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Remedial Investigation Report

Saint John the Evangelist R.C. Church and Elementary School
148 Hamilton Avenue
White Plains, New York

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Executive Summary

As a follow-up to the initial evaluation of the potential for subsurface vapor intrusion conducted at the Saint John the Evangelist R.C. Church and Elementary School property in White Plains, New York (St. John's property) in February 2003, and in response to comments on this work provided by the New York State Department of Health (NYSDOH), The RETEC Group, Inc. (RETEC) performed a Remedial Investigation (RI) on behalf of Consolidated Edison Company of New York, Inc. (Con Edison) at the St. John's property to thoroughly evaluate the potential for subsurface vapor intrusion into buildings at the St. John's property and to understand the nature and extent of possible subsurface soil impacts and groundwater impacts at the site. The Remedial Investigation (RI) was comprised of two major phases, with the first phase performed in April 2004 to augment the initial evaluation of potential subsurface vapor intrusion performed by RETEC in February 2003. This work was centered within the building footprints of the rectory building, the school building, and the gymnasium building. A second remedial investigation phase was performed in July 2004 south and west of the school and gymnasium buildings to delineate the extent of deep soil impacts noted during the April 2004 work. Following this work, a deep groundwater monitoring well was installed and sampled at the site in September 2004. Overall, the RI was prompted by the results of a subsurface investigation that was conducted by Con Edison at the adjacent former manufactured gas plant (MGP) site to the north of St. John's property. Results of that investigation indicated the potential for impacts to soil and possibly groundwater migrating from the former MGP site beneath the St. John's property. The overall goals of the RI were to 1) determine whether the air quality within the school, rectory, and gymnasium buildings was being adversely affected by potential residual subsurface impacts beneath the St. John's property at depth, and 2) delineate the horizontal and vertical extent of potential impacts migrating from the former MGP site beneath the St. John's property.

An initial and follow-on evaluation of indoor air quality was conducted at the St. John's property in February 2003 and April 2004. The work performed consisted of a walk-through of the buildings, and collection of ambient air (outdoor), indoor air, and soil gas samples. The April 2004 work also included the installation of soil borings and the collection of soil and groundwater samples at depth beneath the footprint of the St. John's School building. In addition, a second, post-investigation round of indoor air samples was collected. In July 2004, twelve additional soil borings were installed and soil samples collected. In September 2004, one deep downgradient monitoring well was installed at the site and sampled along with select wells at the adjacent MGP.

In total, 38 subsurface soil samples and seven groundwater samples were collected during the RI and tested for MGP-related constituents. Two soil samples were also submitted for gas chromatography with flame ionization detector (GC/FID) fingerprint analysis to determine the likely source of impacts noted in the samples. Similar to the initial vapor intrusion evaluation performed in February 2003, a total of 18 air samples and one field duplicate sample for quality assurance/quality control purposes were collected in April 2004 from the basement and first floors of the rectory and school buildings, and the floor of the gymnasium. In addition, five soil gas samples were collected from within and outside of the buildings. The air samples were submitted to a commercial laboratory for chemical analysis of volatile organic compounds (VOCs) by USEPA Method TO-15. During the April 2004 work, pressure differential measurements through the basement floor slabs were also recorded to aid in the evaluation of potential vapor intrusion.

After the April 2004 investigation work was completed, a set of 14 post-investigation air samples and one duplicate sample for quality assurance/quality control purposes were collected to determine whether the investigation activities had impacted indoor air quality. The air samples were submitted to a commercial laboratory for chemical analysis of VOCs (USEPA Method TO-15).

A volatilization study was also performed using samples of groundwater and visibly impacted soils collected at depth beneath the school building in April 2004. The volatilization study also included a soil sample collected in the southern former MGP relief holder area of the White Plains Substation property during the IRM activities and that was known to be impacted by MGP tar materials. The groundwater and impacted soil samples containing visible non-aqueous phase liquid (NAPL) were submitted to Air Toxics Ltd. (ATL) laboratories to qualitatively analyze the volatile fraction of the MGP-impacted material (referred to as analysis of the headspace). The suite of constituents detected in the volatile fraction of the materials was then compared to those compounds detected in indoor air and soil gas to further evaluate if the source of the VOCs detected in indoor air or soil gas was MGP-related.

Soil analytical data and laboratory data collected during the RI were used to delineate the horizontal and vertical extent of deep soil impacts at the St. John's property. Based on results of this investigation, combined with existing site data and data generated during previous investigations at the adjacent former MGP site, deep soil impacts extend from the MGP site under a narrow stretch of New Street, and beneath a portion of the footprint of the school building. These impacts further extend to the south and west under a portion of the courtyard area and likely extend beneath a portion of the eastern edge of the gymnasium building. Deep soils are visibly impacted with NAPL residuals and samples from this zone contained VOCs and semi-volatile organic compounds (SVOCs) above New York State Department of Environmental Conservation (NYSDEC) Recommended Soil Cleanup Objectives (RSCOs) for both VOCs and SVOCs. The vertical extent of these exceedances was determined and impacts are largely limited to the visibly impacted zone present at depths between 35 and 53 feet below ground surface (bgs), with no impacts noted in soils from shallower depths. Samples collected beneath the visibly impacted zone provide data to vertically delineate subsurface soil impacts at depth. Laterally, no deep soil impacts were noted visually or through laboratory analysis between the school and the rectory to the east or beneath the boiler room area near the western end of the school or west of the gymnasium building.

Groundwater impacts beneath the site are associated with the same interval of deep NAPL-impacted soil. Groundwater at depth immediately downgradient of this zone contained several VOCs and SVOCs above NYSDEC guidance/cleanup values. No groundwater impacts were detected beneath the school building at the water table (approximately 20-24 feet beneath the basement floor) in areas that are underlain by deep NAPL impacts, confirming that the upward vertical extent of groundwater impacts associated with deep NAPL is limited. Geochemical data collected to identify the presence of natural biodegradation processes and apparent decreases in observed concentrations of dissolved constituents in groundwater at the adjacent MGP site indicate that natural attenuation is occurring at some level in the site area. It is anticipated that active source removal, coupled with natural attenuation at the MGP site, will support further degradation of dissolved constituents in groundwater over time.

Concentrations of Possibly MGP-Related VOCs in indoor air were detected within, or only slightly above, the range considered typical by the NYSDOH for residential indoor air. One compound, iso-octane, was detected at an elevated concentration during a sampling event; however, its presence does not appear to be associated with the subsurface MGP contamination and is most likely due to a temporary gasoline source present in indoor air.

VOCs were found to be present in the soil gas samples beneath the buildings. However, a detailed comparison of the soil gas VOCs and the VOCs detected in the volatile fraction of known MGP-impacted materials (headspace analysis) indicated that the soil gas VOCs originated from non-MGP sources.

