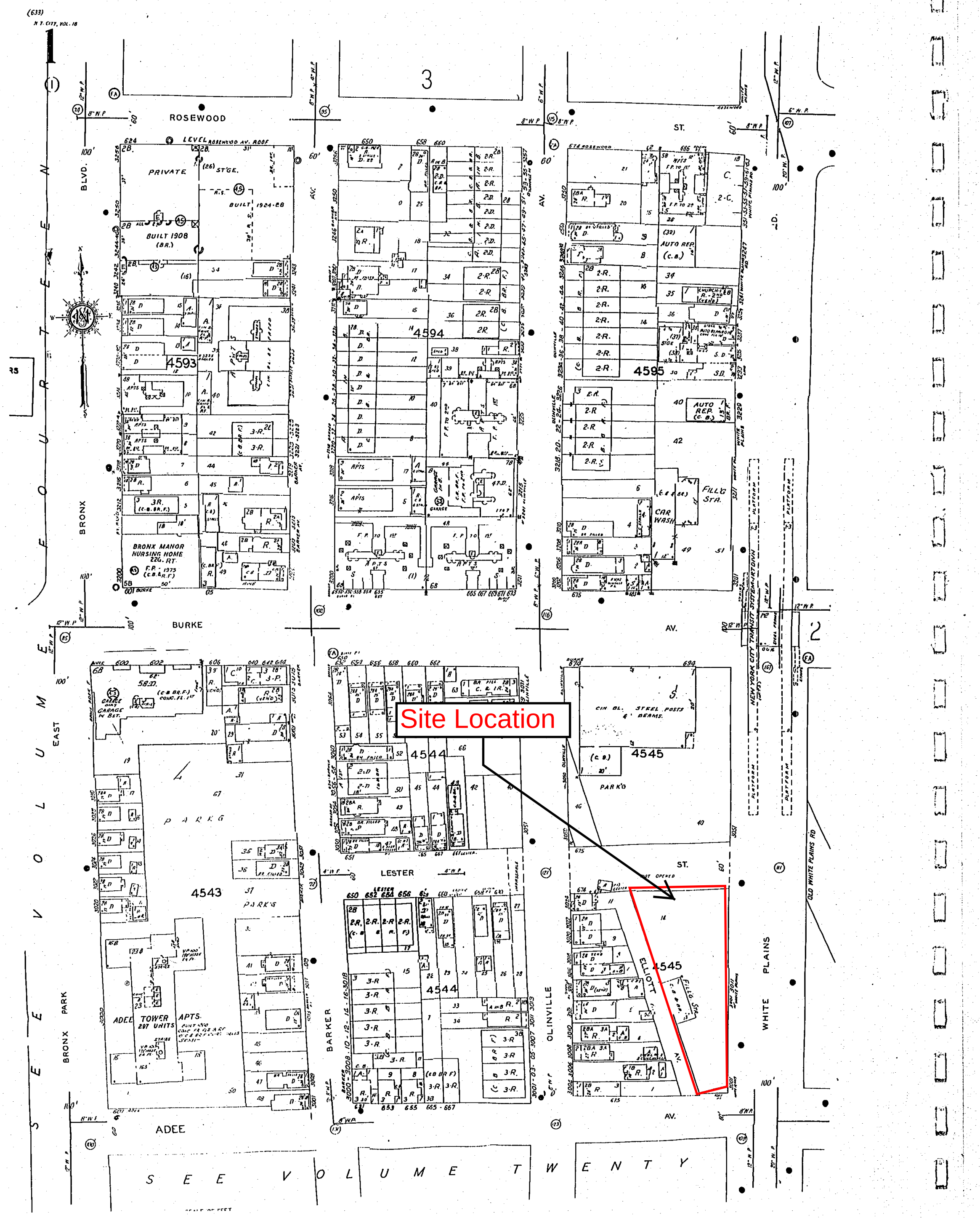


The Sanborn Library, LLC



©1993 Sanborn Co., EDR Sanborn, Inc.

The Sanborn Library, LLC

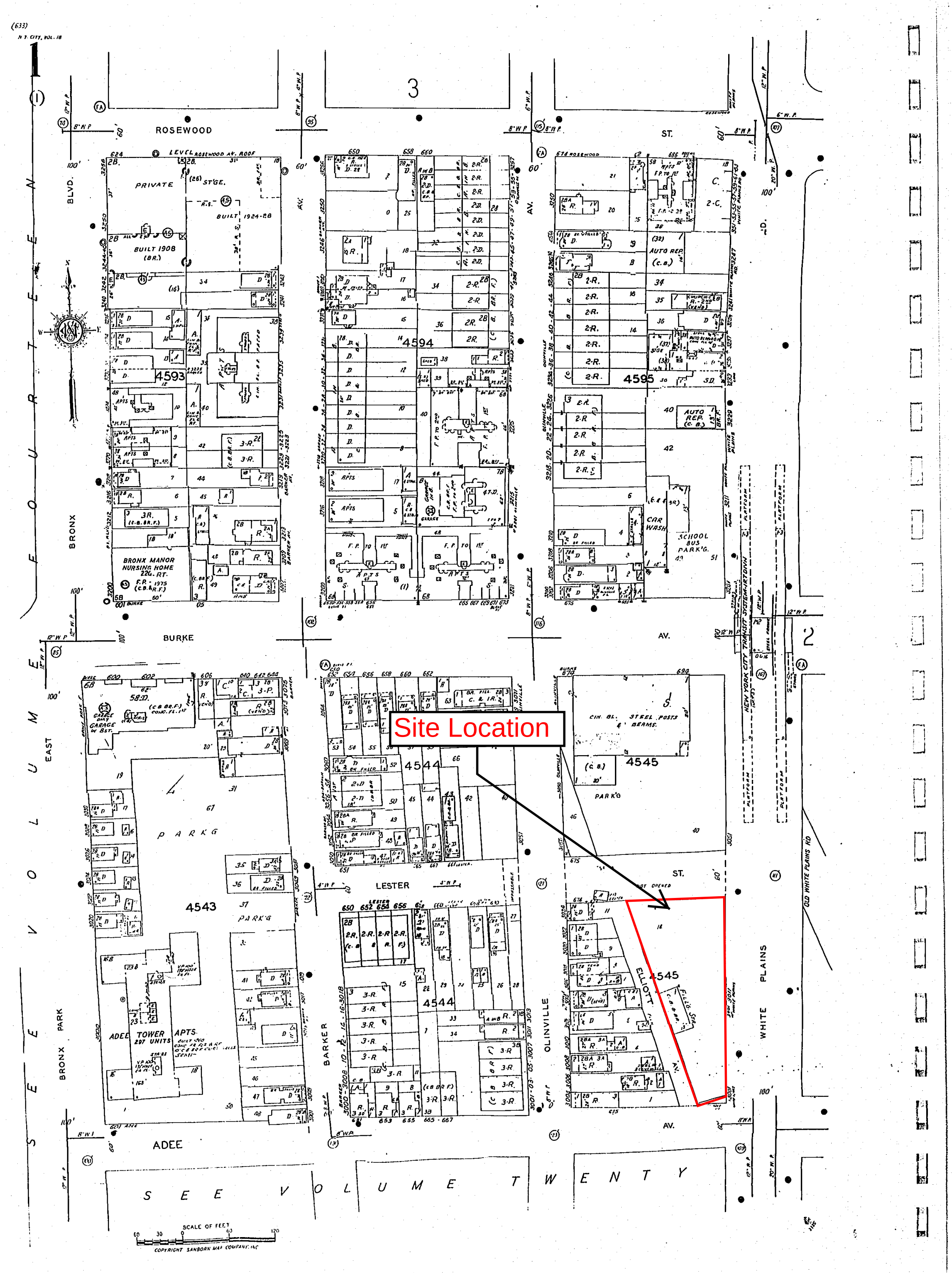


© 1995 Sanborn Co., EDR Sanborn, Inc.

The Sanborn Library, LLC

Copyright© 1995 The Sanborn Library, LLC HNS

Year EDR Research Associate



The Sanborn Library, LLC

HNS

Year

EDR Research Associate

APPENDIX - C
Environmental Easement

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this ________day of December, 2008, between Owners 3035 White Plains Housing Development Fund Corp. as nominee for 3035 White Plains Retail, LLC, and 3035 White Plains Housing Development Fund Corp. as nominee for Adee & Lester Limited Partnership, having an office c/o The Arker Companies located at 15 Verbena Avenue, Suite 100, Floral Park, New York 11001 (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner" or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and of ensuring the potential restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and;

WHEREAS, Grantor is the owner of real property located at the address of 3035 White Plains Road, in the City of New York, Bronx County, New York known and designated on the tax map of the Borough of the Bronx as tax map parcel numbers Block 4545, Lots 1001 and 1002 , being the same as to Lot 1001 as that property conveyed to Grantor 3035 White Plains Housing Development Fund Corp. as nominee for 3035 White Plains Retail LLC by deed on July 31, 2007, and recorded in the Land Records of the City Register for Bronx County on October 24, 2007 at computerized system tracking/ identification number 2007000536870 and that declaration of interest and nominee agreement by and between 3035 White Plains Housing

Development Fund Corp., and 3035 White Plains Retail LLC dated as of July 31, 2007 and recorded in the office of the City Register for Bronx County at computerized system tracking/ identification number 2007000536878; and being the same as to Lot 1002 as that property conveyed to Grantor 3035 White Plains Housing Development Fund Corp. as nominee for Adee and Lester Limited Partnership by deed on July 31, 2007, and recorded in the Land Records of the City Register for Bronx County on August 15, 2007 at computerized system tracking/ identification number 2007000422860 and that declaration of interest and nominee agreement by and between 3035 White Plains Housing Development Fund Corp., and Adee and Lester Limited Partnership dated as of July 31, 2007 and recorded in the office of the City Register for Bronx County at computerized system tracking/ identification number 2007000536871, comprised of approximately 0.39 acres, and hereinafter more fully described in Schedule A (Description of Property) and Schedule B (Map of Property) attached hereto and made a part hereof (the " Controlled Property"); and,

WHEREAS, the Commissioner does hereby acknowledge that the Department accepts this Environmental Easement in order to ensure the protection of human health and the environment and to achieve the requirements for remediation established at this Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36;and

NOW THEREFORE, in consideration of the covenants and mutual promises contained herein and the terms and conditions of Brownfield Cleanup Agreement Number W2-1108-07-07, Grantor grants, conveys and releases to Grantee a permanent Environmental Easement pursuant to Article 71, Title 36 of the ECL in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the potential restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The following controls apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees, and any person using the Controlled Property:

A. The Controlled Property may be used for unrestricted use so long as the following short-term engineering controls are employed:

(i) The use of the groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for the intended use and approval by the NYS Department of Health;

(ii) Compliance with all elements of the NYSDEC-approved Site Management Plan, dated November 2008 ("SMP").

The Grantor hereby acknowledges receipt of a copy of the NYSDEC-approved SMP. The SMP describes obligations that Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system on the Controlled Property, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for all uses. Upon notice of not less than thirty (30) days the Department in exercise of its discretion and consistent with applicable law may revise the SMP. This notice shall be a final agency determination. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Regional Remediation Engineer
Region 2
NYS DEC
One Hunter's Plaza
47-40 21st Street
Long Island City, NY 11101

or

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233

B. The above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an environmental easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

D. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

E. Grantor covenants and agrees that it shall annually, or such time as NYSDEC may allow, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury that the controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls employed at the Controlled Property were approved by the NYSDEC, and that nothing has occurred that would impair the ability of such control to protect the public health and environment or constitute a violation or failure to comply with any Site Management Plan for such controls and giving access to such Controlled Property to evaluate continued maintenance of such controls.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Controlled Property, including:

1. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

2. The right to give, sell, assign, or otherwise transfer the underlying fee interest to the Controlled Property by operation of law, by deed, or by indenture, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person intentionally violates this Environmental Easement, the Grantee may revoke the Certificate of Completion provided under ECL Article 27, Title 14, or Article 56, Title 5 with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach. Grantor shall then have a reasonable amount of time from receipt of such notice to cure. At the expiration of said second period, Grantee may commence any proceedings and take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement in accordance with applicable law to require compliance with the terms of this Environmental Easement.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar its enforcement rights in the event of a subsequent breach of or noncompliance with any of the terms of this Environmental Easement.

6. <u>Notice</u>. Whenever notice to the State (other than the annual certification) or approval from the State is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:
County, NYSDEC Site Number, NYSDEC Contract or Order Number, and the
County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to: Environmental Easement Attorney
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

Such correspondence shall be delivered by hand, or by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. <u>Recordation</u>. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. <u>Amendment</u>. This Environmental Easement may be amended only by an amendment executed by the Commissioner of the New York State Department of Environmental Conservation and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. <u>Extinguishment.</u> This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

Grantor's Name:
3035 White Plains Housing Development Fund Corp. as
Nominee for 3035 White Plains Retail, LLC

By: 3035 White Plains Retail, LLC, a New York limited
liability company, as Attorney-in-Fact

By:

Title: a member Date: 12-19-08

Grantor's Name:
3035 White Plains Housing Development Fund Corp. as
Nominee for Adee and Lester Limited Partnership

By: Adee and Lester Limited Partnership, a New York
limited partnership, as Attorney-in-Fact

By: Adee and Lester GP LLC, a New York limited
liability company, its General Partner

By: Bedford Park Associates, LLC, a New York
limited liability company, its Member

By:

Title: a member Date: 12-19-08

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation

by: ______________________
Alexander B. Grannis, Commissioner

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF Nassau)

On the 19th day of December in the year 20 08 before me, the undersigned, personally appeared Sol Arker personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Carol Giuliani
Notary Public - State of New York

CAROL GIULIANI
Notary Public, State of New York
No. 24-4903300
Qualified in Nassau County
Commission Expires July 31, 20 10

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF Nassau)

On the 19th day of December, in the year 20 08, before me, the undersigned, personally appeared Sol Arker personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Carol Giuliani
Notary Public - State of New York

CAROL GIULIANI
Notary Public, State of New York
No. 24-4903300
Qualified in Nassau County
Commission Expires July 31, 20 10

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the _______ day of _________, in the year 20__, before me, the undersigned, personally appeared ALEXANDER B. GRANNIS, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity as Commissioner of the State of New York Department of Environmental Conservation, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

____
Notary Public - State of New York

SCHEDULE A

SCHEDULE B

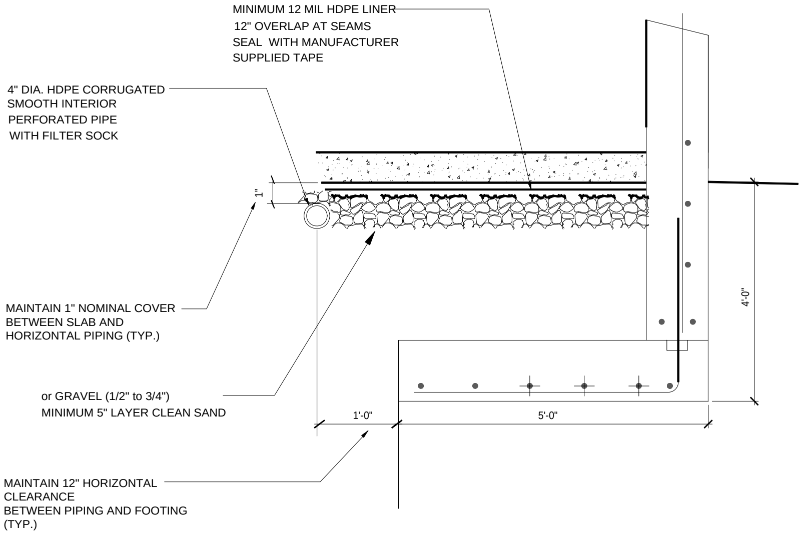
MAP OF CONTROLLED PROPERTY

APPENDIX - D

Digital Files of RAWP and Electronic Database

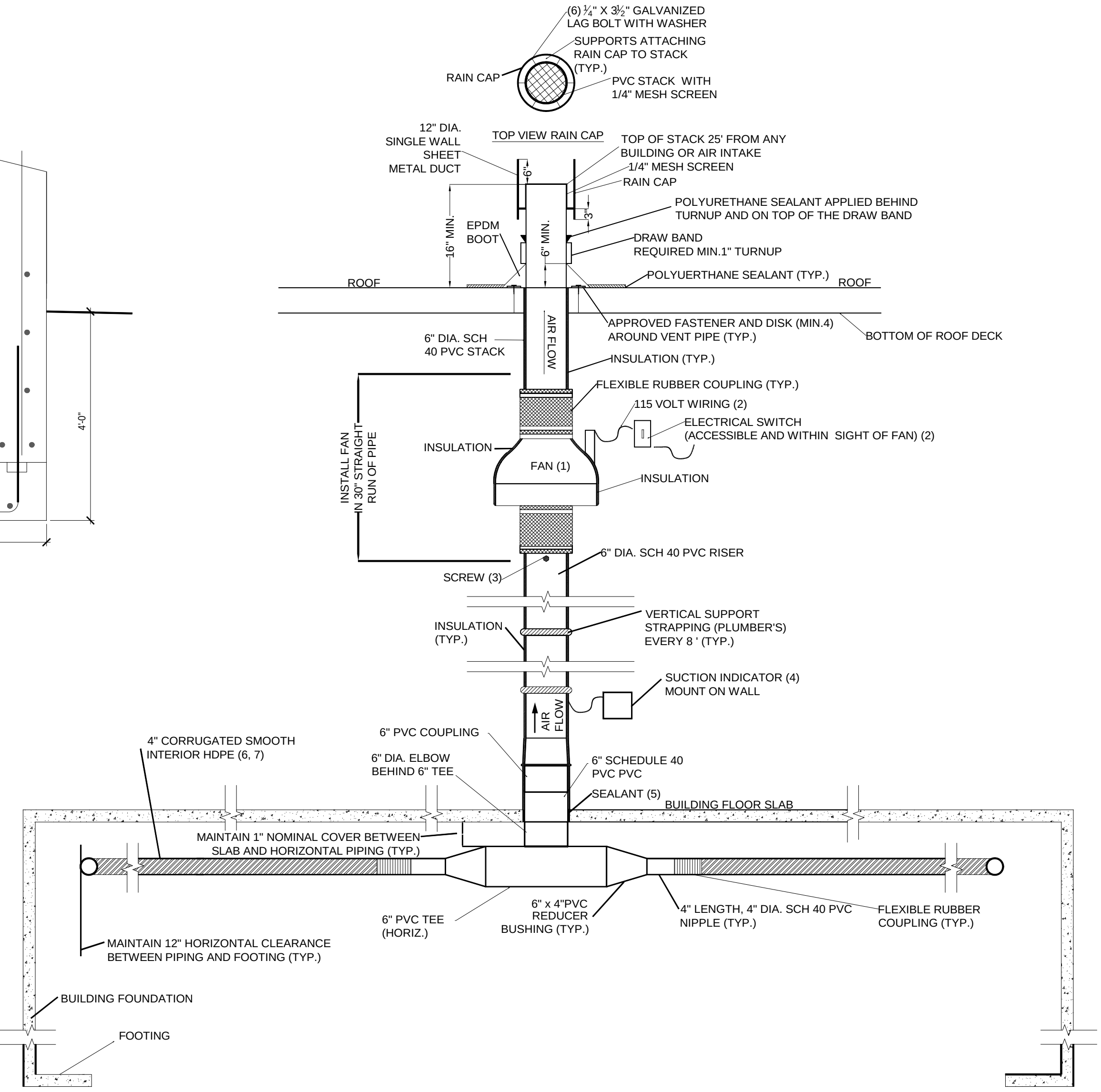
APPENDIX - E

Sub-Slab Depressurization System Details



A -A

N.T.S.



NOTES:

1. FAN TO BE RADONAWAY HIGH-FLOW IN-LINE FAN, MODEL RP 265, OR APPROVED EQUAL.
2. FAN AND ON/OFF SWITCH TO BE HARD-WIRED TOGETHER TO 115 VOLT CIRCUIT.
3. SECURE RUBBER COUPLING WITH SCREW TO PREVENT FAN ASSEMBLY FROM SLIPPING DOWN VERTICAL PIPE.
4. DWYER MAGNAHELIC DIAL TYPE VACUUM GAUGE MODEL 2002-M OR APPROVED EQUAL.
5. SEAL OPENING WITH ELASTOMERIC JOINT SEALANT AS DEFINED IN ASTM C920.
6. HIGH DENSITY POLYETHYLENE CORRUGATED PERFORATED PIPE WITH SMOOTH INTERIOR WATERWAY. ADS N-12 OR APPROVED EQUAL.
7. WRAP 4' HDPE PIPE WITH GEOTEXTILE FABRIC, GSE NW4 OR APPROVED EQUAL.
8. NYSDEC MUST PRE-APPROVE ALL FILLMATERIAL BEFORE DELIVERY TO SITE. VIRGIN MINED MATERIAL ONLY.