Furthermore, the potential concern that VOCs from soil gas beneath the buildings could be migrating upward through the concrete slab and impacting indoor air quality does not appear to be warranted, based on a close examination of the indoor air data, soil gas data, and the shallow groundwater data.

Based on these findings, there are no migration pathways by which compounds in the deep NAPL-impacted soil can reach any of the potential receptors at the school, gymnasium, or church. Given the lack of migration pathways at the site, there is no indication that any of the receptors associated with the St. John's school, gymnasium, or church are at risk from MGP-related compounds.

1 Introduction

This report has been prepared for Consolidated Edison Company of New York, Inc. (Con Edison) to present the results of a recent investigation performed at the Saint John the Evangelist R.C. Church and Elementary School property in White Plains, New York (St. John's property). The investigation was performed in two phases beginning in April 2004 and ending in September 2004. The April 2004 work was performed to evaluate potential subsurface vapor intrusion at the St. John's property. It included an evaluation and collection of soil, soil gas, groundwater, and indoor air samples within and beneath the school, rectory, and gymnasium buildings (both before and after the investigation program was completed). The soil gas and indoor air work represent a continuation of earlier soil gas and indoor air investigation work performed in February 2003 at the site by The RETEC Group, Inc. (RETEC) on behalf of Con Edison. The results of this investigation are presented in the Report on Evaluation of Sub-Surface Vapor Intrusion (RETEC, 2003). The soil and groundwater samples were collected to supplement the soil gas and indoor air data and also to better delineate the horizontal and vertical extent of soil impacts detected at depth [approximately 35-40 feet below ground surface (bgs)] at boring SB-24, completed along the southern edge of New Street. This boring was installed as part of Con Edison's Site Investigation of the former Manufactured Gas Plant (MGP) site that is currently occupied by a Con Edison electric distribution substation adjacent to and north of the St. John's property. Results of this study are presented in the Site Investigation Report (Parsons, 2004). The second phase of work, performed between July and September 2004, included the advancement of additional soil borings and one groundwater monitoring well, and associated soil and groundwater sampling to further delineate subsurface impacts noted during the April 2004 work.

The indoor air and soil gas work was performed in accordance with the Work Plan for Evaluation of Sub-Surface Vapor Intrusion (RETEC, 2002), and in cooperation with the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH). This work plan was prepared for general use in the program that Con Edison has initiated to evaluate potential subsurface vapor intrusion that may be associated with its former MGP sites. The soil boring/groundwater/soil sampling program was conducted in accordance with the NYSDEC-approved Work Plan for Additional Indoor Air/Soil Gas/Soil Investigation dated April 5, 2004. Additional details and procedures for the recent work are outlined in the site-specific Health and Safety Plan (HASP) (RETEC, 2003a) developed for the February 2003 site work, and the standard operating procedure (SOP) for soil gas sampling developed for this project. Representatives from the NYSDEC were also present on site for portions of the investigation program performed in 2004 to ensure consistency with the work plans.

This report describes the field investigation activities and associated methodologies, the observations made during the field investigation, analyses of environmental samples, and site conditions. It also provides an assessment of potential risks associated with subsurface environmental conditions encountered at the site and a summary and conclusions based on data generated during this investigation. The report has been prepared in accordance with the most recent and applicable guidelines of the NYSDEC, the NYSDOH, and the United States Environmental Protection Agency (USEPA) as well as the National Contingency Plan (NCP).

1.1 Report Objectives

This report describes the various investigation activities performed in 2004, presents and documents the results, and provides an interpretation of the results. The primary objectives of the report are to:

- Determine whether potential MGP byproducts and/or other chemical constituents are present at the site in subsurface soil and groundwater as a result of natural migration from the adjacent former MGP site and whether their extent has been fully delineated during the Remedial Investigation (RI); and

- Determine whether potential MGP residuals and associated constituents identified at the site present a threat to human health and/or the environment.

1.2 Scope of Work

The scope of work for the April 2004 evaluation at the St. John's property is described in the NYSDEC-approved Work Plan for Additional Indoor Air/Soil Gas/Soil Investigation dated April 5, 2004. A representative from the NYSDEC, Mr. Joseph Moloughney, was present during a site visit on March 17, 2004 to confirm the sampling program locations. The July 2004 investigation program is described in the NYSDEC-approved Work Plan for Additional Soil Investigation dated June 16, 2004. The September 2004 groundwater monitoring well installation at the site was conducted as described in Con Edison's letter to the NYSDEC dated August 31, 2004 and was verbally approved by the Department.

In summary, the RI scope of work for the included:

- A building inspection to identify the presence of various chemicals that could be sources of volatile organic compounds (VOCs) in indoor air (April 2004);

- Collection of indoor air and ambient air samples within three buildings of the parish (the rectory, school, and school gymnasium) prior to advancement of the soil borings (April 2004);

- Collection of soil gas samples beneath the floor of the school and gymnasium buildings (April 2004);

- Collection of sub-slab differential pressure data in the school and gymnasium buildings to measure building pressures with respect to the shallow subsurface (April 2004);

- Advancement of soil borings and the collection of soil samples (for both laboratory characterization and chemical fingerprinting), and shallow groundwater samples beneath the floor slab of the school building and between the school and the rectory (April 2004);

- Collection of post-investigation indoor air and ambient air samples (April 2004);

- Performance of a volatilization study and forensic comparison of the integrated data set to determine the most likely source of petroleum hydrocarbons detected in indoor air and soil gas beneath the St. John's Parish property (April 2004);

- Advancement of additional soil borings and the collection of soil samples for laboratory characterization south and west of the school building and gymnasium building to delineate the extent of subsurface impacts identified during the April 2004 investigation phase. Performance of community air monitoring during this phase of work (July 2004);

- Installation and sampling of one groundwater monitoring well just downgradient of the identified subsurface impact zone at the site (September 2004);

- Gauging and/or sampling of the existing monitoring wells at the adjacent former MGP site (September 2004); and

- Collection of an additional MGP-impacted soil sample from the area of the former southern relief holder at the former MGP site for inclusion into the volatilization study for comparison of headspace vapors to those collected in indoor air and soil gas beneath the St. John's property (December 2004).

1.3 Report Organization

The remainder of this report is organized in the following manner:

Section 2 – provides a description of the St. John's site and surrounding properties and summary information regarding site history.

Section 3 – provides a description of field investigation activities, including the sampling locations and procedures.

Section 4 – provides a discussion of the geologic and hydrogeologic setting at the site, as well as observations and measurements made during ambient air, indoor air, and soil gas sampling.

Section 5 – provides a discussion of chemical analyses performed and analytical results for environmental and quality control and quality assurance samples.

Section 6 – provides a discussion of the potential risks present at the site.

Section 7 – presents a summary and conclusions for the site based on available data; and

Section 8 – provides a list of references cited in this report.

Tables and Figures are provided in their own respective sections following Section 8.

Appendix A – NYSDOH Questionnaires

Appendix B – Subsurface Soil Boring Logs

Appendix C – Photographic Records of Representative Sampling Activities

Appendix D – Groundwater Sampling Forms

Appendix E – Monitoring Well Development Record (MW-9)

Appendix F – PID, Cyanide, and Meteorological Observations and Measurements During Indoor Air and Soil Gas Sampling

Appendix G – Data Usability Reports and Laboratory Analytical Data

Appendix H – Evaluation of Chromatographic and Mass Spectral Data

2 Site Description and History

2.1 Site Description

The site description and historical information provided in this section has been summarized from a Site Investigation Report prepared for the former MGP site located adjacent to the St. John's property (Parsons, 2004).

The site is located at 146-148 Hamilton Avenue in White Plains, New York (Figure 2-1). It is comprised of a rectangular parcel covering a total land area of approximately 1.75 acres. Site features include the Parish of St. John the Evangelist consisting of four buildings, a parking lot, and grassy areas. The four buildings include a church, the rectory, a school, and a gymnasium.

- Across the street from the site is a piece of property that formerly operated as an MGP. The MGP was in operation from approximately the mid-1800s to approximately 1930. Gas was initially produced from coal ("coal gas") and later, from oil and water ("carburetted water gas"). Detailed information regarding operational dates and the locations of structures related to the former MGP are included in the Site Investigation Report (Parsons, 2004). The former MGP property is currently occupied by a Con Edison electric distribution substation (9 New Street) and a commercial office building and parking lot (12 Water Street). To assess the potential subsurface impacts associated with the former MGP operations, a site investigation was conducted at the substation property and the adjacent 12 Water Street and 170 Hamilton Avenue properties in several phases between March 2000 and May 2003. A site layout map showing the current structures at both the electric substation and adjacent properties, along with the locations of the primary former MGP structures, is shown on Figure 2-2.

- In September 2002, Con Edison and the NYSDEC entered into a Voluntary Cleanup Agreement (VCA) for the former MGP operations on the White Plains Substation and 12 Water Street properties. Con Edison recently completed an interim remedial measures (IRM) project that was approved by the NYSDEC under the VCA for the southern former relief holder area at the White Plains Substation property. As part of the approved IRM, Con Edison demolished and removed the buried foundation of the southern former relief holder and excavated MGP coal tar-contaminated soil that was present in the remnant structure. To prevent any potential off-site migration of MGP residuals and contaminants towards New Street and the St. John's property, the completed IRM also included the installation of an underground cutoff wall and a series of MGP coal tar recovery wells just north of the cutoff wall and along the New Street side of the White Plains Substation property.

2.2 Adjoining Property Description

Surrounding properties include the former MGP site/electric substation and commercial office building (12 Water Street) to the north, Hamilton Avenue, open space, and commercial buildings to the south, North Lexington Avenue, open space and an above-ground parking garage to the west, and office buildings and above-ground parking garage to the east.

2.3 Previous Investigations

Previous investigative work at the St. John's property included the advancement of two soil borings south and west of the school building during the MGP site investigation in 2001. Data collected from these borings are provided in the Site Investigation Report (Parsons, 2004) and also summarized in Section 3 of this RI Report. In addition, RETEC performed an evaluation of the potential for subsurface vapor intrusion at the St. John's property in February 2003 (RETEC, 2003b). This work included the collection of several ambient and indoor air samples and soil gas samples collected from beneath and adjacent to the rectory, school, and gymnasium buildings.

3 Investigation Activities

This section provides a description of the methodologies used for conducting the field investigation at the St. John's property. Specific tasks performed during the RI consisted of the following:

- A building inspection to evaluate potential vapor intrusion pathways and document site conditions
- An inventory of all chemicals in the various school buildings with the potential to be present in indoor air
- Underground utility clearance and geophysical survey
- Collection of indoor air, ambient air, and soil gas samples
- Collection of subsurface soil samples (both inside and outside of various buildings)
- Collection of shallow groundwater samples using a direct push technology
- Collection of post-investigation indoor air samples
- Community air monitoring
- Monitoring well installation and development
- Groundwater sampling
- Site survey
- Investigation waste management

All field activities were conducted in accordance with the methods and procedures specified in the NYSDEC-approved Work Plans for the St. John's property site and Site Investigation Work Plan for the former MGP/substation site (Parsons, 1999), and in cooperation with the NYSDEC and the NYSDOH. All subsurface investigation locations were pre-cleared using Ground Penetrating Radar (GPR) and a magnetometer prior to each investigation phase.

3.1 Building Inspection and Chemical Inventory

Representatives of RETEC conducted a walk-through inspection of the buildings on April 9, 2004. The purpose of the walk-through was to identify potential vapor intrusion pathways, identify the presence of chemicals that could be sources of VOCs, and to determine the appropriate sampling locations. RETEC inspected the basement and first floors of the rectory and school, including the classrooms, boiler rooms, storage rooms, and the gymnasium.

The information obtained during the building inspection is summarized in the NYSDOH Indoor Air Quality Questionnaire and Building Inventory, provided in Appendix A. Observations were made regarding potential indoor sources of hydrocarbon vapors, as further described in Section 5 of this report.

3.2 Underground Utility Clearance and Geophysical Survey

Prior to the initiation of all phases of intrusive field work, RETEC contacted Dig Safely New York to arrange for the location and marking of all underground utilities in the vicinity of the proposed soil gas locations, soil borings, and monitoring well locations.

Utility clearance outside of the public properties was performed by Enviroprobe Service, Inc. (Enviroprobe), under contract to RETEC. Enviroprobe used ground-penetrating radar (GPR) and magnetic survey methods to scan each area where borings, wells, or test pits were scheduled for completion. During the course of the utility survey, Enviroprobe also noted the locations of any underground structures that were detected. As-built drawings for the various St. John's school and rectory buildings were reviewed during sampling placement. Subsurface features detected by the geophysical survey included drain lines from the gymnasium roof to sewer lines in the parking lot, and cable/telephone lines in and around the various buildings. Gas lines were located extending along New Street and entering the site buildings between the rectory and the school building. Two water lines were detected extending from Hamilton Avenue to the fire hydrants located adjacent to the gym.

Following the completion of the utility mark-out, each intrusive sampling location was hand or vacuum excavated to a depth of 5 feet (bgs) to confirm the absence of subsurface utilities. Each location was approved for drilling/probing upon completion of the confirmatory hand or vacuum excavation.

3.3 Indoor and Ambient Air Sampling

Sampling locations inside and outside of the buildings were determined with reference to the previous sampling activities at the property, the results of the investigation activities at the adjacent former MGP site (Parsons, 2004) and the building floor plans.