SUB - SLAB VENTING SYSTEM - DETAIL/ELEVATION

N.T.S.

TYPICAL PLAN

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

1808 Middle Country Road
Ridge, NY 11961

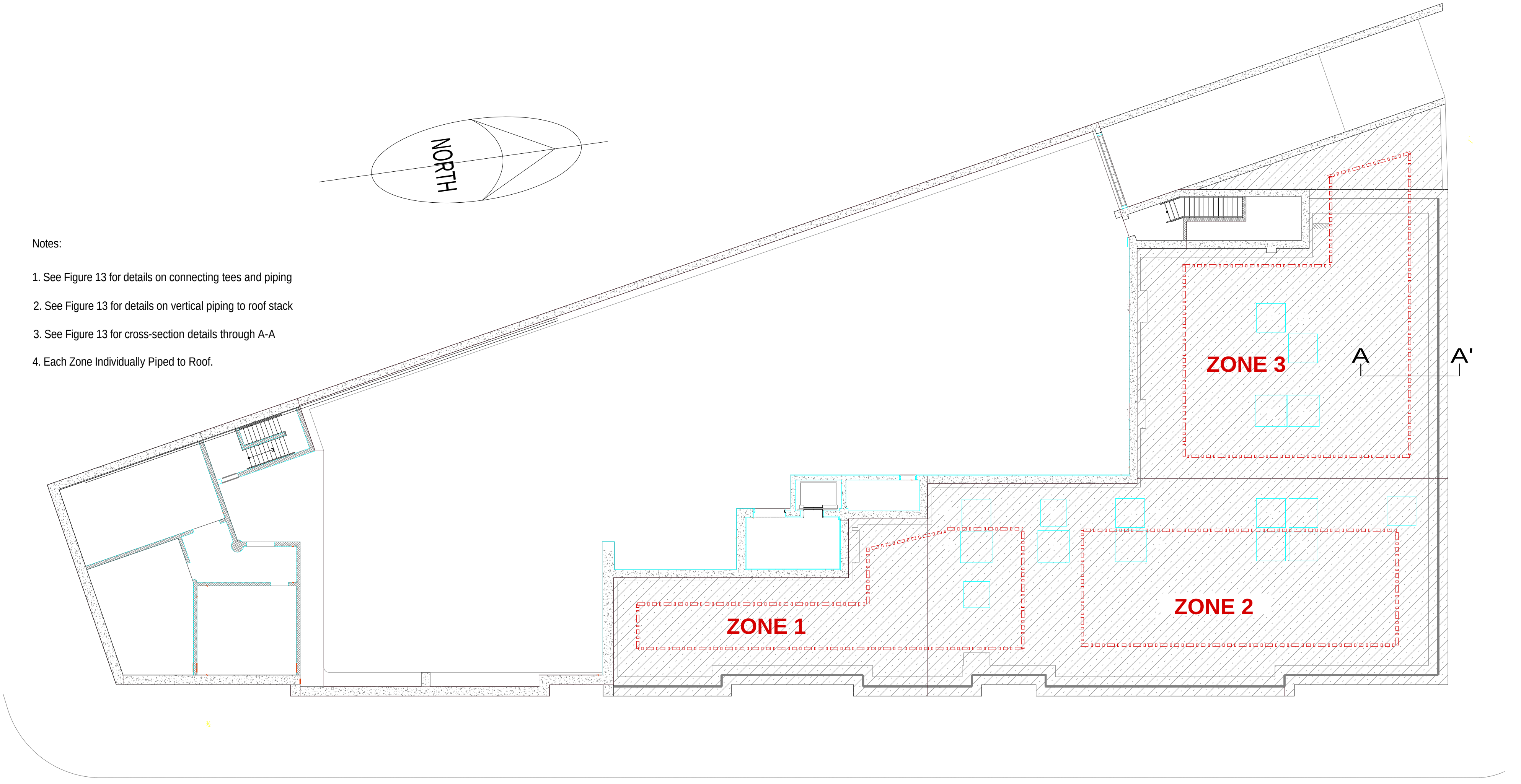
Phone *631.924.0870*
Fax *631. 924 .2870*

3035 WHITE PLAINS ROAD, BRONX, NY

SSDS - DETAIL

Notes:

1. See Figure 13 for details on connecting tees and piping
2. See Figure 13 for details on vertical piping to roof stack
3. See Figure 13 for cross-section details through A-A
4. Each Zone Individually Piped to Roof.



-·-·-·- 4" Perforated HDPE vent line w / filter sock

0 15 30

1inch = 30 feet

WHITE PLAINS ROAD

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

Phone	631.504.6000
Fax	631. 924 .2870

FORMER DICO G AUTO & TRUCK REPAIR
3035 WHITE PLAINS ROAD, BRONX, NY

SUB-SLAB DEPRESSURIZATION SYSTEM LAYOUT

APPENDIX - F

Chemical Oxidant Documentation

FMC

Environmental Solutions

Klozur™ Activation Chemistries

Selection Guide: ✓ **recommended, lab or field data demonstrating success**
■ **recommended, no available lab or field data**
Ø **not recommended**

Activator Contaminant	Fe Chelate	Alkaline	Hydrogen Peroxide	Heat
Chlorinated Solvents				
Tetrachloroethene (PCE)	✓	✓	✓	✓
Trichloroethene (TCE)	✓	✓	✓	✓
Dichloroethene (*cis* and *trans* DCE)	✓	✓	✓	✓
Trichloroethane (TCA)	Ø	✓	✓	✓
Dichloroethane (DCA)	Ø	✓	■	✓
Carbon tetrachloride	Ø	✓	✓	✓
Chloroethane	Ø	■	■	✓
Chloroform	Ø	✓	✓	✓
Chloromethane	Ø	■	■	✓
Chlorotoluene	■	■	■	✓
Methylene chloride	Ø	✓	✓	✓
Vinyl chloride	✓	✓	✓	✓
Dichloropropane	Ø	■	■	✓
Dichloropropene	Ø	■	■	✓
Hexachlorobutadiene	Ø	■	■	✓
Tetrachloroethane	Ø	■	✓	■
Trichloropropane	Ø	■	■	✓
BTEX				
Benzene	✓	✓	✓	✓
Toluene	✓	✓	✓	✓
Ethylbenzene	✓	✓	✓	✓
Xylenes	✓	✓	✓	✓
PAHs				
Acenaphthene	✓	✓	■	✓
Acenaphthylene	✓	✓	■	✓
Anthracene	■	✓	■	■
Benzo(a)anthracene	■	✓	■	■
Benzo(a)pyrene	■	✓	■	■
Benzo(b)fluoranthene	■	✓	■	■
Benzo(ghi)perylene	■	✓	■	■
Bis(2-ethyhexyl)phthalate	■	✓	■	■
n-butylbenzene	✓	■	■	✓
Chrysene	■	✓	■	■
Dibenzo(ah)anthracene	■	✓	■	■
Fluorene	✓	✓	■	✓
Naphthalene	✓	✓	■	✓
Nitrobenzene	Ø	Ø	✓	✓
Phenathrene	✓	✓	✓	✓
Propylbenzene	✓	✓	✓	✓
4-iso-propyltoluene	✓	✓	✓	✓
Pyrene	■	✓	■	■
Styrene	✓	✓	✓	✓
Trimethylbenzene	✓	✓	✓	✓
Oxygenates				
Methyl tert-butyl ether (MTBE)	✓	✓	✓	✓
Tert-butyl alcohol (TBA)	✓	✓	✓	✓

Environmental Solutions

Selection Guide: ✓ **recommended, lab or field data demonstrating success**

■ **recommended, no available lab or field data**

Ø **not recommended**

Contaminant / Activator	Fe Chelate	Alkaline	Hydrogen Peroxide	Heat
Petroleum Hydrocarbons				
GRO (octane)	Ø	✓	✓	■
DRO (dodecane)	Ø	✓	✓	■
ORO (C20 alkane)	Ø	✓	✓	■
Creosote (coal tar)	✓	✓	■	■
Chlorobenzenes				
Chlorobenzene	✓	✓	■	✓
Dichlorobenzene	✓	✓	■	✓
Trichlorobenzene	Ø	✓	■	✓
Phenols				
Phenol	■	■	■	✓
4-chloro-3-methyl phenol	■	■	■	✓
2-chlorophenol	■	■	■	✓
2,4-dichlorophenol	■	■	■	✓
2,4-dinitrophenol	■	■	■	✓
4-nitrophenol	■	■	■	✓
Pentachlorophenol	■	■	■	✓
Haloalkanes				
Dichlorodifluoromethane (Freon 12)	Ø	✓	■	✓
Trichlorofluouromethane (Freon 11)	Ø	✓	■	✓
Trichlorotrifluoroethane (Freon 113)	Ø	✓	■	✓
Pesticides				
α-Chlordane	Ø	✓	■	✓
DDD	Ø	✓	■	✓
DDE	Ø	✓	■	✓
DDT	Ø	✓	■	✓
Heptachlor Epoxide	Ø	✓	■	✓
Lindane (hexachlorocyclohexane)	✓	✓	✓	✓
Miscellaneous				
Acetone	■	✓	✓	✓
4-methyl-2-pentanone (MIBK)	✓	■	✓	✓
1,4-dioxane	✓	✓	✓	✓
BCEE	Ø	✓	✓	✓
BCEM	Ø	✓	✓	✓
Perchlorate	Ø	Ø	Ø	Ø
Polychlorinated biphenyls (PCBs)	Ø	✓	■	✓

The Klozur™ Activator Selection Guide is for guidance only. It is recommended that a suitable treatability study be performed to verify applicability to you specific contaminant and site conditions.

Although the above information accurately reflects current knowledge, FMC makes no warranty or representation, expressed or inferred, and nothing herein should be construed as to guaranteeing actual results in field use, or permission or recommendation to infringe any patent. No agent, representative or employee of FMC is authorized to vary any terms of this notice. FMC is the owner or licensee under various patents and patent applications relating to the use of these activator chemistries.

Technical data

Klozur™

Environmental grade persulfate
CAS No. 7775-27-1

Typical formula by weight percent	$Na_2S_2O_8$	99% MW 238.1 g/mol
Active oxygen content		6.7%
pH of solution strength	**wt%**	**pH**
	20%	5.9
	Note: pH of solution will decrease over time.	

Typical properties

Odor	none
Appearance	white crystals
Melting point	decomposes
Solubility @ 25°C	73 grms/100 grms H_2O
Loose bulk density, lb/ft^3	69.9
Crystal density, g/cc	2.59

Typical metallic impurity concentrations (ppm)

Iron	2
Copper	<0.2
Chromium	<0.15
Lead	<0.2

Uses

Chemical oxidation of organic contaminants in conjunction with FMC Activation Chemistries

Shipment/container information:

DOT Classification: 5.1 (Oxidizer), yellow Oxidizer label.
55 lb (25 kg) polyethylene bag;
225 lb (102.3 kg) fiber drum with polyethylene liner;
2,200 lb (1,000 kg) woven polypropylene sack with polyethylene liner

HMIS classification:

Health	1
Flammability	0
Physical hazard	1
Personal protection	J

FMC Corporation   Active Oxidants Division   1735 Market Street   Philadelphia, Pennsylvania 19103   215-299-6000

MATERIAL SAFETY DATA SHEET

Klozür™

MSDS Ref. No.: 7775-27-1-12
Date Approved: 02/22/2005
Revision No.: 1

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the Canada's Workplace Hazardous Materials Information System (WHMIS) and, the EC Directive, 2001/58/EC.

---

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	Klozür™
SYNONYMS:	Sodium Persulfate, Sodium Peroxydisulfate; Disodium Peroxydisulfate
GENERAL USE:	In situ and ex situ chemical oxidation of contaminants and compounds of concern for environmental remediation applications.

MANUFACTURER

FMC CORPORATION
Active Oxidants Division
1735 Market Street
Philadelphia, PA 19103
(215) 299-6000 (General Information)

EMERGENCY TELEPHONE NUMBERS

(800) 424-9300 (CHEMTREC - U.S.)
(303) 595-9048 (Medical - Call Collect)

---

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- White, odorless, crystals
- Oxidizer.
- Decomposes in storage under conditions of moisture (water/water vapor) and/or excessive heat causing release of oxides of sulfur and oxygen that supports combustion. Decomposition could form a high temperature melt. See Section 10 ("Stability and Reactivity").

POTENTIAL HEALTH EFFECTS: Airborne persulfate dust may be irritating to eyes, nose, lungs, throat and skin upon contact. Exposure to high levels of persulfate dust may cause difficulty in breathing in sensitive persons.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt.%	EC No.	EC Class
Sodium Persulfate	7775-27-1	>99	231-892-1	Not classified as hazardous

4. FIRST AID MEASURES

EYES: Flush with plenty of water. Get medical attention if irritation occurs and persists.

SKIN: Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

INGESTION: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

NOTES TO MEDICAL DOCTOR: This product has low oral toxicity and is not irritating to the eyes and skin. Flooding of exposed areas with water is suggested, but gastric lavage or emesis induction for ingestions must consider possible aggravation of esophageal injury and the expected absence of system effects. Treatment is controlled removal of exposure followed by symptomatic and supportive care.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Deluge with water.

FIRE / EXPLOSION HAZARDS: Product is non-combustible. On decomposition releases oxygen which may intensify fire. Presence of water accelerates decomposition.

FIRE FIGHTING PROCEDURES: Do not use carbon dioxide or other gas filled fire extinguishers; they will have no effect on decomposing persulfates. Wear full protective clothing and self-contained breathing apparatus.

FLAMMABLE LIMITS: Non-combustible

SENSITIVITY TO IMPACT: No data available

SENSITIVITY TO STATIC DISCHARGE: Not available

---

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Spilled material should be collected and put in approved DOT container and isolated for disposal. Isolated material should be monitored for signs of decomposition (fuming/smoking). If spilled material is wet, dissolve with large quantity of water and dispose as a hazardous waste. All disposals should be carried out according to regulatory agencies procedures.

---

7. HANDLING AND STORAGE

HANDLING: Use adequate ventilation when transferring product from bags or drums. Wear respiratory protection if ventilation is inadequate or not available. Use eye and skin protection. Use clean plastic or stainless steel scoops only.

STORAGE: Store (unopened) in a cool, clean, dry place away from point sources of heat, e.g. radiant heaters or steam pipes. Use first in, first out storage system. Avoid contamination of opened product. In case of fire or decomposition (fuming/smoking) deluge with plenty of water to control decomposition. For storage, refer to NFPA Bulletin 430 on storage of liquid and solid oxidizing materials.

COMMENTS: VENTILATION: Provide mechanical general and/or local exhaust ventilation to prevent release of dust into work environment. Spills should be collected into suitable containers to prevent dispersion into the air.

---

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
Sodium Persulfate	0.1 mg/m^3 (TWA)		

ENGINEERING CONTROLS: Provide mechanical local general room ventilation to prevent release of dust into the work environment. Remove contaminated clothing immediately and wash before reuse.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Use cup type chemical goggles. Full face shield may be used.

RESPIRATORY: Use approved dust respirator when airborne dust is expected.

PROTECTIVE CLOTHING: Normal work clothes. Rubber or neoprene footwear.

GLOVES: Rubber or neoprene gloves. Thoroughly wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	None
APPEARANCE:	White crystals
AUTOIGNITION TEMPERATURE:	Not applicable. No evidence of combustion up to 800°C. Decomposition will occur upon heating.
BOILING POINT:	Not applicable
COEFFICIENT OF OIL / WATER:	Not applicable
DENSITY / WEIGHT PER VOLUME:	Not available
EVAPORATION RATE:	Not applicable (Butyl Acetate = 1)
FLASH POINT:	Non-combustible
MELTING POINT:	Decomposes
ODOR THRESHOLD:	Not applicable
OXIDIZING PROPERTIES:	Oxidizer
PERCENT VOLATILE:	Not applicable
pH:	typically 5.0 - 7.0 @ 25 °C (1% solution)
SOLUBILITY IN WATER:	73 % @ 25 °C (by wt.)
SPECIFIC GRAVITY:	2.6 (H_2O=1)
VAPOR DENSITY:	Not applicable (Air = 1)
VAPOR PRESSURE:	Not applicable

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Heat, moisture and contamination.
STABILITY:	Stable (becomes unstable in presence of heat, moisture and/or contamination).
POLYMERIZATION:	Will not occur
INCOMPATIBLE MATERIALS:	Acids, alkalis, halides (fluorides, chlorides, bromides and iodides), combustible materials, most metals and heavy metals, oxidizable materials, other oxidizers, reducing agents, cleaners, and organic or carbon containing compounds. Contact

	with incompatible materials can result in a material decomposition or other uncontrolled reactions.
HAZARDOUS DECOMPOSITION PRODUCTS:	Oxygen that supports combustion and oxides of sulfur.

COMMENTS: PRECAUTIONARY STATEMENT: Pumping and transport of Klozür persulfate requires appropriate precautions and design considerations for pressure and thermal relief.

Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated.

Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Non-irritating (rabbit) [FMC Study Number: ICG/T-79.029]

SKIN EFFECTS: Non-irritating (rabbit) [FMC Study Number: ICG/T-79.029]

DERMAL LD_{50}: > 10 g/kg [FMC Study Number: ICG/T-79.029]

ORAL LD_{50}: 895 mg/kg (rat) [FMC Study Number: ICG/T-79.029]

INHALATION LC_{50}: 5.1 mg/l (rat) [FMC I95-2017]

SENSITIZATION: May be sensitizing to allergic persons. [FMC Study Number: ICG/T-79.029]

TARGET ORGANS: Eyes, skin, respiratory passages

ACUTE EFFECTS FROM OVEREXPOSURE: Dust may be harmful and irritating. May be harmful if swallowed.

CHRONIC EFFECTS FROM OVEREXPOSURE: Sensitive persons may develop dermatitis and asthma [Respiration 38:144, 1979]. Groups of male and female rats were fed 0, 300 or 3000 ppm sodium persulfate in the diet for 13 weeks, followed by 5000 ppm for 5 weeks. Microscopic examination of tissues revealed some injury to the gastrointestinal tract at the high dose (3000 ppm) only. This effect is not unexpected for an oxidizer at high concentrations. [Ref. FMC I90-1151, Toxicologist 1:149, 1981].

CARCINOGENICITY:

NTP:	Not listed
IARC:	Not listed
OSHA:	Not listed
OTHER:	ACGIH: Not listed

---

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:

Bluegill sunfish, 96-hour LC_{50} = 771 mg/L [FMC Study I92-1250]
Rainbow trout, 96-hour LC_{50} = 163 mg/L [FMC Study I92-1251]
Daphnia, 48-hour LC_{50} = 133 mg/L [FMC Study I92-1252]
Grass shrimp, 96-hour LC_{50} = 519 mg/L [FMC Study I92-1253]

CHEMICAL FATE INFORMATION: Biodegradability does not apply to inorganic substances.

---

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose as a hazardous waste in accordance with local, state and federal regulatory agencies.

---

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PROPER SHIPPING NAME:	Sodium Persulfate
PRIMARY HAZARD CLASS / DIVISION:	5.1 (Oxidizer)
UN/NA NUMBER:	UN 1505
PACKING GROUP:	III
LABEL(S):	5.1 (Oxidizer)
PLACARD(S):	5.1 (Oxidizer)
MARKING(S):	Sodium Persulfate, UN 1505
ADDITIONAL INFORMATION:	Hazardous Substance/RQ: Not applicable

	49 STCC Number: 4918733
	This material is shipped in 225 lb. fiber drums, 55 lb. poly bags and 1000 - 2200 lb. IBC's (supersacks).

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PROPER SHIPPING NAME:	Sodium Persulfate

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

PROPER SHIPPING NAME:	Sodium Persulfate

OTHER INFORMATION:

Protect from physical damage. Do not store near acids, moisture or heat.