The rationale for selecting the locations of the ambient samples was to "bracket" the building by collecting air from the prevailing upwind direction and the prevailing downwind direction. Figure 3-1 shows the location of the ambient air samples. These locations are the same as those used during the initial evaluation in February 2003.

The rationale for selection of indoor air sample locations in the basement of the rectory and school building, as well as the gymnasium, was based on the results of the site investigation conducted by Con Edison at the adjacent former MGP site (Parsons, 2004). This investigation indicated that MGP residuals had migrated south of the former MGP site and likely beneath a portion of the St. John's property. Some sample locations were selected based on known or suspected areas of subsurface impacts. The remaining sample locations were selected from other areas for comparison purposes. The rationale for selection of first floor samples was to match the locations of the basement samples. With the exception of one location (103, school kitchen), all indoor air samples were collected from the same locations as during the February 2003 sampling event.

Figures 3-2 and 3-3 show the indoor air sampling locations for the April 2004 sampling event with abbreviated sample numbers. Table 3-1 lists the full sample numbers, locations, and sampling details. Sampling locations and data from the February 2003 sampling event are summarized in the Evaluation of Sub-Surface Vapor Intrusion Report (RETEC, 2003b).

Two initial ambient air samples, 14 indoor air samples, one field duplicate for quality assurance/quality control purposes, and two final ambient air samples were collected on April 12, 2004 by RETEC. Six-liter Summa canisters with flow regulators were used to collect each sample over a period of approximately one hour. Samples were submitted for laboratory analysis as described in Section 5.1. Collection of meteorological data was conducted on the day of sampling.

Assessment of VOCs in air from potential vapor intrusion points using a photoionization detector (PID), and measurement of cyanide in air were also conducted by RETEC in the school, rectory and gymnasium buildings on April 9, 2004.

Additional ambient and indoor air samples were collected by RETEC on April 24, 2004, after the investigation work was complete. This post-investigation sampling consisted of two initial ambient air samples, nine indoor air samples, one field duplicate for quality assurance/quality control purposes, and two final ambient air samples. These samples were collected from the same locations as those on April 12, 2004. To distinguish these post-investigation samples, a sample identification prefix of "St-J2" was added to the indoor sample names, as noted on Figures 3-2 and 3-3. The purpose of this sampling was to determine if the soil boring and sampling activities had adversely affected the indoor air quality in the school building where these activities had been conducted. Six-liter Summa canisters with flow regulators were used to collect each sample over a period of approximately one hour. Samples were submitted for the same laboratory analyses as the initial indoor and ambient air samples as described in Section 5.1.

3.4 Soil Gas Sampling

Soil gas sampling locations inside and outside of the buildings were established and marked during the site walk-through on March 29, 2004 and confirmed during the initial building inspection on April 9, 2004. The locations were determined with reference to the previous soil gas sampling locations collected on February 23, 2003 (RETEC, 2003b), the results of the investigation activities at the adjacent former MGP site (Parsons, 2004), and the building floor plans. Soil gas sample locations were also selected to match the indoor air sample locations for comparison purposes. As discussed, ground penetrating radar and a magnetometer were used at the locations as a utility clearance safety measure. The selected locations were then adjusted as necessary based on the building floor plans and the utility clearance results so as to avoid any subsurface interference.

Figure 3-4 shows the soil gas sampling locations with abbreviated sample numbers. A summary of field observations for each soil gas sample location, including differential pressure measurements, is provided in Table 3-2. Soil gas sampling occurred on April 12, 2004, immediately after the indoor and ambient air sampling. A total of five soil gas samples (SG-101, SG-102, SG-103, SG-104, and SG-106) were collected by RETEC. Collection of the samples required coring of concrete on the bottom floor of the building. Thickness of the cores ranged from 4.5 to 9 inches.

Prior to the installation of the soil gas probes, the differential pressure between the sub-slab space and the above ground area was measured. A 4-inch diameter rubber "J" plug was inserted into the open concrete core. Hydrated bentonite was applied around the joint separating the plug material and the concrete, creating an air-tight seal. The "J" plug was fitted with an open air probe so that a Dwyer Magnahelic pressure gauge could be affixed by using a section of poly tubing and the pressure could be measured in inches of water. The "J" plug was then removed and the soil gas sampling procedure was conducted.

Hand auguring of the soils was performed as part of Con Edison's standard safety procedures for invasive soil work. Soil gas samples required hand auguring to 1-foot below the sub-slab surface. Prior to soil gas sampling, the sample probes were advanced by hand and then backfilled to ensure that a representative sample of the soil gas was collected. The backfill consisted of a

6-inch layer of hydrated bentonite and the soil cuttings generated during hand advancement. This seal ensured that indoor air was not entrained into the soil gas sample. A steel sample probe, containing disposable tubing and sealed at the tip, was hand driven to the desired depth of approximately 2 feet below the bottom of the floor slab into undisturbed soils. The probe was then removed from the drive point and the equipment was purged using a PID as a vacuum pump. Upon completion of purging, a soil gas sample was collected from undisturbed soils approximately 2 feet below the floor slab.

Six-liter, laboratory-certified Summa canisters with flow regulators were used to collect each sample over a one-hour period. Samples were submitted for laboratory analysis as described in Section 5.1. All borings and concrete coring holes were then backfilled with bentonite, the concrete core, and cement to match the grade of the surrounding floor.

3.5 Soil Borings and Soil Sampling

A total of six soil borings were completed during the April 2004 phase of the investigation. Borings were advanced by Aquifer Drilling and Testing Company (ADT). The borings were advanced to better delineate the extent of subsurface impacts noted at SB-24 during the investigation at the adjacent former MGP site (Parsons, 2004). Five borings (B-102, B-103, B-104, B-107, and B-108) were installed in the basement of the school building. At these locations, soil gas and indoor air samples were also collected. The sixth boring (B-101) was located between the rectory and the school building. Locations of the borings are presented on Figure 3-5.

An additional 12 borings were advanced in July 2004 by Zebra Environmental (Zebra). These borings were completed to further delineate the extent of deep soil impacts noted during the April 2004 investigation phase. The borings were placed in three primary transects oriented in an east-west direction, with the first transect installed adjacent to the southern side of the school building (B-109 through B-111) and subsequent transects installed south (B-114 though B-118) and west (B-119 and B-120) of this transect as needed to fully delineate the horizontal and vertical extent of deep soil impacts (Figure 3-5).