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):
Not applicable

SECTION 311 HAZARD CATEGORIES (40 CFR 370):
Fire Hazard, Immediate (Acute) Health Hazard

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.: None

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):
Not listed

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):
Unlisted, RQ = 100 lbs., Ignitability

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA INVENTORY STATUS (40 CFR 710):

Listed

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

RCRA IDENTIFICATION OF HAZARDOUS WASTE (40 CFR 261):

Waste Number: D001

CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):

Product Identification Number:	1505
Hazard Classification / Division:	Class C (Oxidizer), Class D, Div. 2, Subdiv. B. (Toxic)
Ingredient Disclosure List:	Listed

INTERNATIONAL LISTINGS

Sodium persulfate:
Australia (AICS): Listed
China: Listed
Japan (ENCS): (1)-1131
Korea: KE-12369
Philippines (PICCS): Listed

HAZARD, RISK AND SAFETY PHRASE DESCRIPTIONS:

EC Symbols:	(Not classified as hazardous)
EC Risk Phrases:	(Not classified as hazardous)
EC Safety Phrases:	(Not classified as hazardous)

---

16. OTHER INFORMATION

HMIS

Health	1
Flammability	0
Physical Hazard	1
Personal Protection (PPE)	J

Protection = J (Safety goggles, gloves, apron & combination dust & vapor respirator)

HMIS = Hazardous Materials Identification System

Degree of Hazard Code:
4 = Severe

3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

NFPA

Health	1
Flammability	0
Reactivity	1
Special	OX

SPECIAL = OX (Oxidizer)

NFPA = National Fire Protection Association

Degree of Hazard Code:
4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

REVISION SUMMARY:
New MSDS

Klozür and FMC Logo - FMC Trademarks

FMC Corporation believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be applicable where such product is used in combination with any other materials or in any process. It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Further, since the conditions and methods of use are beyond the control of FMC Corporation, FMC Corporation expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

MATERIAL SAFETY DATA SHEET

Dissolvine® E-FE-13

MSDS Ref. No.: 15708-41-5
Date Approved: 01/17/2006
Revision No.: 1

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the Canada's Workplace Hazardous Materials Information System (WHMIS) and, the EC Directive, 2001/58/EC.

---

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	Dissolvine® E-FE-13
MOLECULAR FORMULA:	$C_{10}H_{12}FeN_2O_8Na \cdot 3H_2O$
SYNONYMS:	Ferric sodium EDTA; CHEMICAL NAME: Ethylenediaminetetraacetic acid, ferric sodium complex
GENERAL USE:	Chelating agent / Plant nutrient

NOTE: This product is not defined and regulated as a hazardous substance. Handle in accordance with good industrial hygiene practices.

MANUFACTURER

Akzo Nobel Functional Chemicals LLC
525 West Van Buren Street
Chicago, IL 60607-3823

Product & Technical Information:
(800) 906-7979 (U.S.A.)
(312) 544-7000 (outside of U.S.A.)

EMERGENCY TELEPHONE NUMBERS

(914) 693-6946 (Akzo Nobel - U.S.A.)

For leak, fire, spill, or accident emergencies, call:
(800) 424-9300 (CHEMTREC - U.S.A.)
(703) 527-3887 (CHEMTREC - All Other Countries)
(613) 996-6666 (CANUTEC - Canada)

---

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- Yellow-green odorless powder.
- CAUTION: Contact with dust may cause discomfort and/or mild irritation.

POTENTIAL HEALTH EFFECTS: Effects from overexposure may occur from inhaling, or coming into contact with skin or eyes. Acute exposure to excessive concentrations of dust may cause respiratory tract discomfort and/or mild irritation. Eye contact with dust may cause mild physical irritation.

MEDICAL CONDITIONS AGGRAVATED: No data available.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt.%	EC No.	EC Class
EDTA, ferric sodium complex	15708-41-5	87 - 89	239-802-2	Not classified
Water	7732-18-5	11 - 13	231-791-2	Not classified

4. FIRST AID MEASURES

EYES: Flush with large quantities of water for at least 15 minutes, lifting the upper and lower eyelids intermittently. If wearing contact lenses, remove after the first five minutes and continue flushing with water. If irritation occurs and persists, get medical attention.

SKIN: Immediately flush with plenty of water while removing contaminated clothing and/or shoes, and thoroughly wash with soap and water. If irritation occurs and persists, obtain medical attention.

INGESTION: Give several glasses of water if able to swallow. DO NOT induce vomiting. If vomiting occurs, keep head below hips to reduce the risk of aspiration. Never give anything by mouth to an unconscious or convulsing person. Get medical attention if health effects occur.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, see a medical doctor. If breathing has stopped, give artificial respiration and see a medical doctor immediately.

NOTES TO MEDICAL DOCTOR: This product has a low order of toxicity and is considered to be practially harmless by ingestion. Treatment is symptomatic and supportive.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Foam, CO_2 or dry chemical. Soft stream water fog only if necessary. Contain all runoff.

FIRE / EXPLOSION HAZARDS: This product is not defined as flammable or combustible. When involved in a fire, it does not contribute any unusual hazards.

FIRE FIGHTING PROCEDURES: As in any fire, prevent human exposure to fire, smoke, fumes or products of combustion. Evacuate all non-essential personnel from the fire area. Fire-fighters should wear full-face, self-contained breathing apparatus and impervious protective clothing.

FLAMMABLE LIMITS: Upper / Lower (% by volume): Not determined

SENSITIVITY TO IMPACT: It is not self-reactive and is not sensitive to impact under typical conditions of use, storage or transport.

COMMENTS: CONDITIONS OF FLAMMABILITY: Not flammable or combustible.

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Keep material out of streams and sewers. Large spills should be covered to prevent dispersal. For dry material, use a wet sweeping compound or water to prevent the formation of dust. If water is used, prevent runoff or dispersion of excess liquid by diking and absorbing with a non-combustible absorbent such as clay, sand or soil. Vacuum, shovel or pump waste into a drum and label contents for disposal.

Restrict non-essential personnel from area. All personnel involved in spill cleanup should follow good industrial hygiene practices and avoid skin and eye contact by wearing appropriate personal protective equipment, as indicated in Section 8 (Exposure Controls / Personal Protection) below.

7. HANDLING AND STORAGE

HANDLING: Containers should not be opened until ready for use. Avoid inhalation and prolonged and/or repeated skin and eye contact. Minimize generation of dust.

STORAGE: Store in a cool, dry place at an ambient temperature (below 25ºC / 77ºF). This material is suitable for any general chemical storage area; however, store in PVC, PE, stainless steel or bituminized tanks. Isolate from strong oxidizing agents and avoid contact with aluminum, copper, copper allows and nickel.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Under normal use conditions, special ventilation is usually not required; however, ensure that existing ventilation is sufficient to prevent the circulation and/or accumulation of dust in the air.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Wear dust-tight goggles when handling this product.

RESPIRATORY: For dust exposures, wear a NIOSH-approved half-mask, air-purifying respirator with dust, mist and fume filters to reduce the potential for inhalation exposure. When using respirator cartridges or canisters, they must be changed frequently (following each use or at the end of the work shift) to assure breakthrough exposure does not occur.

PROTECTIVE CLOTHING: Wear suitable protective clothing and footwear in accordance with use and exposure potential.

GLOVES: Wear gloves that are in accordance with use and exposure potential. Wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

WORK HYGIENIC PRACTICES: Clean water should be available for washing in case of eye or skin contamination. All food and smoking materials should be kept in a separate area away from the storage / use location. Eating, drinking and smoking should be prohibited in areas where there is a potential for significant exposure to this material. Wash skin prior to eating, drinking or using tobacco. Shower at the end of the workday.

COMMENTS:

EXPOSURE LIMITS:

Particulates Not Otherwise Classified (PNOC):
ACGIH / TWA: 10 mg/m^3 (inhalable particulate); 3 mg/m^3 (respirable particulate)
OSHA (PEL / TWA): 15 mg/m^3 (total dust); 5 mg/m^3 (resp fraction)

---

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	Odorless
APPEARANCE:	Yellow-green powder
AUTOIGNITION TEMPERATURE:	Not applicable
BOILING POINT:	Not applicable
COEFFICIENT OF OIL / WATER:	Not determined.
DENSITY / WEIGHT PER VOLUME:	(Bulk) ~ 650 kg/m^3
EVAPORATION RATE:	(Butyl Acetate = 1) Not determined
FLASH POINT:	Not applicable
MELTING POINT:	80ºC (176ºF) / crystal water loss
ODOR THRESHOLD:	Not determined.
PERCENT VOLATILE:	(% by weight) Not determined

pH:	~ 4.0 - 5.5 (1% solution)
SOLUBILITY IN WATER:	90 g/L (at 20ºC / 68ºF); 300 g/L (at 80ºC / 176ºF)
SPECIFIC GRAVITY:	(H_2O=1) Not determined
VAPOR DENSITY:	(Air = 1) Not determined
VAPOR PRESSURE:	Not applicable
VISCOSITY:	Not determined.

10. STABILITY AND REACTIVITY

STABILITY:	Stable at ambient temperatures and atmospheric pressures.
POLYMERIZATION:	Not expected under normal temperatures and pressure.
INCOMPATIBLE MATERIALS:	Aqueous solution in contact with aluminum evolves hydrogen. This product is incompatible with strong oxidizers. Avoid contact with aluminum, copper, copper alloys and nickel. Avoid prolonged storage at elevated temperatures.
HAZARDOUS DECOMPOSITION PRODUCTS:	Under fire conditions this product may support combustion and decomposes to give off carbon mon/dioxide fumes (CO, CO2) and nitrogen oxides. Decomposition Temperature: 180 ± 20ºC (356 ± 36ºF)

COMMENTS: HAZARDOUS COMBUSTION PRODUCTS: Thermal decomposition products may release toxic and/or hazardous fumes and gases, including nitrogen oxides and carbon oxides.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Expected to be minimally irritating.

SKIN EFFECTS: Expected to be slightly irritating.

DERMAL LD_{50}: No data available.

ORAL LD_{50}: Similar product: > 2,000 mg/kg (rat)

INHALATION LC_{50}: No data available.

SENSITIZATION: No data available.

TARGET ORGANS: Eyes, skin

ACUTE EFFECTS FROM OVEREXPOSURE: This product has a low order of toxicity and is considered to be practially harmless by ingestion. Ferric sodium EDTA has shown slight transient conjunctivitis and corneal opacity in rabbits. No additional acute toxicological information is known.

CHRONIC EFFECTS FROM OVEREXPOSURE: Ingestion of up to 86.15 mg/kg/day of ferric sodium EDTA for 31 to 61 days by rats resulted in an accumulation of iron in the liver, spleen and kidneys. There were no abnormal necropsy or histopathology findings.

Ferric sodium EDTA, when tested as a pure substance, gave a negative response in the Ames Assay and the E. Coli bacterial reverse assay, but a positive response in the Mouse Lymphoma Assay (in vitro) with and without metabolic activation at concentrations which were cytotoxic The positive response was attributed to a possible sensitivity of the cells to abnormal iron concentrations.

EDTA and its sodium salts have been reported, in some studies, to cause developmental toxicity in laboratory animals only at exaggerated doses that were toxic to the mother. These effects are likely associated with zinc deficiency due to chelation. Exposures having no effect on the zinc level of the mother, should have no effect on the fetus.

CARCINOGENICITY:

NTP:	Not listed
IARC:	Not listed
OSHA:	Not listed
OTHER:	Not Listed (ACGIH)

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL DATA: Ferric sodium EDTA was biodegradable when evaluated using a mixed population of aerated bacteria. Ferric sodium EDTA component is not likely to bioaccumulate due to its high water solubility and a Log Pow equal to -10.6 (based on EPIWIN model).

ECOTOXICOLOGICAL INFORMATION: Ferric sodium EDTA showed low toxicity to fish (96-hour LC_{50} = 8100 mg/L for a 32% solution and 2592 mg/L for a 100% active), and moderate toxicity to algae (72-hour LC_{50} = 76.7 mg/L).

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: In its unused condition, this product is not considered to be a RCRA-defined hazardous waste by characteristics or listings. It is the responsibility of the waste generator to evaulate whether the waste is hazardous by characteistic or listing. Dispose as a hazardous waste in accordance with local, state and federal regulatory agencies. NOTE: State and local regulations may be more stringent than federal regulations.

EMPTY CONTAINER: Containers which held this material should be triple-rinsed prior to disposal or return. Empty containers should be disposed of, or shipped, in accordance with all applicable laws and regulations.

---

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

ADDITIONAL INFORMATION:	This material is not a hazardous material as defined by US Department of Transportation at 49 CFR Parts 100 through 185.

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

ADDITIONAL INFORMATION:	This material is not a dangerous good as defined by the International Maritime Dangerous Goods Code.

ADR - EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD

ADDITIONAL INFORMATION:	This material is not a dangerous good as defined by ADR.

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

ADDITIONAL INFORMATION:	This material is not a dangerous good as defined in ICAO and the International Air Transport Association Dangerous Goods Regulations.

OTHER INFORMATION:

REQUIRED LABELS: No transport label required.

ENVIRONMENTALLY HAZARDOUS SUBSTANCES (49 CFR 172.101, Appendix A): None

---

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):
Not regulated

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.:
Not regulated

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):
Not regulated

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):
Not regulated

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA INVENTORY STATUS (40 CFR 710):
Listed (components)

U.S. STATES

California Prop 65:
Not regulated
U.S. State Regulation:
Not regulated

CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):

Not a controlled product under the Canadian Workplace Hazardous Materials Information System (WHMIS).

Domestic Substance List:	Listed (components)

INTERNATIONAL LISTINGS

EDTA, ferric sodium
Australia (AICS): Listed
China: Listed

Japan (ENCS): (2)-1266
Korea: KE-31512
Philippines (PICCS): Listed

Water
Australia (AICS): Listed
China: Listed
Korea: KE-35400
Philippines (PICCS): Listed

---

16. OTHER INFORMATION

HMIS

Health	1
Flammability	1
Physical Hazard	0
Personal Protection (PPE)	None

No special requirements

HMIS = Hazardous Materials Identification System

Degree of Hazard Code:
4 = Severe
3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

NFPA

Health	1
Flammability	0
Reactivity	0
Special	None

No special requirements

NFPA = National Fire Protection Association

Degree of Hazard Code:
4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

REVISION SUMMARY:
New MSDS.

FMC Logo - FMC Corporation Trademark
Dissolvine - Akzo Nobel Chemicals, Inc. Trademark

SITE INSPECTION CHECKLIST

Site Inspection Checklist
3035 White Plains Road
Bronx, NY

Date: Time:

Inspector Name/Organization:

Physical Inspection of Fans

Fan 1 :	**yes**	**no**	Fan Model No. Manufacturer:
Operational?			
Observed Leaks at Seals?			
Air Flow at Exhaust Stack?			Other Comments / Observations
Alarm Sound W/power off?			
Alarm Flash W/power off?			
Vacuum Reading:			

Fan 2 :	**yes**	**no**	Fan Model No. Manufacturer:
Operational?			
Observed Leaks at Seals?			
Air Flow at Exhaust Stack?			Other Comments / Observations
Alarm Sound W/power off?			
Alarm Flash W/power off?			
Vacuum Reading:			

Fan 3 :	**yes**	**no**	Fan Model No. Manufacturer:
Operational?			
Observed Leaks at Seals?			
Air Flow at Exhaust Stack?			Other Comments / Observations
Alarm Sound W/power off?			
Alarm Flash W/power off?			
Vacuum Reading:			

Repairs Needed and / or Maintenance at this time?

Signature: Date:

APPENDIX - G

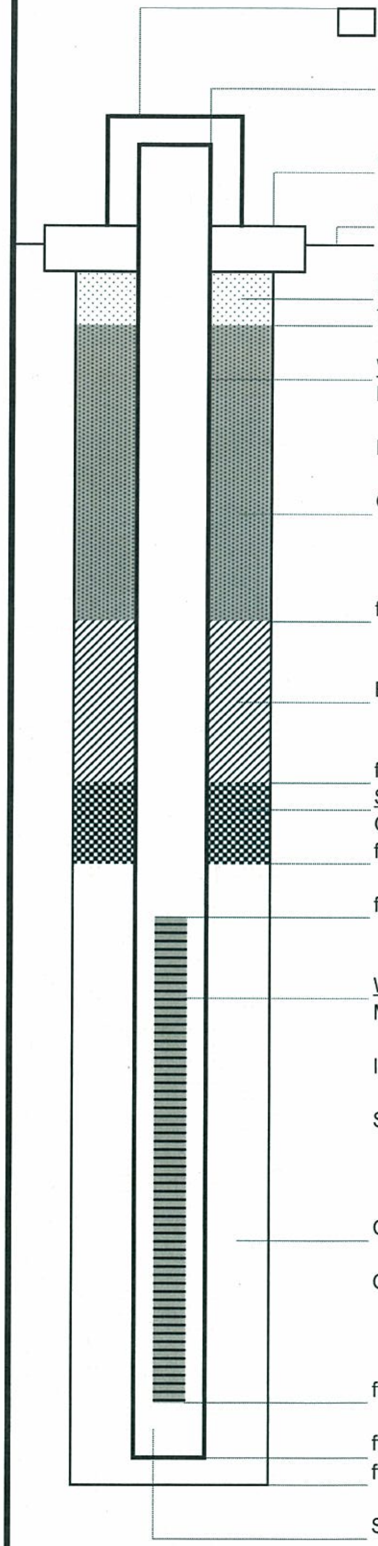
Site Inspection Checklist and Inspection Forms

APPENDIX - H

Well Construction Logs

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG



Protective Casing
☐ Flush Mount ☒ Pop-up

Measuring Point

Concrete Pad

Land Surface

Backfill
ft

Well Casing
Material Sch. 40 PVC

Inch Diam. 1 inch

Grout

ft

Bentonite ☐ Slurry ☒ Pellets

ft

Sand Seal
Grain Size
ft

ft 7 ft

Well Screen
Material Sch. 40 PVC

Inch Diam. 1 inch

Slot 0.02 inch

Gravel Pack

Grain Size 2 Morie

ft 12

ft

ft

Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. Oxidant Injection Wells 1-14

NYSDEC Permit No.

Project 3035 White Plains Road, Bronx

Surveyor

Land Surface Elevation

Measuring Point Elevation

Borehole Diameter: 2 inches

Installation Date 6/21, 22, 28 & 29/08 & 9/13/08

Drilling Contractor LVS Inc.

Drilling Method Rock coring

Drilling Fluid None

Development Technique (s) and Date (s)

Fluid Loss During Drilling Gallons

Water Removed During Development

Static Depth to Water

Pumping Depth to Water

Pumping Duration

Yield GPM DATE

Specific Capacity GPM/Ft

Well Purpose

Oxidant Injection Well

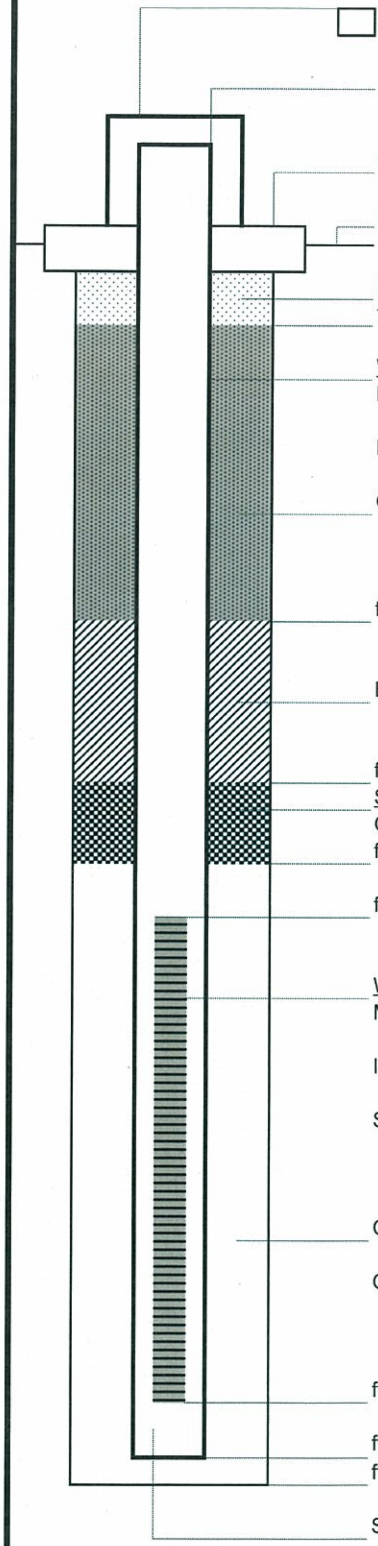
Hydrogeologist Damion Lawyer

Company Name Environmental Business Cons.

Notes

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG



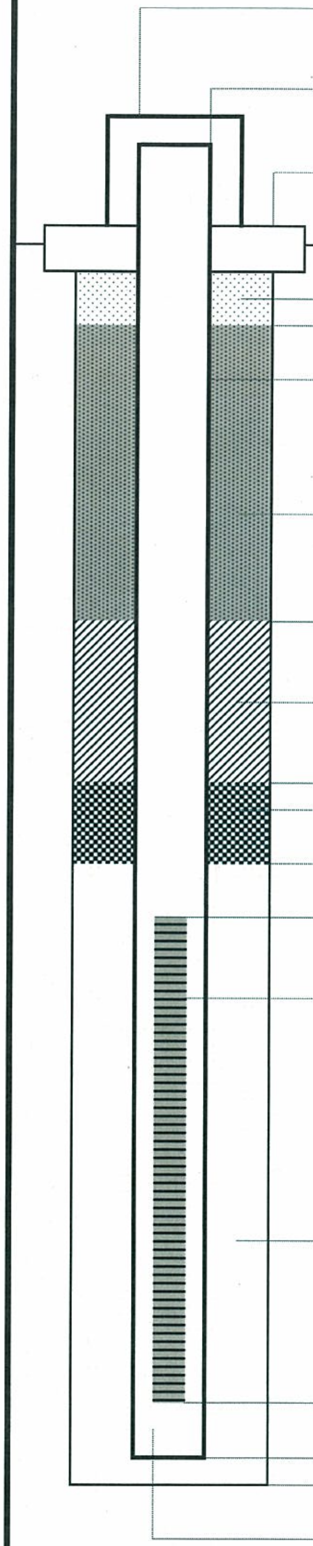
Protective Casing
☐ Flush Mount ☒ Pop-up
Measuring Point
Concrete Pad
Land Surface
Backfill
ft
Well Casing
Material Sch. 40 PVC
Inch Diam. 1 inch
Grout
ft
Bentonite ☐ Slurry ☒ Pellets
ft
Sand Seal
Grain Size
ft
ft 5.1 ft
Well Screen
Material Sch. 40 PVC
Inch Diam. 1 inch
Slot 0.01 inch
Gravel Pack
Grain Size 00 Moire
ft 12.1
ft
ft
Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. IRM-W1
NYSDEC Permit No.
Project 3035 White Plains Road, Bronx
Surveyor
Land Surface Elevation
Measuring Point Elevation
Borehole Diameter: 2 inches
Installation Date 5/24/08
Drilling Contractor LVS Inc.
Drilling Method Rock coring
Drilling Fluid None
Development Technique (s) and Date (s)
Fluid Loss During Drilling Gallons
Water Removed During Development
Static Depth to Water
Pumping Depth to Water
Pumping Duration
Yield GPM DATE
Specific Capacity GPM/Ft
Well Purpose
monitoring well
Hydrogeologist Damion Lawyer
Company Name Environmental Business Cons.
Notes

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG



Protective Casing

☐ Flush Mount ☒ Pop-up

Measuring Point

Concrete Pad

Land Surface

Backfill

ft

Well Casing

Material Sch. 40 PVC

Inch Diam. 1 inch

Grout

ft

Bentonite ☐ Slurry ☒ Pellets

ft

Sand Seal

Grain Size

ft

ft 5.4 ft

Well Screen

Material Sch. 40 PVC

Inch Diam. 1 inch

Slot 0.01 inch

Gravel Pack

Grain Size 00 Moire

ft 12.4

ft

ft

Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. IRM-W2

NYSDEC Permit No.

Project 3035 White Plains Road, Bronx

Surveyor

Land Surface Elevation

Measuring Point Elevation

Borehole Diameter: 2 inches

Installation Date 5/24/08

Drilling Contractor LVS Inc.

Drilling Method Rock coring

Drilling Fluid None

Development Technique (s) and Date (s)

Fluid Loss During Drilling Gallons

Water Removed During Development

Static Depth to Water

Pumping Depth to Water

Pumping Duration

Yield GPM DATE

Specific Capacity GPM/Ft

Well Purpose

monitoring well

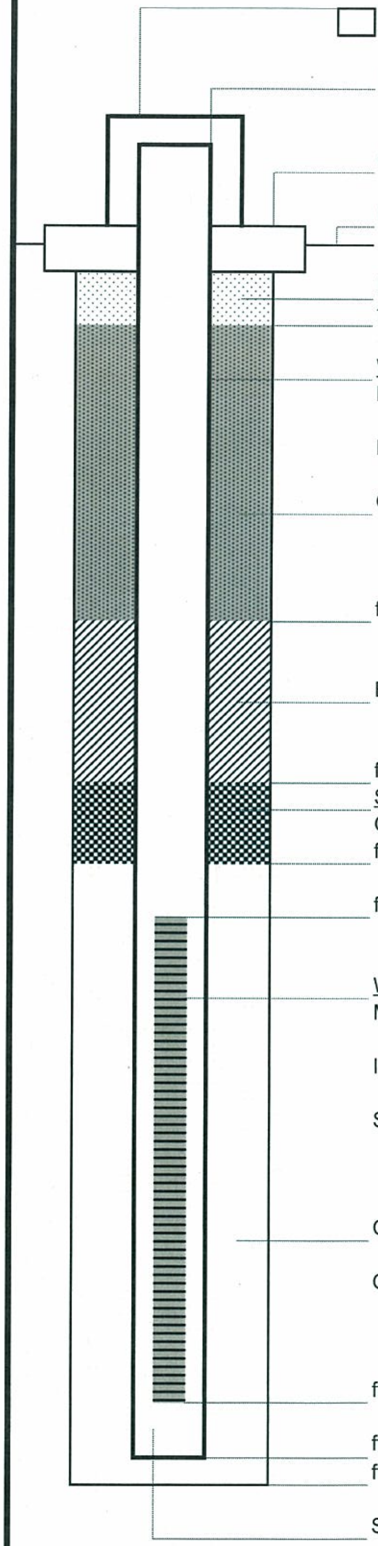
Hydrogeologist Damion Lawyer

Company Name Environmental Business Cons.

Notes

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG



Protective Casing
☐ Flush Mount ☒ Pop-up

Measauring Point

Concrete Pad

Land Surface

Backfill
ft

Well Casing
Material Sch. 40 PVC

Inch Diam. 1 inch

Grout

ft

Bentonite ☐ Slurry ☒ Pellets

ft

Sand Seal
Grain Size
ft

ft 5.5 ft

Well Screen
Material Sch. 40 PVC

Inch Diam. 1 inch

Slot 0.01 inch

Gravel Pack

Grain Size 00 Moire

ft 12.5

ft

ft

Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. IRM-W3

NYSDEC Permit No.

Project 3035 White Plains Road, Bronx

Surveyor

Land Surface Elevation

Measuring Point Elevation

Borehole Diameter: 2 inches

Installation Date 5/25/08

Drilling Contractor LVS Inc.

Drilling Method Rock coring

Drilling Fluid None

Development Technique (s) and Date (s)

Fluid Loss During Drilling Gallons

Water Removed During Development

Static Depth to Water

Pumping Depth to Water

Pumping Duration

Yield GPM DATE

Specific Capacity GPM/Ft

Well Purpose
monitoring well

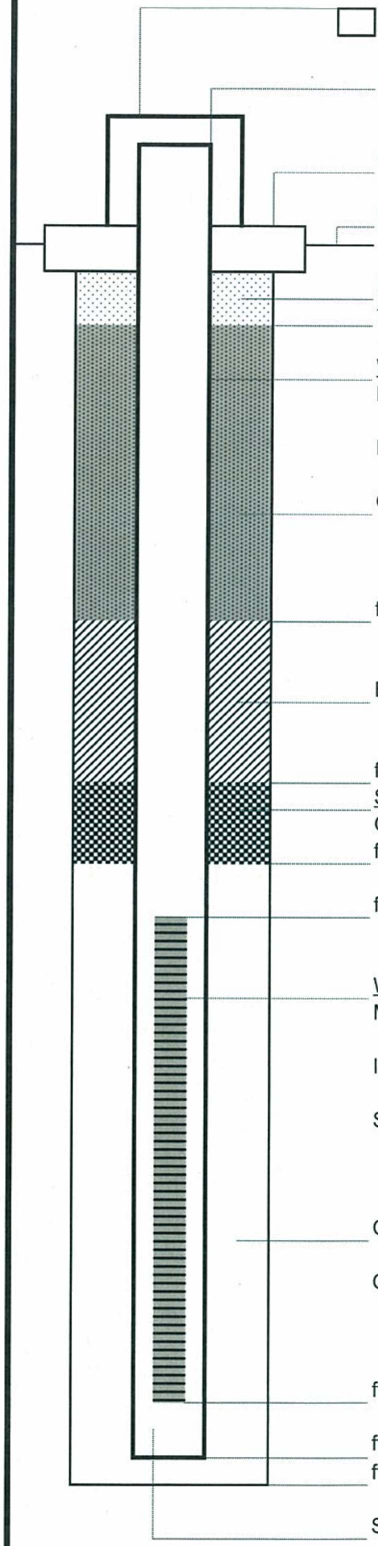
Hydrogeologist Damion Lawyer

Company Name Environmental Business Cons.

Notes

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG



Protective Casing
☐ Flush Mount ☒ Pop-up

Measuring Point

Concrete Pad

Land Surface

Backfill
ft

Well Casing
Material Sch. 40 PVC
Inch Diam. 1 inch

Grout

ft

Bentonite
☐ Slurry
☒ Pellets

ft

Sand Seal
Grain Size
ft

ft 5.2 ft

Well Screen
Material Sch. 40 PVC
Inch Diam. 1 inch
Slot 0.01 inch

Gravel Pack
Grain Size 00 Moire

ft 12.2

ft
ft

Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. IRM-W4

NYSDEC Permit No.

Project 3035 White Plains Road, Bronx

Surveyor

Land Surface Elevation

Measuring Point Elevation

Borehole Diameter: 2 inches

Installation Date 5/25/08

Drilling Contractor LVS Inc.

Drilling Method Rock coring

Drilling Fluid None

Development Technique (s) and Date (s)

Fluid Loss During Drilling Gallons

Water Removed During Development

Static Depth to Water

Pumping Depth to Water

Pumping Duration

Yield GPM DATE

Specific Capacity GPM/Ft

Well Purpose
monitoring well

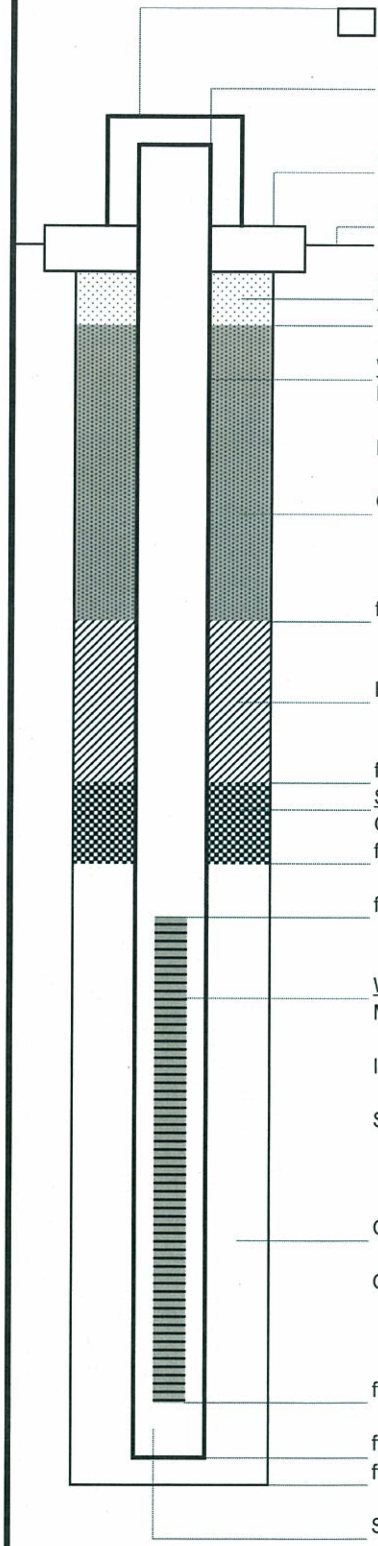
Hydrogeologist Damion Lawyer

Company Name Environmental Business Cons.

Notes

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG



Protective Casing
☐ Flush Mount ☒ Pop-up
Measuring Point
Concrete Pad
Land Surface
Backfill
ft
Well Casing
Material Sch. 40 PVC
Inch Diam. 1 inch
Grout
ft
Bentonite ☐ Slurry ☒ Pellets
ft
Sand Seal
Grain Size
ft
ft 5.2 ft
Well Screen
Material Sch. 40 PVC
Inch Diam. 1 inch
Slot 0.01 inch
Gravel Pack
Grain Size 00 Moire
ft 12.2
ft
ft
Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. IRM-W5
NYSDEC Permit No.
Project 3035 White Plains Road, Bronx
Surveyor
Land Surface Elevation
Measuring Point Elevation
Borehole Diameter: 2 inches

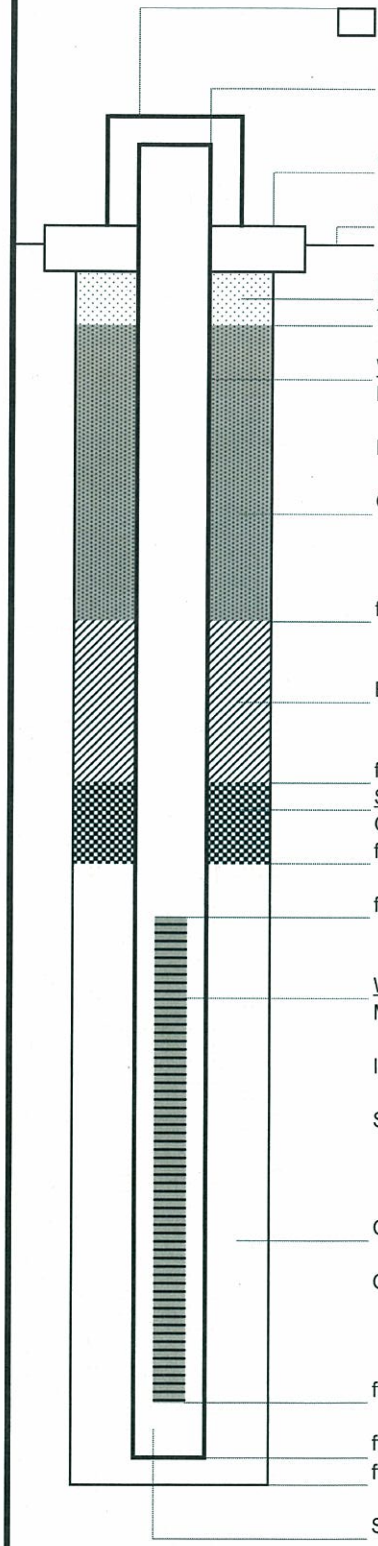
Installation Date 5/26/08
Drilling Contractor LVS Inc.
Drilling Method Rock coring
Drilling Fluid None
Development Technique (s) and Date (s)

Fluid Loss During Drilling Gallons
Water Removed During Development
Static Depth to Water
Pumping Depth to Water
Pumping Duration
Yield GPM DATE
Specific Capacity GPM/Ft
Well Purpose
monitoring well

Hydrogeologist Damion Lawyer
Company Name Environmental Business Cons.
Notes

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG



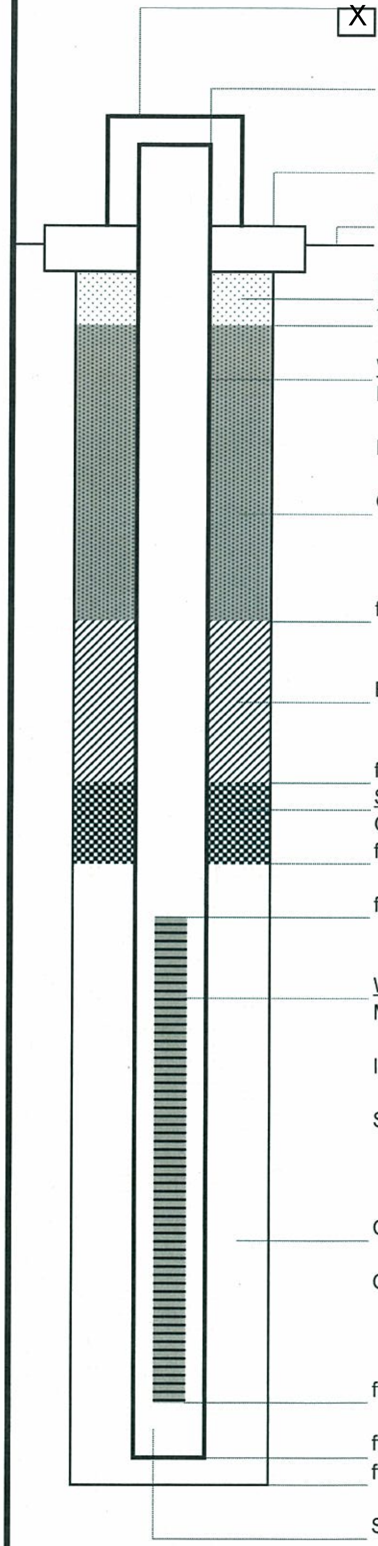
Protective Casing
☐ Flush Mount ☒ Pop-up
Measuring Point
Concrete Pad
Land Surface
Backfill
ft
Well Casing
Material Sch. 40 PVC
Inch Diam. 1 inch
Grout
ft
Bentonite ☐ Slurry ☒ Pellets
ft
Sand Seal
Grain Size
ft
ft 5.1 ft
Well Screen
Material Sch. 40 PVC
Inch Diam. 1 inch
Slot 0.01 inch
Gravel Pack
Grain Size 00 Moire
ft 12.1
ft
ft
Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. IRM-W6
NYSDEC Permit No.
Project 3035 White Plains Road, Bronx
Surveyor
Land Surface Elevation
Measuring Point Elevation
Borehole Diameter: 2 inches
Installation Date 5/26/08
Drilling Contractor LVS Inc.
Drilling Method Rock coring
Drilling Fluid None
Development Technique (s) and Date (s)
Fluid Loss During Drilling Gallons
Water Removed During Development
Static Depth to Water
Pumping Depth to Water
Pumping Duration
Yield GPM DATE
Specific Capacity GPM/Ft
Well Purpose
monitoring well
Hydrogeologist Damion Lawyer
Company Name Environmental Business Cons.
Notes

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG



Protective Casing
☒ Flush Mount ☐ Pop-up

Measuring Point

Concrete Pad

Land Surface

Backfill
ft

Well Casing
Material Sch. 40 PVC

Inch Diam. 2 inch

Grout

ft

Bentonite ☐ Slurry ☒ Pellets

ft

Sand Seal
Grain Size
ft

ft 11.1 ft

Well Screen
Material Sch. 40 PVC

Inch Diam. 2 inch

Slot 0.01 inch

Gravel Pack

Grain Size 00 Moire

ft 21.1

ft

ft

Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. IRM-W7

NYSDEC Permit No.

Project 3035 White Plains Road, Bronx

Surveyor

Land Surface Elevation

Measuring Point Elevation

Borehole Diameter: 2 inches

Installation Date 8/2/08

Drilling Contractor LVS Inc.

Drilling Method Rock coring

Drilling Fluid None

Development Technique (s) and Date (s)

Fluid Loss During Drilling Gallons

Water Removed During Development

Static Depth to Water

Pumping Depth to Water

Pumping Duration

Yield GPM DATE

Specific Capacity GPM/Ft

Well Purpose

monitoring well

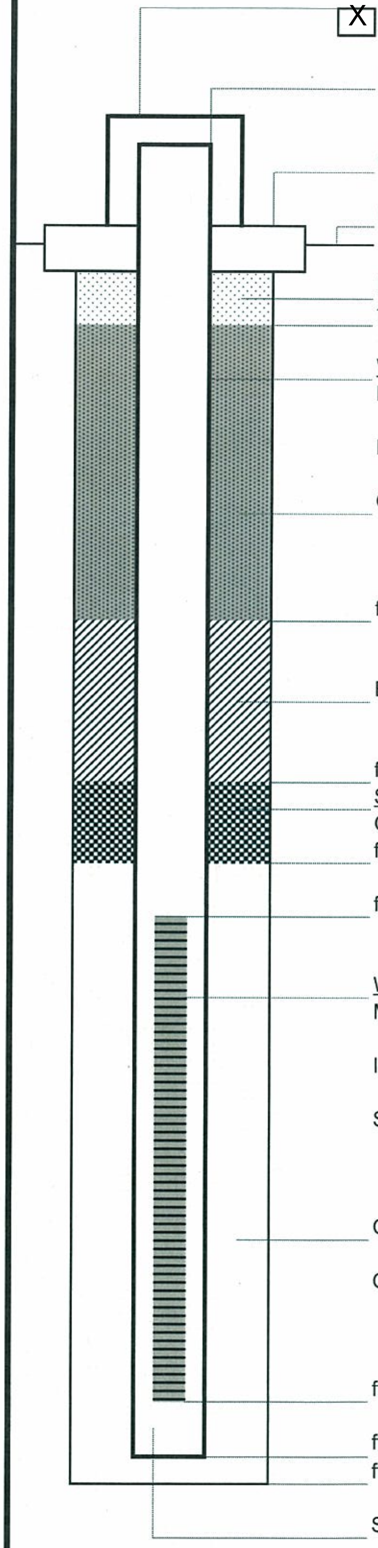
Hydrogeologist Damion Lawyer

Company Name Environmental Business Cons.