During soil boring advancement, soils were logged for composition and for the presence of visual impacts and field screened with a PID for the presence of VOCs. With the exception of B-102 and B-104, all soil borings were installed with a track-mounted, direct-push Geoprobe® drill rig. Borings B-102 and B-104 were advanced manually using a jackhammer and standard Geoprobe® tooling. A 2-inch diameter and 4-foot long sampling tube (Macro-core sampler) equipped with a plastic liner was used to collect soil samples. The liner containing the soil was extracted from the sampling tube and split lengthwise to access the soil inside. To ensure that only soil from the target depth interval could enter the sampler, a discrete sampler was used during sample collection. This sampling device, containing a plug on the bottom, was inserted into the macro core sampler. When the top of the sample interval was reached, the plug was removed and the sampler was driven to the desired depth allowing only soil from the sample interval to enter the sampler.

Continuous soil sampling using a Macro-core sampler equipped with a discrete sampler was conduced from 5 feet bgs to the final depth at each soil boring location during the April 2004 investigation. Given the considerable amount of information regarding subsurface stratigraphy and impacted zone depth obtained during the April investigation phase, the July 2004 borings were advanced to a target depth prior to sampling to improve the efficiency of the program. During both the April and July investigation phases, the upper 5 feet of soil column were logged and sampled during the hand-excavated utility clearance test pits. Soil samples were described and classified using the modified Burmeister system. In addition, soil samples were screened in the field for VOC "head space" concentrations. Soil from each macro-core sampler was placed into plastic storage bags and allowed to warm. The inlet probe of the PID was then used to pierce the bag and measure total VOC concentration in the bag headspace.

All soil borings were advanced until the bottom of impacted soil horizons (if encountered) was determined, with the exception of one location (B-102). At B-102, equipment limitations forced termination of the boring at 40 feet below the basement floor slab prior to encountering the base of the impacted soil horizon. However, complete vertical delineation of soil impacts was performed at several borings adjacent to and downgradient from B-102. Completion depths for the soil borings ranged from 40 feet below the basement floor slab (B-102 and B-104) to 88 feet bgs (B-110). Two of the soil borings (B-101 and B-110) were advanced to the bedrock surface to define the site geology and assess the soil conditions at the bedrock interface. Boring B-110 was also used to provide a full stratigraphic record of subsurface conditions along the "centerline" of the area of deep soil impacts. Copies of subsurface boring logs including boring depths, visual descriptions of soil types, and the presence of subsurface impacts and field screening results are provided in Appendix B. Photographs showing representative investigation activities and examples of impacted soil horizons are included in Appendix C.

The sample designation, sample rationale, sample depth, and laboratory analyses performed at each soil boring location are provided on Table 3-3. Analytical methods for all soil samples are also summarized in Section 5.1. The primary objectives of the sampling program were to delineate the horizontal and vertical extent of deep soil impacts migrating from the adjacent former MGP site beneath the St. John's property. Sampling protocols were consistent with those outlined in the Site Investigation Work Plan for the former MGP/substation site (Parsons, 1999). In summary, one soil sample from each boring was collected in the zone of highest impacts based on field and visual screening and one soil sample was collected in the first apparent clean interval below the impacted zone. If no impacts were detected, one sample was collected from the base of each borehole and one from just above the water table. To prevent the loss of VOCs from the soil during sampling, samples for VOCs analysis were placed in clean laboratory-supplied sample jars first, followed by the jars for the remaining analytical parameters.

In addition, on December 1, 2004, a sample of NAPL-impacted soil was collected by Parsons from the former southern relief holder area at the former MGP/substation site during the IRM excavation activities. Soil samples selected for laboratory analysis were packed in a cooler with ice and sent by overnight courier under proper chain-of-custody procedures to Severn Trent Laboratories, Inc. of Pittsburgh, Pennsylvania (STL-Pittsburgh). Aliquots of select soil samples collected beneath the school building and the soil sample collected from the area of the former southern relief holder at the former MGP site were also sent to Air Toxics, Ltd. (ATL) of Folsom, California, and to Dr. Steven Hawthorne of SOTA Analytical, Inc. of Grand Forks, North Dakota, for headspace vapor analysis.

Once the boring was complete, all unused soil cores were placed in 55-gallon drums. Soil borings in which monitoring wells were not installed were grouted immediately following completion. All subsurface drilling equipment was decontaminated and power-washed after completing each boring to avoid cross-contamination between boring locations.

3.6 Shallow Groundwater Sampling

During the April 2004 investigation phase, shallow groundwater samples were collected from borings B-101 through B-104 during advancement for comparison to the soil, soil gas, and indoor air data (Figure 3-6). All shallow groundwater samples were collected by ADT. The sample designation, sample rationale, sample depth, and laboratory analyses performed for each groundwater sample are summarized on Table 3-4. Analytical methods for these samples are also summarized in Section 5.1. The samples were collected once each borehole reached the water table by inserting a stainless steel temporary screen point inside the borehole. The screen point was exposed to allow groundwater to enter the tooling, and new polyethylene tubing connected to a peristaltic pump was inserted into the screen point. Once in place, the temporary screen points were purged until they were relatively free of sediment. Water quality parameters including dissolved oxygen, oxidation-reduction potential, temperature, pH, conductivity, and turbidity were recorded, and when stable, the well points were sampled (Appendix D). Upon completion, the screen points were removed and the soil sampling tooling replaced to allow continuation of the borehole advancement until the target depth was reached.

Following collection, groundwater samples were packed in a cooler with ice and sent by overnight courier under proper chain-of-custody procedures to STL-Pittsburgh for analyses. Aliquots of selected groundwater samples were also sent to ATL and to Dr. Steven Hawthorne of SOTA Analytical, Inc. for headspace vapor analysis.

3.7 Community Air Monitoring

During the July 2004 investigation phase, community air monitoring was performed to provide real-time concentrations of total VOCs and particulates in air surrounding the worksite, as well as indications of MGP-related odors, if any, at the downwind perimeter of each designated work area when outdoor intrusive investigation activities were in progress at the site. The purpose of the monitoring was to provide a measure of protection for the downwind community, such as residences, businesses, and on-site workers not directly involved with the project, from potential releases of airborne contaminants resulting from the investigation activities. Community air monitoring was not performed during the April 2004 investigation phase since all of the work except one boring location was performed inside various school buildings. VOCs and particulates were monitored continuously with an organic vapor meter equipped with a PID and a dust meter, respectively, located upwind and downwind of each work zone. The VOC and particulate levels at each location were recorded every 15 minutes. The PID and dust meter were equipped with data loggers capable of calculating a 15-minute average concentration. Action levels for VOCs and particulates are provided in the HASP (RETEC, 2003a). Action levels were never reached during the recent investigation and no response actions were required.

3.8 Monitoring Well Installation

One deep overburden monitoring well (MW-9) was installed along the identified groundwater flow path "centerline" and downgradient of the impacted soil area at the site. The location of the well, along with the locations of the four groundwater grab samples, is shown on Figure 3-6.