Notes

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG



Protective Casing
☒ Flush Mount ☐ Pop-up

Measuring Point

Concrete Pad

Land Surface

Backfill
ft

Well Casing
Material Sch. 40 PVC

Inch Diam. 2 inch

Grout

ft

Bentonite ☐ Slurry ☒ Pellets

ft

Sand Seal
Grain Size
ft

ft 13.5 ft

Well Screen
Material Sch. 40 PVC

Inch Diam. 2 inch

Slot 0.01 inch

Gravel Pack

Grain Size 00 Moire

ft 23.5

ft
ft

Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. IRM-W8

NYSDEC Permit No.

Project 3035 White Plains Road, Bronx

Surveyor

Land Surface Elevation

Measuring Point Elevation

Borehole Diameter: 6 inches

Installation Date 6/11/08

Drilling Contractor ADT Inc.

Drilling Method Air Rotary

Drilling Fluid None

Development Technique (s) and Date (s)

Fluid Loss During Drilling Gallons

Water Removed During Development

Static Depth to Water

Pumping Depth to Water

Pumping Duration

Yield GPM DATE

Specific Capacity GPM/Ft

Well Purpose
monitoring well

Hydrogeologist Damion Lawyer

Company Name Environmental Business Cons.

Notes

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG

Protective Casing
☒ Flush Mount ☐ Pop-up

Measuring Point

Concrete Pad

Land Surface

Backfill
ft

Well Casing
Material Sch. 40 PVC
Inch Diam. 2 inch

Grout

ft

Bentonite ☐ Slurry ☒ Pellets

ft

Sand Seal
Grain Size
ft

ft 14.3 ft

Well Screen
Material Sch. 40 PVC
Inch Diam. 2 inch
Slot 0.01 inch

Gravel Pack
Grain Size 00 Moire

ft 24.3

ft
ft

Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. IRM-W9

NYSDEC Permit No.

Project 3035 White Plains Road, Bronx

Surveyor

Land Surface Elevation

Measuring Point Elevation

Borehole Diameter: 6 inches

Installation Date 6/11/08

Drilling Contractor ADT Inc.

Drilling Method Air Rotary

Drilling Fluid None

Development Technique (s) and Date (s)

Fluid Loss During Drilling Gallons

Water Removed During Development

Static Depth to Water

Pumping Depth to Water

Pumping Duration

Yield GPM DATE

Specific Capacity GPM/Ft

Well Purpose
monitoring well

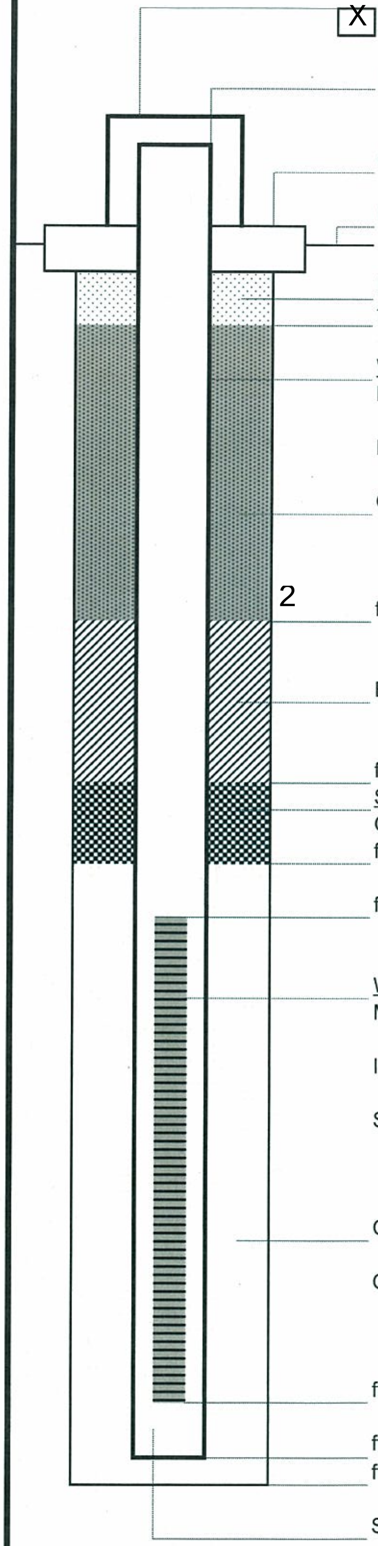
Hydrogeologist Damion Lawyer

Company Name Environmental Business Cons.

Notes

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG



Protective Casing
☒ Flush Mount ☐ Pop-up

Measuring Point

Concrete Pad

Land Surface

Backfill
ft

Well Casing
Material Sch. 40 PVC

Inch Diam. 2 inch

Grout

2 ft

Bentonite ☒ Slurry ☐ Pellets

ft

Sand Seal
Grain Size
ft

ft

Well Screen
Material None

Inch Diam.

Slot

Gravel Pack

Grain Size

ft 20.1

ft

ft

Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. IRM-W10

NYSDEC Permit No.

Project 3035 White Plains Road, Bronx

Surveyor

Land Surface Elevation

Measuring Point Elevation

Borehole Diameter: 2 inches

Installation Date 12/20/08

Drilling Contractor LVS Inc.

Drilling Method Rock coring

Drilling Fluid None

Development Technique (s) and Date (s)

Fluid Loss During Drilling Gallons

Water Removed During Development

Static Depth to Water

Pumping Depth to Water

Pumping Duration

Yield GPM DATE

Specific Capacity GPM/Ft

Well Purpose

monitoring well

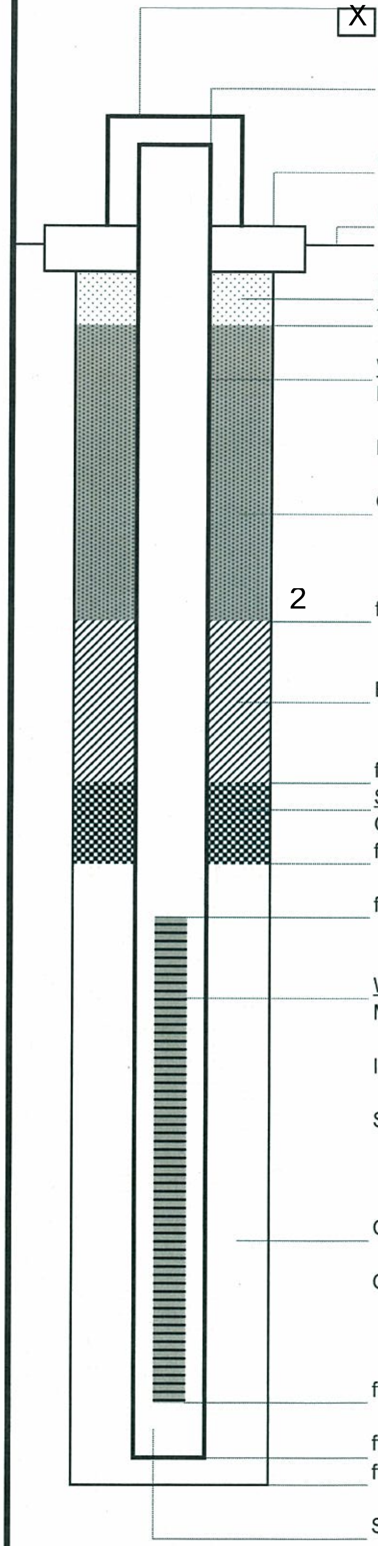
Hydrogeologist K. Brussee

Company Name Environmental Business Cons.

Notes

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG



Protective Casing
☒ Flush Mount ☐ Pop-up

Measuring Point

Concrete Pad

Land Surface

Backfill
ft

Well Casing
Material Sch. 40 PVC

Inch Diam. 2 inch

Grout

2 ft

Bentonite ☒ Slurry ☐ Pellets

ft

Sand Seal
Grain Size
ft

ft

Well Screen
Material None

Inch Diam.

Slot

Gravel Pack

Grain Size

ft 20.5

ft

ft

Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. IRM-W11

NYSDEC Permit No.

Project 3035 White Plains Road, Bronx

Surveyor

Land Surface Elevation

Measuring Point Elevation

Borehole Diameter: 2 inches

Installation Date 12/23/08

Drilling Contractor LVS Inc.

Drilling Method Rock coring

Drilling Fluid None

Development Technique (s) and Date (s)

Fluid Loss During Drilling Gallons

Water Removed During Development

Static Depth to Water

Pumping Depth to Water

Pumping Duration

Yield GPM DATE

Specific Capacity GPM/Ft

Well Purpose

monitoring well

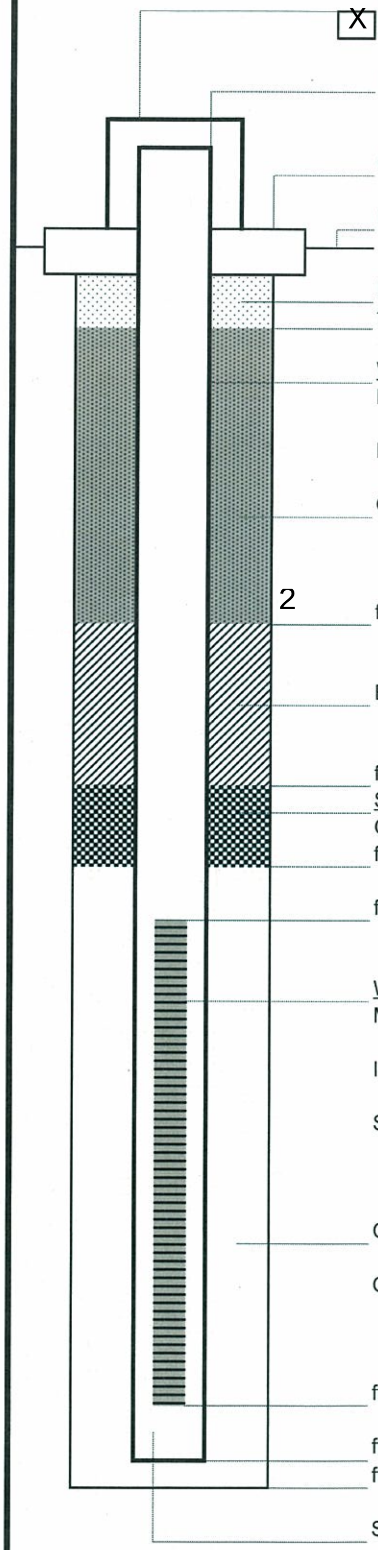
Hydrogeologist K. Brussee

Company Name Environmental Business Cons.

Notes

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG



Protective Casing
☒ Flush Mount ☐ Pop-up

Measuring Point

Concrete Pad

Land Surface

Backfill
ft

Well Casing
Material Sch. 40 PVC
Inch Diam. 2 inch

Grout

2 ft

Bentonite
☒ Slurry
☐ Pellets

ft

Sand Seal
Grain Size
ft

ft

Well Screen
Material None
Inch Diam.
Slot

Gravel Pack
Grain Size

ft 20.2
ft
ft

Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. IRM-W12
NYSDEC Permit No.
Project 3035 White Plains Road, Bronx
Surveyor
Land Surface Elevation
Measuring Point Elevation
Borehole Diameter: 2 inches

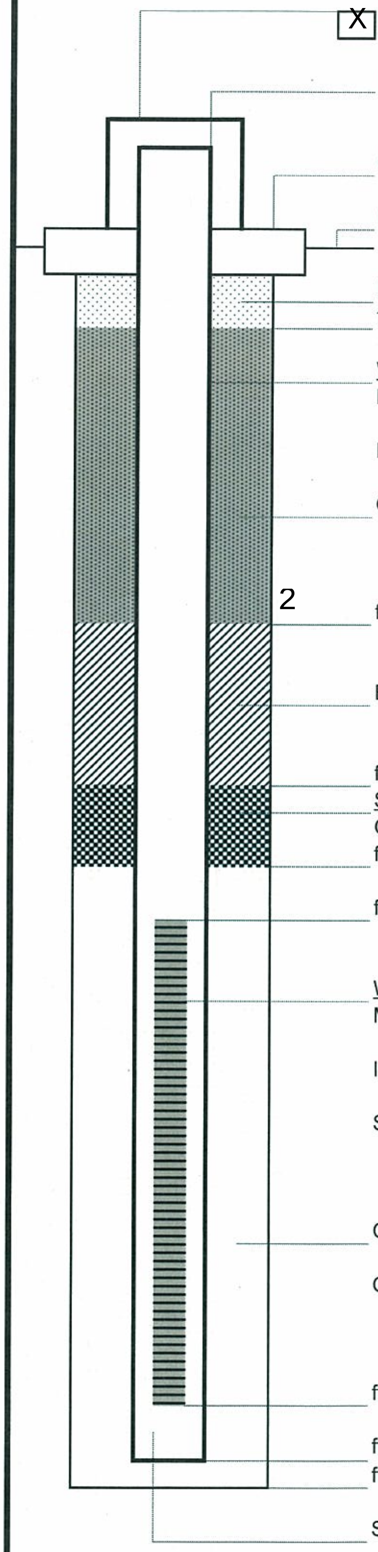
Installation Date 12/21/08
Drilling Contractor LVS Inc.
Drilling Method Rock coring
Drilling Fluid None
Development Technique (s) and Date (s)

Fluid Loss During Drilling Gallons
Water Removed During Development
Static Depth to Water
Pumping Depth to Water
Pumping Duration
Yield GPM DATE
Specific Capacity GPM/Ft
Well Purpose
monitoring well

Hydrogeologist K. Brussee
Company Name Environmental Business Cons.
Notes

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG



Protective Casing
☒ Flush Mount ☐ Pop-up
Measuring Point
Concrete Pad
Land Surface
Backfill
ft
Well Casing
Material Sch. 40 PVC
Inch Diam. 2 inch
Grout
2 ft
Bentonite ☒ Slurry ☐ Pellets
ft
Sand Seal
Grain Size
ft
ft
Well Screen
Material None
Inch Diam.
Slot
Gravel Pack
Grain Size
ft 10.5
ft
ft
Sump

Note: Drawing is not to scale.
Depths are given in feet below land surface.

Well No. IRM-W13
NYSDEC Permit No.
Project 3035 White Plains Road, Bronx
Surveyor
Land Surface Elevation
Measuring Point Elevation
Borehole Diameter: 2 inches
Installation Date 12/21/08
Drilling Contractor LVS Inc.
Drilling Method Rock coring
Drilling Fluid None
Development Technique (s) and Date (s)
Fluid Loss During Drilling Gallons
Water Removed During Development
Static Depth to Water
Pumping Depth to Water
Pumping Duration
Yield GPM DATE
Specific Capacity GPM/Ft
Well Purpose
monitoring well
Hydrogeologist K. Brussee
Company Name Environmental Business Cons.
Notes

APPENDIX - I

Groundwater Sampling Logs

GROUNDWATER PURGING/SAMPLING SHEET

Project No. ____________________ Client Study/Protocol No.: ____________________

Sampling Event: ____________________ Field Reps. (Initials): ____________________

Date: ____________________ Well Number/ID: ____________________

PURGING INFORMATION

DTW (Depth to Water): ____________________ FT

BTW (Depth to bottom from measuring point): ____________________ FT

CF (Conversion factor: 2" well=0.163; 4" well=0.653): ____________________ GAL/FT

WVOL (Water Volume = [BTW-DTW]*CF): ____________________ GAL

Pumping Rate: ____________________ GPM

RECORDINGS

Purge Start Time: ____________________ Purge End Time: __________

Actual Vol. Purged: ______________gal Did well go dry? Y N

	Purge Vol. (bail #/pump time)	pH (std units)	Conductivity (u/cm)	Tempurature (^{o}C)
Initial				
Midway				
Final				
Sample				

Sample Collection Time: __________ Sample Vol.: ______________

Replicate (1)/Sample No.: __________ Sample Vol.: ______________

Replicate (2)/Sample No.: __________

Comments:

Recorded by: ____________________ Date: ____________________

APPENDIX - J

Standard Operating Procedures

GENERAL FIELD SAMPLING GUIDELINES

SOP#: 2001
DATE: 08/11/94
REV. #: 0.0

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to provide general field sampling guidelines that will assist REAC personnel in choosing sampling strategies, location, and frequency for proper assessment of site characteristics. This SOP is applicable to all field activities that involve sampling.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent on site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. EPA endorsement or recommendation for use.

2.0 METHOD SUMMARY

Sampling is the selection of a representative portion of a larger population, universe, or body. Through examination of a sample, the characteristics of the larger body from which the sample was drawn can be inferred. In this manner, sampling can be a valuable tool for determining the presence, type, and extent of contamination by hazardous substances in the environment.

The primary objective of all sampling activities is to characterize a hazardous waste site accurately so that its impact on human health and the environment can be properly evaluated. It is only through sampling and analysis that site hazards can be measured and the job of cleanup and restoration can be accomplished effectively with minimal risk. The sampling itself must be conducted so that every sample collected retains its original physical form and chemical composition. In this way, sample integrity is insured, quality assurance standards are maintained, and the sample can accurately represent the larger body of material under investigation.

The extent to which valid inferences can be drawn from a sample depends on the degree to which the sampling effort conforms to the project's objectives. For example, as few as one sample may produce adequate, technically valid data to address the project's objectives. Meeting the project's objectives requires thorough planning of sampling activities, and implementation of the most appropriate sampling and analytical procedures. These issues will be discussed in this procedure.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The amount of sample to be collected, and the proper sample container type (i.e., glass, plastic), chemical preservation, and storage requirements are dependent on the matrix being sampled and the parameter(s) of interest. Sample preservation, containers, handling, and storage for air and waste samples are discussed in the specific SOPs for air and waste sampling techniques.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

The nature of the object or materials being sampled may be a potential problem to the sampler. If a material is homogeneous, it will generally have a uniform composition throughout. In this case, any sample increment can be considered representative of the material. On the other hand, heterogeneous samples present problems to the sampler because of changes in the material over distance, both laterally and vertically.

Samples of hazardous materials may pose a safety threat to both field and laboratory personnel. Proper health and safety precautions should be implemented when handling this type of sample.

Environmental conditions, weather conditions, or non-target chemicals may cause problems and/or interferences when performing sampling activities or when sampling for a specific parameter. Refer to the specific SOPs for sampling techniques.

5.0 EQUIPMENT/APPARATUS

The equipment/apparatus required to collect samples must be determined on a site specific basis. Due to the wide variety of sampling equipment available, refer to the specific SOPs for sampling techniques which include lists of the equipment/apparatus required for sampling.

6.0 REAGENTS

Reagents may be utilized for preservation of samples and for decontamination of sampling equipment. The preservatives required are specified by the analysis to be performed. Decontamination solutions are specified in ERT SOP #2006, Sampling Equipment Decontamination.

7.0 PROCEDURE

7.1 Types of Samples

In relation to the media to be sampled, two basic types of samples can be considered: the environmental sample and the hazardous sample.

Environmental samples are those collected from streams, ponds, lakes, wells, and are off-site samples that are not expected to be contaminated with hazardous materials. They usually do not require the special handling procedures typically used for concentrated wastes. However, in certain instances, environmental samples can contain elevated concentrations of pollutants and in such cases would have to be handled as hazardous samples.

Hazardous or concentrated samples are those collected from drums, tanks, lagoons, pits, waste piles, fresh spills, or areas previously identified as contaminated, and require special handling procedures because of their potential toxicity or hazard. These samples can be further subdivided based on their degree of hazard; however, care should be taken when handling and shipping any wastes believed to be concentrated regardless of the degree.

The importance of making the distinction between environmental and hazardous samples is two-fold:

(1) Personnel safety requirements: Any sample thought to contain enough hazardous materials to pose a safety threat should be designated as hazardous and handled in a manner which ensures the safety of both field and laboratory personnel.

(2) Transportation requirements: Hazardous samples must be packaged, labeled, and shipped according to the International Air Transport Association (IATA) Dangerous Goods Regulations or Department of Transportation (DOT) regulations and U.S. EPA guidelines.

7.2 Sample Collection Techniques

In general, two basic types of sample collection techniques are recognized, both of which can be used for either environmental or hazardous samples.

Grab Samples

A grab sample is defined as a discrete aliquot representative of a specific location at a given point in time. The sample is collected all at once at one particular point in the sample medium. The representativeness of such samples is defined by the nature of the materials being sampled. In general, as sources vary over time and distance, the representativeness of grab samples will decrease.

Composite Samples

Composites are nondiscrete samples composed of more than one specific aliquot collected at various sampling locations and/or different points in time. Analysis of this type of sample produces an average value and can in certain instances be used as an alternative to analyzing a number of individual grab samples and calculating an average value. It should be noted, however, that compositing can mask problems by diluting isolated concentrations of some hazardous compounds below detection limits.

Compositing is often used for environmental samples and may be used for hazardous samples under certain conditions. For example, compositing of hazardous waste is often performed after compatibility tests have been completed to determine an average value over a number of different locations (group of drums). This procedure generates data that can be useful by providing an average concentration within a number of units, can serve to keep analytical costs down, and can provide information useful to transporters and waste disposal operations.

For sampling situations involving hazardous wastes, grab sampling techniques are generally preferred because grab sampling minimizes the amount of time sampling personnel must be in contact with the wastes, reduces risks associated with compositing unknowns, and eliminates chemical changes that might occur due to compositing.

7.3 Types of Sampling Strategies

The number of samples that should be collected and analyzed depends on the objective of the investigation. There are three basic sampling strategies: random, systematic, and judgmental sampling.

Random sampling involves collection of samples in a nonsystematic fashion from the entire site or a specific portion of a site. Systematic sampling involves collection of samples based on a grid or a pattern which has been previously established. When judgmental sampling is performed, samples are collected only from the portion(s) of the site most likely to be contaminated. Often, a combination of these strategies is the best approach depending on the type of the suspected/known contamination, the uniformity and size of the site, the level/type of information desired, etc.

7.4 QA Work Plans (QAWP)

A QAWP is required when it becomes evident that a field investigation is necessary. It should be initiated in conjunction with, or immediately following, notification of the field investigation. This plan should be clear and concise and should detail the following basic components, with regard to sampling activities:

- Objective and purpose of the investigation.
- Basis upon which data will be evaluated.
- Information known about the site including location, type and size of the facility, and length of operations/abandonment.
- Type and volume of contaminated material, contaminants of concern (including concentration), and basis of the information/data.
- Technical approach including media/matrix to be sampled, sampling equipment to be used, sample equipment decontamination (if necessary), sampling design and rationale, and SOPs or description of the procedure to be implemented.
- Project management and reporting, schedule, project organization and responsibilities, manpower and cost projections, and required deliverables.
- QA objectives and protocols including tables summarizing field sampling and QA/QC analysis and objectives.

Note that this list of QAWP components is not all-inclusive and that additional elements may be added or altered depending on the specific requirements of the field investigation. It should also be recognized that although a detailed QAWP is quite important, it may be impractical in some instances. Emergency responses and accidental spills are prime examples of such instances where time might prohibit the development of site-specific QAWPs prior to field activities. In such cases, investigators would have to rely on general guidelines and personal judgment, and the sampling or response plans might simply be a strategy based on preliminary information and finalized on site. In any event, a plan of action should be developed, no matter how concise or informal, to aid investigators in maintaining a logical and consistent order to the implementation of their task.

7.5 Legal Implications

The data derived from sampling activities are often introduced as critical evidence during litigation of a hazardous waste site cleanup. Legal issues in which sampling data are important may include cleanup cost recovery, identification of pollution sources and responsible parties, and technical validation of remedial design methodologies. Because of the potential for involvement in legal actions, strict adherence to technical and administrative SOPs is essential during both the development and implementation of sampling activities.

Technically valid sampling begins with thorough planning and continues through the sample collection and analytical procedures. Administrative requirements involve thorough, accurate documentation of all sampling activities. Documentation requirements include maintenance of a chain of custody, as well as accurate records of field activities and analytical instructions. Failure to observe these procedures fully and consistently may result in data that are questionable, invalid and non-defensible in court, and the consequent loss of enforcement proceedings.

8.0 CALCULATIONS

Refer to the specific SOPs for any calculations which are associated with sampling techniques.

9.0 QUALITY ASSURANCE/ QUALITY CONTROL

Refer to the specific SOPs for the type and frequency of QA/QC samples to be analyzed, the acceptance criteria for the QA/QC samples, and any other QA/QC activities which are associated with sampling techniques.

10.0 DATA VALIDATION

Refer to the specific SOPs for data validation activities that are associated with sampling techniques.

11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA, and corporate health and safety procedures.

GROUNDWATER WELL SAMPLING

SOP#: 2007
DATE: 01/26/95
REV. #: 0.0

1.0 SCOPE AND APPLICATION

The objective of this standard operating procedure (SOP) is to provide general reference information on sampling of ground water wells. This guideline is primarily concerned with the collection of water samples from the saturated zone of the subsurface. Every effort must be made to ensure that the sample is representative of the particular zone of water being sampled. These procedures are designed to be used in conjunction with analyses for the most common types of ground water contaminants (e.g., volatile and semi-volatile organic compounds, pesticides, metals, biological parameters).

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. Environmental Protection Agency (EPA) endorsement or recommendation for use.

2.0 METHOD SUMMARY

In order to obtain a representative groundwater sample for chemical analysis it is important to remove stagnant water in the well casing and the water immediately adjacent to the well before collection of the sample. This may be achieved with one of a number of instruments. The most common of these are the bailer, submersible pump, non-contact gas bladder pump, inertia pump and suction pump. At a minimum, three well volumes should be purged, if possible. Equipment must be decontaminated prior to use and between wells. Once purging is completed and the correct laboratory-cleaned sample containers have been prepared, sampling may proceed. Sampling may be conducted with any of the above instruments, and need not be the same as the device used for purging. Care should be taken when choosing the sampling device as some will affect the integrity of the sample. Sampling should occur in a progression from the least to most contaminated well, if this information is known.

The growing concern over the past several years over low levels of volatile organic compounds in water supplies has led to the development of highly sophisticated analytical methods that can provide detection limits at part per trillion levels. While the laboratory methods are extremely sensitive, well controlled and quality assured, they cannot compensate for a poorly collected sample. The collection of a sample should be as sensitive, highly developed and quality assured as the analytical procedures.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The type of analysis for which a sample is being collected determines the type of bottle, preservative, holding time, and filtering requirements. Samples should be collected directly from the sampling device into appropriate laboratory cleaned containers. Check that a Teflon liner is present in the cap, if required. Attach a sample identification label. Complete a field data sheet, a chain of custody form, and record all pertinent data in the site logbook.

Samples shall be appropriately preserved, labelled, logged, and placed in a cooler to be maintained at 4EC. Samples must be shipped well before the holding time is up and ideally should be shipped within 24 hours of sample collection. It is imperative that samples be shipped or delivered daily to the analytical laboratory in order to maximize the time available for the laboratory to perform the analyses. The bottles should be shipped with adequate packing and cooling to ensure that they arrive intact.

Sample retrieval systems suitable for the valid collection of volatile organic samples are: positive displacement bladder pumps, gear driven submersible pumps, syringe samplers and bailers (Barcelona, 1984; Nielsen, 1985). Field conditions and other constraints will limit the choice of appropriate systems. The focus of concern must remain to provide a valid sample for analysis, one which has been subjected to the least amount of turbulence possible.

Treatment of the sample with sodium thiosulfate preservative is required only if there is residual chlorine in the water that could cause free radical chlorination and change the identity of the original contaminants. It should not be used if there is no chlorine in the water.

Holding time for volatiles analysis is seven days. It is imperative that the sample be shipped or delivered daily to the analytical laboratory. The bottles must be shipped on their sides to aid in maintaining the airtight seal during shipment, with adequate packing and cooling to ensure that they arrive intact.

For collection of volatile organic samples, refer to the work plan to ensure that 40 mL glass sample vials with Teflon lined septa are ordered and in sufficient numbers. Check sampling supplies; field kit for chlorine, preservatives, Parafilm, foam sleeves and coolers. Due to the extreme trace levels at which volatile organics are detectable, cross contamination and introduction of contaminants must be avoided. Trip blanks are incorporated into the shipment package to provide a check against cross contamination.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

4.1 General

The primary goal in performing ground water sampling is to obtain a representative sample of the ground water body. Analysis can be compromised by field personnel in two primary ways: (1) taking an unrepresentative sample, or (2) by incorrect handling of the sample. There are numerous ways of introducing foreign contaminants into a sample, and these must be avoided by following strict sampling procedures and utilizing trained field personnel.

4.2 Purging

In a nonpumping well, there will be little or no vertical mixing of the water, and stratification will occur. The well water in the screened section will mix with the ground water due to normal flow patterns, but the well water above the screened section will remain isolated, become stagnant, and may lack the contaminants representative of the ground water. Persons sampling should realize that stagnant water may contain foreign material inadvertently or deliberately introduced from the surface, resulting in an unrepresentative sample. To safeguard against collecting nonrepresentative stagnant water, the following guidelines and techniques should be adhered to during sampling:

1. As a general rule, all monitor wells should be pumped or bailed prior to sampling. Purge water should be containerized on site or handled as specified in the site specific project plan. Evacuation of a minimum of one volume of water in the well casing, and preferably three to five volumes, is recommended for a representative sample. In a high-yielding ground water formation and where there is no stagnant water in the well above the screened section, evacuation prior to sample withdrawal is not as critical. However, in all cases where the monitoring data is to be used for enforcement actions, evacuation is recommended.

2. When purging with a pump (not a bailer), the pump should be set at the screened interval, or if the well is an open-rock well, it should be set at the same depth the sample will be collected. When sampling a screened well, the sample should also be collected from the same depth the pump was set at.

3. The well should be sampled as soon as possible after purging.

4. Analytical parameters typically dictate whether the sample should be collected through the purging device, or through a separate sampling instrument.

5. For wells that can be pumped or bailed to dryness with the equipment being used, the well should be evacuated and allowed to

recover prior to collecting a sample. If the recovery rate is fairly rapid and time allows, evacuation of more than one volume of water is preferred. If recovery is slow, sample the well upon recovery after one evacuation.

6. A non-representative sample can also result from excessive pre-pumping of the monitoring well. Stratification of the leachate concentration in the ground water formation may occur, or heavier-than-water compounds may sink to the lower portions of the aquifer. Excessive pumping can dilute or increase the contaminant concentrations from what is representative of the sampling point of interest.

4.3 Materials

Materials of construction for samplers and evacuation equipment (bladders, pump, bailers, tubing, etc.) should be limited to stainless steel, Teflon^{R}, and glass in areas where concentrations are expected to be at or near the detection limit. The tendency of organics to leach into and out of many materials make the selection of materials critical for trace analyses. The use of plastics, such as PVC or polyethylene, should be avoided when analyzing for organics. However, PVC may be used for evacuation equipment as it will not come in contact with the sample, and in highly contaminated wells, disposable equipment (i.e., polypropylene bailers) may be appropriate to avoid cross-contamination.

Materials of construction (bladders/ pumps, bailers, tubing, etc.) suitable for collecting and handling Volatile Organic Samples should be limited to stainless steel, Teflon and glass in areas which detection limit range concentrations are expected. The tendency of organics to leach into and out of many materials, make the selection of materials critical for these trace analyses. The use of plastics, e.g., PVC etc., should be avoided. There are numerous ways of introducing foreign contaminants into a sample, and these must be avoided by following strict sampling procedures and utlization of trained personnel.

4.4 Advantages/Disadvantages of Certain Equipment

4.4.1 Bailers

Advantages

C Only practical limitations on size and materials

C No power source needed

C Portable

C Inexpensive, so it can be dedicated and hung in a well, thereby reducing the chances of cross contamination

C Minimal outgassing of volatile organics while sample is in bailer

C Readily available

C Removes stagnant water first

C Rapid, simple method for removing small volumes of purge water

Disadvantages

C Time-consuming to flush a large well of stagnant water

C Transfer of sample may cause aeration

C Stoppers at the bottom of the bailer usually leak thus the bailer must be brought to the surface rapidly

C If the bailer is allowed to hit the bottom of the well boring, gravel can displace the ball valve not allowing the bailer to hold water

4.4.2 Submersible Pumps

Advantages

C Portable and can be transported to several wells

C Depending upon the size of the pump and the pumping depths, relatively high pumping rates are possible

C Generally very reliable and does not require priming

Disadvantages

- Potential for effects on analysis of trace organics
- Heavy and cumbersome to deal with, particularly in deeper wells
- Expensive
- Power source needed
- Sediment in water may cause problems with the pumps
- Impractical in low yielding or shallow wells

4.4.3 Non-Contact Gas Bladder Pumps

Advantages

- Maintains integrity of sample
- Easy to use
- Can sample from discrete locations within the monitor well

Disadvantages

- Difficulty in cleaning, though dedicated tubing and bladder may be used
- Only useful to about 100 feet
- Supply of gas for operation, gas bottles and/or compressors are often difficult to obtain and are cumbersome
- Relatively low pumping rates
- Requires air compressor or pressurized gas source and control box

4.4.4 Suction Pumps

Advantages

- Portable, inexpensive, and readily available

Disadvantages

- Restricted to areas with water levels within 20 to 25 feet of the ground surface
- Vacuum can cause loss of dissolved gasses and volatile organics
- Pump must be primed and vacuum is often difficult to maintain during initial stages of pumping

4.4.5 Inertia Pumps

Advantages

- Portable, inexpensive, and readily available
- Offers a rapid method for purging relatively shallow wells

Disadvantages

- Restricted to areas with water levels within 70 feet of the ground surface
- May be time consuming to purge wells with these manual pumps
- Labor intensive
- WaTerra pumps are only effective in 2-inch diameter wells

5.0 EQUIPMENT APPARATUS

5.1 Equipment Checklist

5.1.1 General

- Water level indicator
  - electric sounder
  - steel tape
  - transducer
  - reflection sounder
  - airline
- Depth sounder
- Appropriate keys for well cap locks
- Steel brush
- HNU or OVA (whichever is most appropriate)
- Logbook
- Calculator
- Field data sheets and samples labels

- Chain of custody records and seals
- Sample containers
- Engineer's rule
- Sharp knife (locking blade)
- Tool box (to include at least: screwdrivers, pliers, hacksaw, hammer, flashlight, adjustable wrench)
- Leather work gloves
- Appropriate Health & Safety gear
- 5-gallon pail
- Plastic sheeting
- Shipping containers
- Packing materials
- Bolt cutters
- Ziploc plastic bags
- Containers for evacuation liquids
- Decontamination solutions
- Tap water
- Non phosphate soap
- Several brushes
- Pails or tubs
- Aluminum foil
- Garden sprayer
- Preservatives
- Distilled or deionized water
- Fire extinguisher (if using a generator for your power source)

5.1.2 Bailers

- Clean, decontaminated bailers of appropriate size and construction material
- Nylon line, enough to dedicate to each well
- Teflon coated bailer wire
- Sharp knife
- Aluminum foil (to wrap clean bailers)
- Five gallon bucket

5.1.3 Submersible Pump

- Pump(s)
- Generator (110, 120, or 240 volt) or 12 volt battery if inaccessible to field vehicle - amp meter is useful
- 1" black PVC coil tubing - enough to dedicate to each well
- Hose clamps
- Safety cable
- Tool box supplement
    - pipe wrenches
    - wire strippers
    - electrical tape
    - heat shrink
    - hose connectors
    - Teflon tape
- Winch, pulley or hoist
- Gasoline for generator/gas can
- Flow meter with gate valve
- 1" nipples and various plumbing (i.e., pipe connectors)
- Control box (if necessary)

5.1.4 Non-Gas Contact Bladder Pump

- Non-gas contact bladder pump
- Compressor or nitrogen gas tank
- Batteries and charger
- Teflon tubing - enough to dedicate to each well
- Swagelock fitting
- Toolbox supplements - same as submersible pump
- Control box (if necessary)

5.1.5 Suction Pump

- Pump
- 1" black PVC coil tubing - enough to dedicate to each well
- Gasoline - if required
- Toolbox
- Plumbing fittings
- Flow meter with gate valve

5.1.6 Inertia Pump

- Pump assembly (WaTerra pump, piston pump)
- Five gallon bucket

6.0 REAGENTS

Reagents may be utilized for preservation of samples and for decontamination of sampling equipment. The preservatives required are specified by the analysis to be performed. Decontamination solutions are specified in ERT SOP #2006, Sampling Equipment Decontamination.

7.0 PROCEDURE

7.1 Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and the types and amounts of equipment and supplies needed (i.e, diameter and depth of wells to be sampled).

2. Obtain necessary sampling and monitoring equipment, appropriate to type of contaminant being investigated. For collection of volatile organic samples, refer to the work plan to ensure that 40 mL glass sample vials with Teflon lined septa are ordered and in sufficient numbers. Check sampling supplies; field kit for chlorine, preservatives, Parafilm, foam sleeves and coolers. Due to extreme trace levels at which volatile organics are detectable, cross contamination and introduction of contaminants must be avoided. Trip blanks are incorporated into the shipment package to provide a check against cross contamination.

3. Decontaminate or preclean equipment, and ensure that it is in working order.

4. Prepare scheduling and coordinate with staff, clients, and regulatory agency, if appropriate.

5. Perform a general site survey prior to site entry in accordance with the site specific Health and Safety Plan.

6. Identify and mark all sampling locations.

7.2 Field Preparation

1. Start at the least contaminated well, if known.

2. Lay plastic sheeting around the well to minimize likelihood of contamination of equipment from soil adjacent to the well.

3. Remove locking well cap, note location, time of day, and date in field notebook or appropriate log form.

4. Remove well casing cap.

5. Screen headspace of well with an appropriate monitoring instrument to determine the presence of volatile organic compounds and record in site logbook.

6. Lower water level measuring device or equivalent (i.e., permanently installed transducers or airline) into well until water surface is encountered.

7. Measure distance from water surface to reference measuring point on well casing or protective barrier post and record in site logbook. Alternatively, if no reference point, note that water level measurement is from top of steel casing, top of PVC riser pipe, from ground surface, or some other position on the well head.

   If floating organics are of concern, this can be determined by measuring the water level with an oil/water interface probe which measures floating organics.

8. Measure total depth of well (at least twice to confirm measurement) and record in site logbook or on field data sheet.

9. Calculate the volume of water in the well and the volume to be purged using the calculations in Section 8.0.

10. Select the appropriate purging and sampling equipment.

11. If residual chlorine is suspected, use the Hach Field Test Kit for chlorine to determine if there is residual chlorine in the water to be sampled. If there is, treat the sample vial with a crystal of sodium thiosulfate prior to sample collection.

7.3 Purging

The amount of flushing a well receives prior to sample collection depends on the intent of the monitoring program as well as the hydrogeologic conditions. Programs where overall quality determination of water resources are involved may require long pumping periods to obtain a sample that is representative of a large volume of that aquifer. The pumped volume can be determined prior to sampling so that the sample is a collected after a known volume of the water is evacuated from the aquifer, or the well can be pumped until the stabilization of parameters such as temperature, electrical conductance, pH, or turbidity has occurred.

However, monitoring for defining a contaminant plume requires a representative sample of a small volume of the aquifer. These circumstances require that the well be pumped enough to remove the stagnant water but not enough to induce flow from other areas. Generally, three well volumes are considered effective, or calculations can be made to determine, on the basis of the aquifer parameters and well dimensions, the appropriate volume to remove prior to sampling.

During purging, water level measurements may be taken regularly at 15-30 second intervals. This data may be used to compute aquifer transmissivity and other hydraulic characteristics. The following well evacuation devices are most commonly used. Other evacuation devices are available, but have been omitted in this discussion due to their limited use.

7.3.1 Bailers

Bailers are the simplest purging device used and have many advantages. They generally consist of a rigid length of tube, usually with a ball check-valve at the bottom. A line is used to lower the bailer into the well and retrieve a volume of water. The three most common types of bailer are PVC, Teflon, and stainless steel.

This manual method of purging is best suited to shallow or narrow diameter wells. For deep, larger diameter wells which require evacuation of large volumes of water, other mechanical devices may be more appropriate.

7.3.1.1 Operation

Equipment needed will include a clean decontaminated bailer, Teflon or nylon line, a sharp knife, and plastic sheeting.

1. Determine the volume of water to be purged as described in 8.0, calculations.

2. Lay plastic sheeting around the well to prevent contamination of the bailer line with foreign materials.

3. Attach the line to the bailer and slowly lower until the bailer is completely submerged, being careful not to drop the bailer to the water, causing turbulence and the possible loss of volatile organic contaminants.

4. Pull bailer out ensuring that the line either falls onto a clean area of plastic sheeting or never touches the ground.