The monitoring well was installed by ADT by first advancing a soil boring to the desired depth using 4¼-inch inside diameter (ID) hollow stem augers on a truck-mounted drill rig. The screen interval for the well was determined using field screening data obtained from adjacent soil boring B-119 (shown on Figure 3-5) and designed to target the area with the highest probability of impacts, if present. The well was constructed of 10 feet of 2-inch ID, threaded, 0.010-inch slot, PVC well screen set at 52 to 62 feet bgs. From 62 to 64 feet bgs, a 2-foot PVC sump was constructed for the collection of any denser than water non-aqueous phase liquid (DNAPL) that might enter the well (not expected based on field observations), and for the settling of suspended sediments. Two-inch PVC riser was installed extending from the ground surface to the top of the well screen. The annular space between the borehole and the well was backfilled with filter sand to 2 feet above the well screen, bentonite chips to 3 feet above the filter sand, grout to 10 feet bgs, and clean native material (set aside from the same interval during drilling) to the ground surface. The surface was completed with a flush-mounted road box in a cement pad cut into the asphalt surface. An expandable plug and lock were placed on the top of the PVC riser to seal and lock the well from surface run-off and tampering. Monitoring well construction details are shown on the monitoring well log provided in Appendix B.

3.8.1 Monitoring Well Development

The monitoring well was developed the day following installation to remove fine sediments (e.g., clays and silts) from within the well, well screen, sand pack, and the aquifer to promote good hydraulic communication between the well and the formation. A surge and pump method using a submersible pump was used to complete well development. The pump itself fits tightly into the well and acts as a surge block as it is risen and dropped within the screened interval while simultaneously removing water and fine sediments suspended as a result of surging action. Surging and pumping was continued until approximately 10 to 15 well volumes had been removed and the well was observed to have clear, low turbidity discharge (less than 50 NTU), and until water quality parameters were relatively stable. Water quality data monitored during development included temperature, pH, and conductivity. These results are summarized on the well development form included in Appendix E.

3.9 Deeper Groundwater Sampling

In addition to the four shallow groundwater samples collected beneath the St. John's School building during the April 2004 investigation phase, groundwater samples were collected from well MW-9 installed along the identified groundwater flow path "centerline" at the site, and two wells located on and adjacent to the former MGP site upgradient/presumed source area well MW-5 and cross-gradient well MW-7. The rationale for the selection of wells MW-5 and MW-7 for inclusion in the groundwater sampling program at the site was based on historical groundwater analytical results and their positioning with respect to groundwater flow beneath both properties.

A summary of the groundwater samples collected and the rationale for their collection is provided in Table 3-4. Monitoring well and groundwater grab sample locations are shown on Figure 3-6. Additional information regarding laboratory analytical methods for all groundwater samples is provided in Section 5.1. Detailed information regarding well gauging, sampling methods, and methods used to evaluate intrinsic biodegradation/natural attenuation (NA) processes are discussed in the following sections.

3.9.1 Depth to Groundwater Measurements

Prior to groundwater sampling, the depths to groundwater and well bottom and the thickness of any non-aqueous phase liquid (NAPL), if present, were measured in each well using an electronic oil/water interface probe. The probe was thoroughly washed with Alconox®, distilled water, and methanol to prevent cross-contamination between wells. The gauging data, collected on September 14, 2004, were used to generate a groundwater contour and flow map for the site, which is discussed later in this report.

3.9.2 Groundwater Sample Collection Methods

Groundwater samples were collected for laboratory analysis from three monitoring wells (MW-5, MW-7, and MW-9). The monitoring wells were purged prior to sampling to ensure that the samples collected were representative of conditions in the aquifer. The wells were purged using sampling procedures and protocol described in USEPA's current editions of the "Practical Guide for Ground-Water Sampling" and "RCRA Ground-Water Monitoring Enforcement Guidance." In brief, these procedures specify purging at a rate of 80 to 300 milliliters per minute, and monitoring of water quality parameters until stabilization, followed by sample collection. Purging was performed using a submersible pump connected to new polyethylene tubing. During purging, water quality criteria, including temperature, specific conductance, pH, dissolved oxygen, oxidation/reduction potential (ORP), and turbidity were measured and recorded every three to five minutes. With the exception of turbidity, these parameters were measured with a Hydrolab Quanta multi-parameter water quality meter attached to a flow-through cell connected to the pump discharge tubing. Turbidity was measured with a Lamott® 2020 turbidimeter. Groundwater samples were collected after the water quality parameters stabilized. Following collection, groundwater samples were packed in a cooler with ice and sent by overnight courier under proper chain-of-custody procedures to STL-Pittsburgh for analysis. The data obtained during purging and sampling were recorded on the groundwater sampling forms, which are included in Appendix D.

3.9.3 Evaluation of Intrinsic Biodegradation/Natural Attenuation Processes

At sites containing volatile and semi-volatile hydrocarbons, intrinsic biodegradation is by far the most significant mass degradation mechanism for organic constituents in groundwater. To evaluate the potential for intrinsic biodegradation/natural attenuation of groundwater impacts in the site area, groundwater samples were collected at three monitoring wells including MW-5 and MW-7 on and adjacent to the former MGP site and well MW-9 at the St. John's property (Figure 3-6). The term "intrinsic bioremediation" refers to the removal of environmental contaminants in soil, surface water, and groundwater through the activity of naturally-occurring microbial populations without the imposition of active, engineered systems or processes. Intrinsic bioremediation is one of several NA mechanisms by which environmental contaminants may be attenuated in the environment. Other mechanisms include sorption, dissolution, volatilization, and physical/chemical decomposition (i.e., hydrolysis, photolysis).

The typical approach for assessing intrinsic biodegradation is based on a common strategy in which site-specific data are gathered to show three lines of evidence used to support active intrinsic biodegradation, including:

- Monitoring data showing a stable or shrinking dissolved contaminant plume over time and/or loss of contaminant mass over time

- A relationship between geochemical parameters indicative of subsurface microbial activity and contaminant distributions

- Direct microbiological data from laboratory or field pilot studies demonstrating the ability of naturally-occurring microbial populations to biodegrade constituents of concern

The first two lines of evidence were evaluated during this RI.

When dissolved oxygen (DO) is present in the groundwater at sites impacted by non-chlorinated organic contaminants, microorganisms will use the oxygen as a terminal electron acceptor (TEA) as they oxidize the organic compounds to carbon dioxide and water. However, when oxygen is not present, microorganisms may use alternate terminal electron acceptors in order to metabolize available organics. Alternate TEAs for anaerobic contaminant biodegradation include nitrate, ferric iron (Fe^{+3}), manganese (Mn^{+3}), sulfate, and carbon dioxide. During this process, microbes sequentially utilize TEAs that yield the most free energy during the respiration process, causing a sequential depletion of electron acceptors in the environment. As discussed, oxygen is the most thermodynamically favorable TEA and gets depleted first, followed by nitrate (reduction), iron (reduction), sulfate (reduction), and lastly carbon dioxide (methanogenesis). Consequently, measuring the concentrations of potential electron acceptors and their reduced byproducts and comparing them to concentrations of dissolved organic constituents often reveals a pattern indicative of biodegradation activity and provides information on which electron acceptors are "active" at the site.