5. Empty the bailer into a pail until full to determine the number of bails necessary to achieve the required purge volume.

6. Thereafter, pour the water into a container and dispose of purge waters as specified in the site specific sampling plan.

7.3.2 Submersible Pumps

The use of submersible pumps for sample collection is permissible provided they are constructed of suitably noncontaminating materials. The chief drawback, however, is the difficulty avoiding cross-contamination between wells. Although some units can be disassembled easily to allow surfaces contacted by contaminants to be cleaned, field decontamination may be difficult and require solvents that can affect sample analysis. The use of submersible pumps in multiple well-sampling programs, therefore, should be carefully considered against other sampling mechanisms (bailers, bladder pumps). In most cases, a sample can be collected by bailer after purging with a submersible pump, however, submersible pumps may be the only practical sampling device for extremely deep wells (greater than 300 feet of water). Under those conditions, dedicated pump systems should be installed to eliminate the potential for cross-contamination of well samples.

Submersible pumps generally use one of two types of power supplies, either electric or compressed gas or air. Electric powered pumps can run off a 12 volt DC rechargeable battery, or a 110 or 220 volt AC power supply. Those units powered by compressed air normally use a small electric or gas-powered air compressor. They may also utilize compressed gas (i.e., nitrogen) from bottles. Different size pumps are available for different depth or diameter monitoring wells.

7.3.2.1 Operation

1. Determine the volume of water to be purged as described in 8.0 Calculations.

2. Lay plastic sheeting around the well to prevent contamination of pumps, hoses or lines with foreign materials.

3. Assemble pump, hoses and safety cable, and lower the pump into the well. Make sure the pump is deep enough so all the water is not evacuated. (Running the pump without water may cause damage.)

4. Attach flow meter to the outlet hose to measure the volume of water purged.

5. Use a ground fault circuit interrupter (GFCI) or ground the generator to avoid possible electric shock.

6. Attach power supply, and purge the well until the specified volume of water has been evacuated (or until field parameters, such as temperature, pH, conductivity, etc, have stabilized). Do not allow the pump to run dry. If the pumping rate exceeds the well recharge rate, lower the pump further into the well, and continue pumping.

7. Collect and dispose of purge waters as specified in the site specific sampling plan.

7.3.3 Non-Contact Gas Bladder Pumps

For this procedure, an all stainless-steel and Teflon Middleburg-squeeze bladder pump (e.g., IEA, TIMCO, Well Wizard, Geoguard, and others) is used to provide the least amount of material interference to the sample (Barcelona, 1985). Water comes into contact with the inside of the bladder (Teflon) and the sample tubing, also Teflon, that may be dedicated to each well. Some wells may have permanently installed bladder pumps, (i.e., Well Wizard, Geoguard), that will be used to sample for all parameters.

7.3.3.1 Operation

1. Assemble Teflon tubing, pump and charged control box.

2. Procedure for purging with a bladder pump is the same as for a submersible pump (Section 7.3.2.1).

3. Be sure to adjust flow rate to prevent violent jolting of the hose as sample is drawn in.

7.3.4 Suction Pumps

There are many different types of suction pumps. They include: centrifugal, peristaltic and diaphragm. Diaphragm pumps can be used for well evacuation at a fast pumping rate and sampling at a low pumping rate. The peristaltic pump is a low volume pump that uses rollers to squeeze the flexible tubing thereby creating suction. This tubing can be dedicated to a well to prevent cross contamination. Peristaltic pumps, however, require a power source.

7.3.4.1 Operation

1. Assembly of the pump, tubing, and power source if necessary.

2. Procedure for purging with a suction pump is exactly the same as for a submersible pump (Section 7.3.2.1).

7.3.5 Inertia Pumps

Inertia pumps such as the WaTerra pump and piston pump, are manually operated. They are most appropriate to use when wells are too deep to bail by hand, or too shallow or narrow (or inaccessible) to warrant an automatic (submersible, etc.) pump. These pumps are made of plastic and may be either decontaminated or discarded.

7.3.5.1 Operation

1. Determine the volume of water to be purged as described in 8.0, Calculations.

2. Lay plastic sheeting around the well to prevent contamination of pumps or hoses with foreign materials.

3. Assemble pump and lower to the appropriate depth in the well.

4. Begin pumping manually, discharging water into a 5 gallon bucket (or other graduated vessel). Purge until specified volume of water has been evacuated (or until field parameters such as temperature, pH,

conductivity, etc. have stabilized).

5. Collect and dispose of purge waters as specified in the site specific project plan.

7.4 Sampling

Sample withdrawal methods require the use of pumps, compressed air, bailers, and samplers. Ideally, purging and sample withdrawal equipment should be completely inert, economical to manufacture, easily cleaned, sterilized, reusable, able to operate at remote sites in the absence of power resources, and capable of delivering variable rates for sample collection.

There are several factors to take into consideration when choosing a sampling device. Care should be taken when reviewing the advantages or disadvantages of any one device. It may be appropriate to use a different device to sample than that which was used to purge. The most common example of this is the use of a submersible pump to purge and a bailer to sample.

7.4.1 Bailers

The positive-displacement volatile sampling bailer is perhaps the most appropriate for collection of water samples for volatile analysis. Other bailer types (messenger, bottom fill, etc.) are less desirable, but may be mandated by cost and site conditions.

7.4.1.1 Operation

1. Surround the monitor well with clean plastic sheeting. If using the GPI bailer, insert a vial into the claim and assemble the unit.
2. Attach a line to a clean decontaminated bailer.
3. Lower the bailer slowly and gently into the well, taking care not to shake the casing sides or to splash the bailer into the water. Stop lowering at a point adjacent to the screen.
4. Allow bailer to fill and then slowly and gently retrieve the bailer from the well avoiding contact with the casing, so as not to knock flakes of rust or other foreign materials into the bailer. If using the GPI bailer for collecting volatile organic samples, once at the surface, remove the bailer from the cable. Carefully open the GPI bailer unit and remove the vial. Begin slowly pouring from the bailer, and collect the duplicate samples from the midstream sample.
5. Remove the cap from the sample container and place it on the plastic sheet or in a location where it won't become contaminated. See Section 7.7 for special considerations on VOA samples.
6. Begin slowly pouring from the bailer.
7. Filter and preserve samples as required by sampling plan.
8. Cap the sample container tightly and place prelabeled sample container in a carrier.
9. Replace the well cap.
10. Log all samples in the site logbook and on field data sheets and label all samples.
11. Package samples and complete necessary paperwork.
12. Transport sample to decontamination zone for preparation for transport to analytical laboratory.

7.4.2 Submersible Pumps

Although it is recommended that samples not be collected with a submersible pump due to the reasons stated in Section 4.4.2, there are some situations where they may be used.

7.4.2.1 Operation

1. Allow the monitor well to recharge after purging, keeping the pump just above screened section.
2. Attach gate valve to hose (if not already fitted), and reduce flow of water to a manageable sampling rate.
3. Assemble the appropriate bottles.
4. If no gate valve is available, run the water

down the side of a clean jar and fill the sample bottles from the jar.

5. Cap the sample container tightly and place prelabeled sample container in a carrier.

6. Replace the well cap.

7. Log all samples in the site logbook and on the field data sheets and label all samples.

8. Package samples and complete necessary paperwork.

9. Transport sample to decontamination zone for preparation for transport to the analytical laboratory.

10. Upon completion, remove pump and assembly and fully decontaminate prior to setting into the next sample well. Dedicate the tubing to the hole.

7.4.3 Non-Contact Gas Bladder Pumps

The use of a non-contact gas positive displacement bladder pump is often mandated by the use of dedicated pumps installed in wells. These pumps are also suitable for shallow (less than 100 feet) wells. They are somewhat difficult to clean, but may be used with dedicated sample tubing to avoid cleaning. These pumps require a power supply and a compressed gas supply (or compressor). They may be operated at variable flow and pressure rates making them ideal for both purging and sampling.

Barcelona (1984) and Nielsen (1985) report that the non-contact gas positive displacement pumps cause the least amount of alteration in sample integrity as compared to other sample retrieval methods.

7.4.3.1 Operation

1. Allow well to recharge after purging.

2. Assemble the appropriate bottles.

3. Turn pump on, increase the cycle time and reduce the pressure to the minimum that will allow the sample to come to the surface.

4. Cap the sample container tightly and place prelabeled sample container in a carrier.

5. Replace the well cap.

6. Log all samples in the site logbook and on field data sheets and label all samples.

7. Package samples and complete necessary paperwork.

8. Transport sample to decontamination zone for preparation for transport to analytical laboratory.

9. On completion, remove the tubing from the well and either replace the Teflon tubing and bladder with new dedicated tubing and bladder or rigorously decontaminate the existing materials.

10. Nonfiltered samples shall be collected directly from the outlet tubing into the sample bottle.

11. For filtered samples, connect the pump outlet tubing directly to the filter unit. The pump pressure should remain decreased so that the pressure build up on the filter does not blow out the pump bladder or displace the filter. For the Geotech barrel filter, no actual connections are necessary so this is not a concern.

7.4.4 Suction Pumps

In view of the limitations of these type pumps, they are not recommended for sampling purposes.

7.4.5 Inertia Pumps

Inertia pumps may be used to collect samples. It is more common, however, to purge with these pumps and sample with a bailer (Section 7.4.1).

7.4.5.1 Operation

1. Following well evacuation, allow the well to recharge.

2. Assemble the appropriate bottles.

3. Since these pumps are manually operated,

the flow rate may be regulated by the sampler. The sample may be discharged from the pump outlet directly into the appropriate sample container.

4. Cap the sample container tightly and place prelabeled sample container in a carrier.
5. Replace the well cap.
6. Log all samples in the site logbook and on field data sheets and label all samples.
7. Package samples and complete necessary paperwork.
8. Transport sample to decontamination zone for preparation for transport to the analytical laboratory.
9. Upon completion, remove pump and decontaminate or discard, as appropriate.

7.4.6. Sample Retrieval - Syringe

A limited number of commercial syringe type samplers are available, (IEA, TIMCO, etc.) some are homemade devices. These devices are claimed to provide good quality samples for volatile analysis, but are severly limited in sample volume and are specific to sampling for volatiles. Essentially, they operated with an evacuated chamber that is lowered down the well, and allowed to fill with the pressure of the water. The entire mechanism is then brought to the surface with the sample. The sample may then be transferred to a sample vial, or the entire unit may be sent as the sample container.

1. Evacuate the syringe if necessary, and lower the sampling device to just below the well screen.
2. Remove the constriction from the device and allow the sample to fill the syringe, apply slight suction as necessary.
3. Bring unit to the surface. If necessary, transfer the sample to vials, as outlined in steps 2 through 7 above.

7.5 Filtering

For samples requiring filtering, such as total metals analysis, the filter must be decontaminated prior to and between uses. Filters work by two methods. A barrel filter such as the "Geotech" filter works with a bicycle pump, used to build up positive pressure in the chamber containing the sample which is then forced through the filter paper (minimum size 0.45 µm) into a jar placed underneath. The barrel itself is filled manually from the bailer or directly via the hose of the sampling pump. The pressure must be maintained up to 30 lbs/in^2 by periodic pumping.

A vacuum type filter involves two chambers; the upper chamber contains the sample and a filter (minimum size 0.45 µm) divides the chambers. Using a hand pump or a Gilian type pump, air is withdrawn from the lower chamber, creating a vacuum and thus causing the sample to move through the filter into the lower chamber where it is drained into a sample jar. Repeated pumping may be required to drain all the sample into the lower chamber. If preservation of the sample is necessary, this should be done after filtering.

7.6 Post Operation

After all samples are collected and preserved, the sampling equipment should be decontaminated prior to sampling another well to prevent cross-contamination of equipment and monitor wells between locations.

1. Decontaminate all equipment.
2. Replace sampling equipment in storage containers.
3. Prepare and transport ground water samples to the laboratory. Check sample documentation and make sure samples are properly packed for shipment.

7.7 Special Considerations for VOA Sampling

The proper collection of a sample for volatile organics requires minimal disturbance of the sample to limit volatilization and therefore a loss of volatiles from the sample.

Sample retrieval systems suitable for the valid collection of volatile organic samples are: positive displacement bladder pumps, gear driven submersible pumps, syringe samplers and bailers (Barcelona, 1984; Nielsen, 1985). Field conditions and other constraints will limit the choice of appropriate systems. The focus of concern must be to provide a valid sample for analysis, one which has been subjected to the least amount of turbulence possible.

The following procedures should be followed:

1. Open the vial, set cap in a clean place, and collect the sample during the middle of the cycle. When collecting duplicates, collect both samples at the same time.

2. Fill the vial to just overflowing. Do not rinse the vial, nor excessively overflow it. There should be a convex meniscus on the top of the vial.

3. Check that the cap has not been contaminated (splashed) and carefully cap the vial. Place the cap directly over the top and screw down firmly. Do not overtighten and break the cap.

4. Invert the vial and tap gently. Observe vial for at least ten (10) seconds. If an air bubble appears, discard the sample and begin again. It is imperative that no entrapped air is in the sample vial.

5. Immediately place the vial in the protective foam sleeve and place into the cooler, oriented so that it is lying on its side, not straight up.

6. The holding time for VOAs is seven days. Samples should be shipped or delivered to the laboratory daily so as not to exceed the holding time. Ensure that the samples remain at 4°C, but do not allow them to freeze.

8.0 CALCULATIONS

If it is necessary to calculate the volume of the well, utilize the following equation:

$$\textit{Well volume} = \pi r^2 h\,(cf) \qquad [\textit{Equation } 1]$$

where:

π = pi
r = radius of monitoring well (feet)
h = height of the water column (feet) [This may be determined by subtracting the depth to water from the total depth of the well as measured from the same reference point.]
cf = conversion factor (gal/ft^3) = 7.48 gal/ft^3 [In this equation, 7.48 gal/ft^3 is the necessary conversion factor.]

Monitor well diameters are typically 2", 3", 4", or 6". Knowing the diameter of the monitor well, there are a number of standard conversion factors which can be used to simplify the equation above.

The volume, in gallons per linear foot, for various standard monitor well diameters can be calculated as follows:

$$v(gal/ft) = \pi r^2\,(cf) \qquad [\textit{Equation } 2]$$

where:

π = pi
r = radius of monitoring well (feet)
cf = conversion factor (7.48 gal/ft^3)

For a 2" diameter well, the volume per linear foot can be calculated as follows:

$$\begin{aligned} vol/linear\ ft &= \pi r^2\,(cf) \qquad [\textit{Equation } 2]\\ &= 3.14\ (1/12\ ft)^2\ \ 7.48\ gal/ft^3\\ &= 0.1632\ gal/ft \end{aligned}$$

Remember that if you have a 2" diameter well, you must convert this to the radius in feet to be able to use the equation.

The conversion factors for the common size monitor wells are as follows:

Well diameter	2"	3"	4"	6"
Volume (gal/ft.)	0.1632	0.3672	0.6528	1.4688

If you utilize the conversion factors above, Equation

1 should be modified as follows:

$$\textbf{\textit{Well volume}} = (\textbf{\textit{h}})(\textbf{\textit{cf}}) \qquad [\textit{Equation}\ 3]$$

where:

h = height of water column (feet)
cf = the conversion factor calculated from Equation 2

The well volume is typically tripled to determine the volume to be purged.

9.0 QUALITY ASSURANCE/ QUALITY CONTROL

There are no specific quality assurance (QA) activities which apply to the implementation of these procedures. However, the following general QA procedures apply:

1. All data must be documented on field data sheets or within site logbooks.

2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation and they must be documented.

3. The collection of rinsate blanks is recommended to evaluate potential for cross contamination from the purging and/or sampling equipment.

4. Trip blanks are required if analytical parameters include VOAs.

10.0 DATA VALIDATION

This section is not applicable to this SOP.

11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA or REAC health and safety guidelines. More specifically, depending upon the site specific contaminants, various protective programs must be implemented prior to sampling the first well. The site health and safety plan should be reviewed with specific emphasis placed on the protection program planned for the well sampling tasks. Standard safe operating practices should be followed such as minimizing contact with potential contaminants in both the vapor phase and liquid matrix through the use of respirators and disposable clothing.

When working around volatile organic contaminants:

1. Avoid breathing constituents venting from the well.

2. Pre-survey the well head-space with an FID/PID prior to sampling.

3. If monitoring results indicate organic constituents, sampling activities may be conducted in Level C protection. At a minimum, skin protection will be afforded by disposable protective clothing.

Physical hazards associated with well sampling:

1. Lifting injuries associated with pump and bailers retrieval; moving equipment.

2. Use of pocket knives for cutting discharge hose.

3. Heat/cold stress as a result of exposure to extreme temperatures and protective clothing.

4. Slip, trip, fall conditions as a result of pump discharge.

5. Restricted mobility due to the wearing of protective clothing.

6. Electrical shock associated with use of submersible pumps is possible. Use a GFCI or a copper grounding stake to avoid this problem.

12.0 REFERENCES

Barcelona, M.J., Helfrich, J.A., Garske, E.E., and J.P. Gibb, Spring 1984. "A Laboratory Evaluation of Groundwater Sampling Mechanisms," Groundwater

Monitoring Review, 1984 pp. 32-41.

Barcelona, M.J., Helfrich, J.A., and Garske, E.E., "Sampling Tubing Effects on Groundwater Samples", Analy. Chem., Vol. 57, 1985 pp. 460-463.

Driscoll, F.G., Groundwater and Wells (2nd ed.) Johnson Division, UOP Inc., St. Paul, Minnesota, 1986, 1089 pp.

Gibb, J.P., R.M. Schuller, and R.A. Griffin,. Monitoring Well Sampling and Preservation Techniques, EPA-600/9-80-010, 1980. March, 1980.

Instrument Specialties Company, (January). Instruction Manual, Model 2100 Wastewater Sampler, Lincoln, Nebraska, 1980.

Keely, J.F. and Kwasi Boateng, Monitoring Well Installation, Purging and Sampling Techniques - Part I: Conceptualizations, Groundwater V25, No. 3, 1987 pp. 300-313.

Keith, Lawrence H., Principles of Environmental Sampling, American Chemical Society, 1988.

Korte, Nic, and Dennis Ealey,. Procedures for Field Chemical Analyses of Water Samples, U.S. Department of Energy, GJ/TMC-07, Technical Measurements Center, Grand Junction Project Office, 1983.

Korte, Nic, and Peter Kearl,. Procedures for the Collection and Preservation of Groundwater and Surface Water Samples and for the Installation of Monitoring Wells: Second Edition, U.S. Department of Energy, GJ/TMC-08, Technical Measurements Center, Grand Junction Projects Office, 1985.

National Council of the Paper Industry for Air and Stream Improvement, Inc.,. A Guide to Groundwater Sampling, Technical Bulletin No. 362, Madison, New York. January, 1982.

Nielsen, David M. and Yeates, Gillian L., Spring. "A Comparison of Sampling Mechanisms Available for Small-Diameter Groundwater Monitoring Wells," Groundwater Monitoring Review, 1985 pp. 83-99.

Scalf, et al. (M.J. Scalf, McNabb, W. Dunlap, R. Crosby, and J. Fryberger),. Manual for Groundwater Sampling Procedures. R.S. Kerr Environmental Research Laboratory, Office of Research and Development. 1980, Ada, OK.

Sisk, S.W. NEIC Manual for Ground/Surface Investigations at Hazardous Waste Sites, EPA-330/9-81-002, 1981.

U.S. Department of the Interior, National Handbook of Recommended Methods for Water-Data Acquisition, Reston, Virginia.

U.S. Environmental Protection Agency, 1977. Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities. EPA-530/SW-611. August, 1977.

U.S. Code of Federal Regulations, 49 CFR Parts 100 to 177, Transportation revised November 1, 1985.

U.S. Environmental Protection Agency, 1982. Handbook for Chemical and Sample Preservation of Water and Wastewater, EPA-600/4-82-029, Washington, D.C.

U.S. Environmental Protection Agency, 1983. Methods for Chemical Analysis of Water and Waste, EPA-600/4-79-020, Washington, D.C.

U.S. Environmental Protection Agency, 1984. Test Methods for Evaluation of Solid Waste, EPA-SW-846, Second Edition, Washington, D.C.

U.S. Environmental Protection Agency, 1981. Manual of Groundwater Quality Sampling Procedures, EPA-600/2-81-160, Washington, D.C.

U.S. Environmental Protection Agency, 1985. Practical Guide for Groundwater Sampling, EPA-600/2-85/104, September, 1985.

U.S. Environmental Protection Agency, 1986. RCRA Groundwater Monitoring Technical Enforcement Guidance Document, OSWER-9950-1, September, 1986.

Weston, 1987. Standard Operations Procedures for Monitor Well Installation. MOUND IGMP/RIP.

U.S. Environmental Protection Agency, 1982. <u>Handbook for Sampling and Sample Preservation of Water and Wastewater</u>, EPA-600/4-82-029, Washington, D.C.

--- 1981. <u>Manual of Groundwater Quality</u>

Sampling Procedures, EPA-600/2-81-160, Washington, D.C.

--- 1985. Practice Guide for Groundwater Sampling, EPA-600/2/85-104, September 1985.

Nielsen, David M. and Yeates, Gillian L., Spring 1985. "A Comparison of Sampling Mechanisms Available for Small-Diameter Groundwater Monitoring Wells," Groundwater Monitoring Review, pp. 83-99.

WESTON, 1987. Standard Operating Procedures for Monitor Well Installation. MOUND IGMP/RIP

Barcelona, M.J. Helfrich, J.A., and Garske, E.E., "Sampling Tubing Effects on Groundwater Samples". 1985, Analy. Chem., Vol. 57, pp. 460-463.

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

LOW STRESS (low flow) PURGING AND SAMPLING PROCEDURE FOR THE COLLECTION OF GROUND WATER SAMPLES FROM MONITORING WELLS

July 30, 1996
Revision 2

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

LOW STRESS (low flow) PURGING AND SAMPLING PROCEDURE FOR THE COLLECTION OF GROUND WATER SAMPLES FROM MONITORING WELLS

I. SCOPE & APPLICATION

This standard operating procedure (SOP) provides a general framework for collecting ground water samples that are indicative of mobile organic and inorganic loads at ambient flow conditions (both the dissolved fraction and the fraction associated with mobile particulates). The SOP emphasizes the need to minimize stress by low water-level drawdowns, and low pumping rates (usually less than 1 liter/min) in order to collect samples with minimal alterations to water chemistry. This SOP is aimed primarily at sampling monitoring wells that can accept a submersible pump and have a screen, or open interval length of 10 feet or less (this is the most common situation). However, this procedure is flexible and can be used in a variety of well construction and ground-water yield situations. Samples thus obtained are suitable for analyses of ground water contaminants (volatile and semi-volatile organic analytes, pesticides, PCBs, metals and other inorganics), or other naturally occurring analytes.

This procedure does not address the collection of samples from wells containing light or dense non-aqueous phase liquids (LNAPLs and DNAPLs). For this the reader may wish to check: Cohen, R.M. and J.W. Mercer, 1993, DNAPL Site Evaluation; C.K. Smoley (CRC Press), Boca Raton, Florida and U.S. Environmental Protection Agency, 1992, RCRA Ground-Water Monitoring: Draft Technical Guidance; Washington, DC (EPA/530-R-93-001).

The screen, or open interval of the monitoring well should be optimally located (both laterally and vertically) to intercept existing contaminant plume(s) or along flowpaths of potential contaminant releases. It is presumed that the analytes of interest move (or potentially move) primarily through the more permeable zones within the screen, or open interval.

Proper well construction and development cannot be overemphasized, since the use of installation techniques that are appropriate to the hydrogeologic setting often prevents "problem well" situations from occurring. It is also recommended that as part of development or redevelopment the well should be tested to determine the appropriate pumping rate to obtain stabilization of field indicator parameters with minimal drawdown in shortest amount of time. With this information field crews can then conduct purging and sampling in a more expeditious manner.

The mid-point of the saturated screen length (which should not exceed 10 feet) is used by convention as the location of the pump intake. However, significant chemical or permeability contrast(s) within the screen may require additional field work to determine the optimum vertical location(s) for the intake, and appropriate pumping rate(s) for purging and sampling more localized target zone(s). Primary flow zones (high(er) permealability and/or high(er) chemical concentrations) should be identified in wells with screen lengths longer than 10 feet, or in wells with open boreholes in bedrock. Targeting these zones for water sampling will help insure that the low stress procedure will not underestimate contaminant concentrations. The Sampling and Analysis Plan must provide clear instructions on how the pump intake depth(s) will be selected, and reason(s) for the depth(s) selected.

Stabilization of indicator field parameters is used to indicate that conditions are suitable for sampling to begin. Achievement of turbidity levels of less than 5 NTU and stable drawdowns of less than 0.3 feet, while desirable, are not mandatory. Sample collection may still take place provided the remaining criteria in this procedure are met. If after 4 hours of purging indicator field parameters have not stabilized, one of 3 optional courses of action may be taken: a) continue purging until stabilization is achieved, b) discontinue purging, do not collect any samples, and record in log book that stabilization could not be achieved (documentation must describe attempts to achieve stabilization) c) discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization (note: there is a risk that the analytical data obtained, especially metals and strongly hydrophobic organic analytes, may not meet the sampling objectives).

Changes to this SOP should be proposed and discussed when the site Sampling and Analysis Plan is submitted for approval. Subsequent requests for modifications of an approved plan must include adequate technical justification for proposed changes. All changes and modifications must be approved before implementation in field.

II.EQUIPMENT

A. Extraction device

Adjustable rate, submersible pumps are preferred (for example, centrifugal or bladder pump constructed of stainless steel or

Teflon).

Adjustable rate, peristaltic pumps (suction) may be used with caution. Note that EPA guidance states: "Suction pumps are not recommended because they may cause degassing, pH modification, and loss of volatile compounds" (EPA/540/P-87/001, 1987, page 8.5-11).

The use of inertial pumps is discouraged. These devices frequently cause greater disturbance during purging and sampling and are less easily controlled than the pumps listed above. This can lead to sampling results that are adversely affected by purging and sampling operations, and a higher degree of data variability.

B. Tubing

Teflon or Teflon lined polyethylene tubing are preferred when sampling is to include VOCs, SVOCs, pesticides, PCBs and inorganics.

PVC, polypropylene or polyethylene tubing may be used when collecting samples for inorganics analyses. However, these materials should be used with caution when sampling for organics. If these materials are used, the equipment blank (which includes the tubing) data must show that these materials do not add contaminants to the sample.

Stainless steel tubing may be used when sampling for VOCs, SVOCs, pesticides, and PCBs. However, it should be used with caution when sampling for metals.

The use of 1/4 inch or 3/8 inch (inner diameter) tubing is preferred. This will help ensure the tubing remains liquid filled when operating at very low pumping rates.

Pharmaceutical grade (Pharmed) tubing should be used for the section around the rotor head of a peristaltic pump, to minimize gaseous diffusion.

C. Water level measuring device(s), capable of measuring to 0.01 foot accuracy (electronic “tape”, pressure transducer). Recording pressure transducers, mounted above the pump, are especially helpful in tracking water levels during pumping operations, but their use must include check measurements with a water level “tape” at the start and end of each record.

D. Flow measurement supplies (e.g., graduated cylinder and stop watch).

E. Interface probe, if needed.

F. Power source (generator, nitrogen tank, etc.). If a gasoline generator is used, it must be located downwind and at least 30 feet from the well so that the exhaust fumes do not contaminate the samples.

G. Indicator field parameter monitoring instruments - pH, Eh, dissolved oxygen (DO), turbidity, specific conductance, and temperature. Use of a flow-through-cell is required when measuring all listed parameters, except turbidity. Standards to perform field calibration of instruments. Analytical methods are listed in 40 CFR 136, 40 CFR 141, and SW-846. For Eh measurements, follow manufacturer's instructions.

H. Decontamination supplies (for example, non-phosphate detergent, distilled/deionized water, isopropyl alcohol, etc.).

I. Logbook(s), and other forms (for example, well purging forms).

J. Sample Bottles.

K. Sample preservation supplies (as required by the analytical methods).

L. Sample tags or labels.

M. Well construction data, location map, field data from last sampling event.

N. Well keys.

O. Site specific Sample and Analysis Plan/Quality Assurance Project Plan.

P. PID or FID instrument (if appropriate) to detect VOCs for health and safety purposes, and provide qualitative field evaluations.

III.PRELIMINARY SITE ACTIVITIES

Check well for security damage or evidence of tampering, record pertinent observations.

Lay out sheet of clean polyethylene for monitoring and sampling equipment.

Remove well cap and immediately measure VOCs at the rim of the well with a PID or FID instrument and record the reading in the field logbook.

If the well casing does not have a reference point (usually a V-cut or indelible mark in the well casing), make one. Describe its location and record the date of the mark in the logbook.

A synoptic water level measurement round should be performed (in the shortest possible time) before any purging and sampling activities begin. It is recommended that water level depth (to 0.01 ft.) and total well depth (to 0.1 ft.) be measured the day before, in order to allow for re-settlement of any particulates in the water column. If measurement of total well depth is not made the day before, it should not be measured until after sampling of the well is complete. All measurements must be taken from the established referenced point. Care should be taken to minimize water column disturbance.

Check newly constructed wells for the presence of LNAPLs or DNAPLs before the initial sampling round. If none are encountered, subsequent check measurements with an interface probe are usually not needed unless analytical data or field head space information signal a worsening situation. Note: procedures for collection of LNAPL and DNAPL samples are not addressed in this SOP.

IV.PURGING AND SAMPLING PROCEDURE

Sampling wells in order of increasing chemical concentrations (known or anticipated) is preferred.

1. Install Pump

Lower pump, safety cable, tubing and electrical lines slowly (to minimize disturbance) into the well to the midpoint of the zone to be sampled. The Sampling and Analysis Plan should specify the sampling depth, or provide criteria for selection of intake depth for each well (see Section I). If possible keep the pump intake at least two feet above the bottom of the well, to minimize mobilization of particulates present in the bottom of the well. Collection of turbid free water samples may be especially difficult if there is two feet or less of standing water in the well.

2. Measure Water Level

Before starting pump, measure water level. If recording pressure transducer is used-initialize starting condition.

3. Purge Well

3a. Initial Low Stress Sampling Event

Start the pump at its lowest speed setting and slowly increase the speed until discharge occurs. Check water level. Adjust pump speed until there is little or no water level drawdown (less than 0.3 feet). If the minimal drawdown that can be achieved exceeds 0.3 feet but remains stable, continue purging until indicator field parameters stabilize.

Monitor and record water level and pumping rate every three to five minutes (or as appropriate) during purging. Record any pumping rate adjustments (both time and flow rate). Pumping rates should, as needed, be reduced to the minimum capabilities of the pump (for example, 0.1 - 0.4 l/min) to ensure stabilization of indicator parameters. Adjustments are best made in the first fifteen minutes of pumping in order to help minimize purging time. During pump start-up, drawdown may exceed the 0.3 feet target and then "recover" as pump flow adjustments are made. Purge volume calculations should utilize stabilized drawdown value, not the initial drawdown. Do not allow the water level to fall to the intake level (if the static water level is above the well screen, avoid lowering the water level into the screen). The final purge volume must be greater than the stabilized drawdown volume plus the extraction tubing volume.

Wells with low recharge rates may require the use of special pumps capable of attaining very low pumping rates (bladder, peristaltic), and/or the use of dedicated equipment. If the recharge rate of the well is lower than extraction rate capabilities of currently manufactured pumps and the well is essentially dewatered during purging, then the well should be sampled as soon as the water level has recovered sufficiently to collect the appropriate volume needed for all anticipated samples (ideally the intake should not be moved during this recovery period). Samples may then be collected even though the indicator field parameters have not stabilized.

3b. Subsequent Low Stress Sampling Events

After synoptic water level measurement round, check intake depth and drawdown information from previous sampling event(s) for each well. Duplicate, to the extent practicable, the intake depth and extraction rate (use final pump dial setting information) from previous event(s). Perform purging operations as above.

4. Monitor Indicator Field Parameters

During well purging, monitor indicator field parameters (turbidity, temperature, specific conductance, pH, Eh, DO) every three to five minutes (or less frequently, if appropriate). Note: during the early phase of purging emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments. Purging is considered complete and sampling may begin when all the above indicator field parameters have stabilized. Stabilization is considered to be achieved when three consecutive readings, taken at three (3) to five (5) minute intervals, are within the following limits:

turbidity (10% for values greater than 1 NTU),
DO (10%),
specific conductance (3%),
temperature (3%),
pH (± 0.1 unit),
ORP/Eh (± 10 millivolts).

All measurements, except turbidity, must be obtained using a flow-through-cell. Transparent flow-through-cells are preferred, because they allow field personnel to watch for particulate build-up within the cell. This build-up may affect indicator field parameter values measured within the cell and may also cause an underestimation of turbidity values measured after the cell. If the cell needs to be cleaned during purging operations, continue pumping and disconnect cell for cleaning, then reconnect after cleaning and continue monitoring activities.

The flow-through-cell must be designed in a way that prevents air bubble entrapment in the cell. When the pump is turned off or cycling on/off (when using a bladder pump), water in the cell must not drain out. Monitoring probes must be submerged in water at all times. If two flow-through-cells are used in series, the one containing the dissolved oxygen probe should come first (this parameter is most susceptible to error if air leaks into the system).

5. Collect Water Samples

Water samples for laboratory analyses must be collected before water has passed through the flow-through-cell (use a by-pass assembly or disconnect cell to obtain sample).

VOC samples should be collected first and directly into pre-preserved sample containers. Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

During purging and sampling, the tubing should remain filled with water so as to minimize possible changes in water chemistry upon contact with the atmosphere. It is recommended that 1/4 inch or 3/8 inch (inside diameter) tubing be used to help insure that the sample tubing remains water filled. If the pump tubing is not completely filled to the sampling point, use one of the following procedures to collect samples: (1) add clamp, connector (Teflon or stainless steel) or valve to constrict sampling end of tubing; (2) insert small diameter Teflon tubing into water filled portion of pump tubing allowing the end to protrude beyond the end of the pump tubing, collect sample from small diameter tubing; (3) collect non-VOC samples first, then increase flow rate slightly until the water completely fills the tubing, collect sample and record new drawdown, flow rate and new indicator field parameter values.

Add preservative, as required by analytical methods, to samples immediately after they are collected if the sample containers are not pre-preserved. Check analytical methods (e.g. EPA SW-846, water supply, etc.) for additional information on preservation. Check pH for all samples requiring pH adjustment to assure proper pH value. For VOC samples, this will require that a test sample be collected during purging to determine the amount of preservative that needs to be added to the sample containers prior to sampling.

If determination of filtered metal concentrations is a sampling objective, collect filtered water samples using the same low flow procedures. The use of an in-line filter is required, and the filter size (0.45 um is commonly used) should be based on the sampling objective. Pre-rinse the filter with approximately 25 - 50 ml of ground water prior to sample collection. Preserve filtered water sample immediately. Note: filtered water samples are not an acceptable substitute for unfiltered samples when the monitoring objective is to obtain chemical concentrations of total mobile contaminants in ground water for human health risk calculations.

Label each sample as collected. Samples requiring cooling (volatile organics, cyanide, etc.) will be placed into a cooler with ice or refrigerant for delivery to the laboratory. Metal samples after acidification to a pH less than 2 do not need to be cooled.

6. Post Sampling Activities

If recording pressure transducer is used, remeasure water level with tape.

After collection of the samples, the pump tubing may either be dedicated to the well for resampling (by hanging the tubing inside the well), decontaminated, or properly discarded.

Before securing the well, measure and record the well depth (to 0.1 ft.), if not measured the day before purging began. Note: measurement of total well depth is optional after the initial low stress sampling event. However, it is recommended if the well has a “silting” problem or if confirmation of well identity is needed.

Secure the well.

V.DECONTAMINATION

Decontaminate sampling equipment prior to use in the first well and following sampling of each subsequent well. Pumps will not be removed between purging and sampling operations. The pump and tubing (including support cable and electrical wires which are in contact with the well) will be decontaminated by one of the procedures listed below.

Procedure 1

The decontaminating solutions can be pumped from either buckets or short PVC casing sections through the pump or the pump can be disassembled and flushed with the decontaminating solutions. It is recommended that detergent and isopropyl alcohol be used sparingly in the decontamination process and water flushing steps be extended to ensure that any sediment trapped in the pump is removed. The pump exterior and electrical wires must be rinsed with the decontaminating solutions, as well. The procedure is as follows:

Flush the equipment/pump with potable water.

Flush with non-phosphate detergent solution. If the solution is recycled, the solution must be changed periodically.

Flush with potable or distilled/deionized water to remove all of the detergent solution. If the water is recycled, the water must be changed periodically.

Flush with isopropyl alcohol (pesticide grade). If equipment blank data from the previous sampling event show that the level of contaminants is insignificant, then this step may be skipped.

Flush with distilled/deionized water. The final water rinse must not be recycled.

Procedure 2

Steam clean the outside of the submersible pump.

Pump hot potable water from the steam cleaner through the inside of the pump. This can be accomplished by placing the pump inside a three or four inch diameter PVC pipe with end cap. Hot water from the steam cleaner jet will be directed inside the PVC pipe and the pump exterior will be cleaned. The hot water from the steam cleaner will then be pumped from the PVC pipe through the pump and collected into another container. Note: additives or solutions should not be added to the steam cleaner.

Pump non-phosphate detergent solution through the inside of the pump. If the solution is recycled, the solution must be changed periodically.

Pump potable water through the inside of the pump to remove all of the detergent solution. If the solution is recycled, the solution must be changed periodically.

Pump distilled/deionized water through the pump. The final water rinse must not be recycled.

VI. FIELD QUALITY CONTROL

Quality control samples are required to verify that the sample collection and handling process has not compromised the quality of the ground water samples. All field quality control samples must be prepared the same as regular investigation samples with regard to sample volume, containers, and preservation. The following quality control samples shall be collected for each batch of samples (a batch may not exceed 20 samples). Trip blanks are required for the VOC samples at a frequency of one set per VOC sample cooler.

Field duplicate.

Matrix spike.

Matrix spike duplicate.

Equipment blank.

Trip blank (VOCs).

Temperature blank (one per sample cooler).

Equipment blank shall include the pump and the pump's tubing. If tubing is dedicated to the well, the equipment blank will only include the pump in subsequent sampling rounds.

Collect samples in order from wells with lowest contaminant concentration to highest concentration. Collect equipment blanks after sampling from contaminated wells and not after background wells.

Field duplicates are collected to determine precision of sampling procedure. For this procedure, collect duplicate for each analyte group in consecutive order (VOC original, VOC duplicate, SVOC original, SVOC duplicate, etc.).

If split samples are to be collected, collect split for each analyte group in consecutive order (VOC original, VOC split, etc.). Split sample should be as identical as possible to original sample.

All monitoring instrumentation shall be operated in accordance with EPA analytical methods and manufacturer's operating instructions. EPA analytical methods are listed in 40 CFR 136, 40 CFR 141, and SW-846 with exception of Eh, for which the manufacturer's instructions are to be followed. Instruments shall be calibrated at the beginning of each day. If a measurement falls outside the calibration range, the instrument should be re-calibrated so that all measurements fall within the calibration range. At the end of each day, check calibration to verify that instruments remained in calibration. Temperature measuring equipment, thermometers and thermistors, need not be calibrated to the above frequency. They should be checked for accuracy prior to field use according to EPA Methods and the manufacturer's instructions.

VII.FIELD LOGBOOK

A field log shall be kept to document all ground water field monitoring activities (see attached example matrix), and record all of the following:

Well identification.

Well depth, and measurement technique.

Static water level depth, date, time and measurement technique.

Presence and thickness of immiscible liquid (NAPL) layers and detection method.

Pumping rate, drawdown, indicator parameters values, and clock time, at the appropriate time intervals; calculated or measured total volume pumped.

Well sampling sequence and time of each sample collection.

Types of sample bottles used and sample identification numbers.

Preservatives used.

Parameters requested for analysis.

Field observations during sampling event.

Name of sample collector(s).

Weather conditions.

QA/QC data for field instruments.

Any problems encountered should be highlighted.

Description of all sampling equipment used, including trade names, model number, diameters, material composition, etc.

VIII. DATA REPORT

Data reports are to include laboratory analytical results, QA/QC information, and whatever field logbook information is needed to allow for a full evaluation of data useability.

EXAMPLE (Minimum Requirements) Page____of____

Well PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name)________________________
Well Number________________Date______________________
Field Personnel______________________________________
Sampling Organization________________________________
Identify MP____

Depth to (below MP) _______/________ of screen
top bottom
Pump Intake at (ft. below MP)______________
Purging Device; (pump type)________________

Clock Time 24 HR	Water Depth below MP ft	Pump Dial[1]	Purge Rate ml/min	Cum. Volume Purged liters	Temp. °C	Spec. Cond.[2] μS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turb- idity NTU	Comments

1. Pump dial setting (for example: hertz, cycles/min, etc).
2. μSiemens per cm(same as μmhos/cm)at 25 °C.
3. Oxidation reduction potential (stand in for Eh).