Conceptually, sites with active intrinsic biodegradation processes contain upgradient areas with aerobic conditions, source areas with anaerobic conditions (due to active biodegradation processes within the plume), and downgradient areas with a mixture of aerobic and anaerobic conditions that ultimately become aerobic at some point downgradient from the source area. It is important to note that the use of TEA data to support conditions reflective of intrinsic biodegradation is based on generalizations of the entire grouped data set. Stable or shrinking COI plumes represent the strongest evidence of NA processes at any given site.

3.10 NAPL Impacted Soil Testing

Two samples of the NAPL-impacted soil present beneath the St. John's School Building were collected at B-107 (40-42') and B-108 (40-43') for laboratory fingerprint analysis. The samples were sealed, labeled, packed in a plastic bag, and placed in a cooler with ice and vermiculite and sent by overnight courier under proper chain-of-custody procedures to META Environmental, Inc. (META) of Watertown, Massachusetts, for fingerprint analysis by gas chromatography with flame ionization detector (GC/FID).

3.11 Site Survey

Following the completion of the investigation program, a site survey was performed by Chazen Engineering & Land Surveying Company, a New York State-licensed surveyor. The horizontal coordinates were tied into the New York State Plane Coordinate System (East Zone) and the vertical elevations were tied into the North American Vertical Datum of 1988 (NAVD88). This allowed the survey data from the St. John's property to be merged with the survey data from the adjacent former MGP site. The purpose of the survey was to create a base map that accurately shows the investigation sample locations and key physical features of the site (*e.g.*, building corners, fences, sidewalks, curbs, driveways, and utilities that were within the property boundary of the former MGP, etc.). The location and ground surface elevation of the soil borings and monitoring well were also surveyed. In addition, the casing elevation and top of PVC riser elevation (highest point on the riser and marked in ink) were surveyed on well MW-9. All site figures presented in this document were developed using the survey results.

3.12 Investigation Waste Management

All soil cuttings, monitoring well development and purge water, decontamination fluids, soiled towels and plastic, and used personal protective equipment (PPE) generated during the investigation phases (April, July, and September) were placed in drums separated by media, and staged in a secure location within the former coal storage area located off the boiler room of the St. John's School basement. Prior to positioning the drums, plastic sheeting was placed on the floor to provide secondary containment for the drums. The drums were then placed on wooden pallets in the plastic-lined containment area. Drums were clearly labeled with the media, the date of waste generation, source, and contact information. Upon receipt of waste characterization results, the drums were disposed of by Con Edison at properly licensed off-site disposal facilities.

4 Field Investigation Results

4.1 Regional Geology

As summarized in the Site Investigation Report for the adjacent MGP (Parsons, 2004), the site is located in Westchester County within the Manhattan and Reading Prongs of the New England Uplands physiographic province. This province is described as being comprised of mature and complex geology (Parsons, 2004). The regional unconsolidated deposits in the site area contain glacial deposits overlying metamorphic sedimentary and igneous rocks. Hilly areas are reportedly underlain by erosion-resistant gneiss and schist of the Fordham and Manhattan Formations (Parsons, 2004).

4.2 Site Topography and Drainage

The United States Geologic Survey (USGS) topographic map for the White Plains, New York Quadrangle was reviewed to provide information about the topography of the site. The map shows that relief at the site is generally flat at a typical elevation of approximately 205 feet and with a gradual slope to the west towards the Bronx River, and to the north and east towards New Street and Grove Street (Dr. Martin Luther King Jr. Blvd.).

Based on the topography of the general area, the surface water would be expected to flow west and south and north across the site; however, runoff from the site would be captured by local storm drains given the urban nature of the site area. Several storm drain catch basins were also noted within and adjacent to the site area.

The nearest surface water body is the Bronx River, which is approximately 900 feet west of the site. The Bronx River in Westchester County is designated as "Class C" surface water. Class C surface water is defined as follows: "Class C, fresh surface waters, best usage is fishing. Waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes."

4.3 Site Geology

Information concerning the site stratigraphy and hydrogeology were obtained from observations made during the installation of soil borings. Two geologic cross-sections, one oriented northeast and extending from the southern edge of the former MGP property across the St. John's property and one trending roughly east-west across the St. John's property (shown on Figure 4-1) are presented as Figures 4-2 and 4-3.

As shown on the cross sections and boring logs, the site geology consists of two distinct unconsolidated lithologic units overlying bedrock. A fill unit was observed across the site beneath the ground surface in approximate thicknesses ranging from 5 to 8 feet. This unit is composed primarily of reworked brown, dry, fine sand from the unit below. Defining the contact between the fill unit and the undisturbed native glacial deposits was difficult given the similar composition of material; nevertheless, the contact with the underlying native material was determined based on the observation of organic matter (*i.e.*, roots) and/or depositional structures (*i.e.*, bedding) at the top of the interpreted native material compared to the fill unit.

Beneath the fill is a thick sequence of fine interbedded sands up to 81 feet thick at B-110 (Appendix B). The unit was observed at soil boring B-101 and B-110 to extend from the base of the fill to the bedrock surface encountered at approximately 64 and 86 feet bgs, respectively. The sand unit was also encountered at depth above the refusal surface in borings SB-28 and SB-29 installed as part of the MGP site investigation (Parsons, 2004). This lower sand unit is comprised of brown and gray fine sand with trace layers of silt and some gravel. The bedding is marked by slight changes in color and composition. Specks of black minerals (mica) are common throughout, giving the material a salt and pepper appearance.

The limited samples of weathered bedrock in the tip of the macro-cores at B-101 and B-110 were observed to be consistent with a mica-schist. The bedrock depth and its composition are consistent with the bedrock described at the adjacent MGP site, classified by Parsons (2004) as the Manhattan Schist. A bedrock elevation contour map based on four borings advanced to the bedrock surface at the St. John's property (B-101, B-110, SB-28, and SB-29) and four locations at the adjacent MGP site (SB-12, SB-26, SB-30, and MW-7) is provided as Figure 4-4. As shown on the figure, the bedrock slopes to the southwest and south in the site area.

4.4 Regional Hydrogeology

The regional groundwater flow is assumed to generally mimic the surface topography and flow to the west/southwest towards the Bronx River. Groundwater is present in unconsolidated glacial deposits and in the metamorphosed bedrock. A map entitled "Unconsolidated Aquifers of Westchester County, New York" (Keneally, 2001) was reviewed to determine if the site is located within the footprint of a significant unconsolidated groundwater aquifer. According to Keneally, the site area is near the eastern edge of an aquifer which extends along the valley of the Bronx River. This aquifer is mapped as having a yield of greater than 100 gallons per minute (gpm). According to the Site Investigation Report for the MGP site (Parsons, 2004), the City of White Plains Water Department reported that the closest public water supply wells are located approximately 1.5 miles northeast (upgradient) of the site. The water supply wells are likely drilled within this aquifer. Closer to the site area, Keneally (2001) reported that two bedrock wells were installed by the Suburban Laundry Company approximately one block north of the St. John's property. These wells were presumably installed to find an alternate source of fresh wash water other than the city water for their laundry operations. One well, installed to 700 feet, was abandoned due to insufficient yield (2 gpm), and the other well that was reportedly 250 feet deep was also abandoned. This well was reportedly pumped at 14 gpm for 24 hours.

Groundwater in the vicinity of the site is classified as GA - Fresh groundwaters with best usage as a source of potable water supply. However, this area is not classified as a primary water supply aquifer (*i.e.*, significant unconsolidated aquifer) or a principal aquifer.

4.5 Site Hydrogeology

Data regarding site hydrogeology is based on a groundwater monitoring well network comprised of wells installed at the MGP site adjacent to the St. John's property, observations of groundwater elevations in soil borings installed beneath the school building in April 2004, and one monitoring well installed at the St. John's property. Groundwater was consistently observed in the soil borings at depths ranging from 20 (B-102) to 23 (B-107) feet (Appendix B) beneath the basement floor of the school building and approximately 29 to 30 feet bgs at borings outside the school building. While groundwater was observed in boring B-104 at 19.5 feet below the basement floor of the school building, the surface elevation of the boring was approximately 3 feet lower than the surface elevation of borings B-101 through B-103 and B-107 and B-108. Overall, the groundwater elevations observed in the soil borings beneath the school building are consistent with the data collected from the monitoring well network, as described below.

The groundwater monitoring well network is comprised of twelve wells at the MGP site (MW-1 through MW-8, SB-1, TB-5, RW-4, and RW-5) and one downgradient well at the site (MW-9). Groundwater was encountered under unconfined conditions within the unconsolidated sand deposits at depths ranging from approximately 5 to 30 feet bgs in the well network. The range in groundwater depths is due to varying surface elevations in the site area. Table 4-1 provides a chronological summary of groundwater elevations, including data from the most recent gauging event performed on September 14, 2004. Figure 4-5 provides a groundwater elevation contour map across the site. The map shows that groundwater flow between the central portion of the adjacent former MGP site and across the St. John's property is from the northeast to the southwest, which is consistent with the presumed regional groundwater flow direction based on local topography and with earlier groundwater maps generated at the MGP (Parsons, 2004). The horizontal gradient measured parallel to groundwater flow ranged from 0.0087 ft/ft between wells MW-8 and MW-9 beneath the St. John's site to 0.035 ft/ft between wells MW-5 and MW-2 at the adjacent MGP site.

4.6 Ambient Air, Indoor Air, and Soil Gas Sampling

Observations made during air sampling performed in April 2004 included meteorological data, PID measurements, and cyanide in air measurement. RETEC's records of these observations are provided in Appendix F.

Meteorological data showed a relatively constant outdoor barometric pressure (30.17-30.24 inches Hg) throughout the day during the April 2004 investigation phase. Wind speed was mostly from the east-southeast at 4.6 to 11.5 mph.

PID measurements showed no intrusion of VOCs from potential vapor intrusion points such as the sump pit and sewer pit in the school boiler room. A more sensitive part-per billion (ppb) RAE PID was used to record results. The PID readings from the school boiler room were 35-60 ppb. The PID readings taken from the indoor air within the rectory boiler room were 45 ppb. These readings are similar to the PID measurements from within the rectory basement, first floor, and similar to those in the school basement, first floor, and outdoors.

Cyanide samples were taken in the St. John's school, rectory, and gymnasium buildings using Gastec colorimetric tubes. There was no color change in the Gastec colorimetric tubes indicating the presence of cyanide in the indoor air. Thus, it is concluded that the presence of cyanide in air was not detected above 0.36 parts per million (ppm), the detection limit of the colorimetric tubes. The record of these measurements and locations are provided in Appendix F.

Differential air pressure measurements between the sub-slab soil gas and the indoor air at the soil gas sampling locations indicated a range of values, with negative pressures of –0.015 inches of water at locations SG-102 and SG-103, 0 inches of water at location SG-106, and +0.015 inches of water at SG-104. Positive pressure measurements indicate pressure upward from below the slab (and possibly into the building through floor cracks, etc.) and negative pressures in the soil gas points indicate pressure downward from the building into the subsurface. A pressure measurement at location SG-101 was not made because the location was outside.

5 Analytical Results

This section presents the analytical laboratory program and results for the April, July, and September 2004 investigation phases, and provides an interpretation of the results. The laboratory data quality is also discussed in this section, with the applicable Data Usability Summary Reports (DUSRs) and laboratory analytical data provided in Appendix G. It is concluded that the data quality meets all applicable requirements. A discussion of the results of the analyses and a comparison to applicable NYSDEC/NYSDOH guidance values or standards is provided in the following sections. The most recent background indoor air data available from the NYSDOH (November 16, 2004) was used in the evaluation of the potential vapor intrusion pathway (NYSDOH 2004).

5.1.1 Chemical Analyses

Soil

The soil samples collected during the RI were analyzed for:

- Volatile organic compounds by USEPA SW-846 Method 8260B
- Semivolatile organic compounds by USEPA SW-846 Method 8260C
- Trace metals by USEPA SW-846 Method 6010B and 7471A (April 2004 phase only)
- Total cyanide by USEPA SW-846 Method 9012A (April 2004 phase only)
- Available cyanide by USEPA MCAWW 1677 (April 2004 phase only)

During the July investigation, soil samples were not analyzed for metals and cyanide since they were not determined to be constituents of concern at the site based on a review of the April 2004 investigation results. In addition, two NAPL-impacted samples were submitted to META Environmental, Inc., (META) in Watertown, Massachusetts for fingerprint analysis by gas chromatography with flame ionization detector (GC/FID) in April 2004.

Groundwater

The shallow groundwater samples collected from borings B-101 through B-104 and the groundwater sample collected from monitoring well MW-9 were analyzed for:

- Volatile organic compounds by USEPA SW-846 Method 8260B

- Semivolatile organic compounds by USEPA SW-846 Method 8260C
- Metals by USEPA SW-846 Method 6010B and 7471A
- Total cyanide by USEPA SW-846 Method 9012A
- Available cyanide by USEPA MCAWW 1677 (April 2004 phase only)

In addition, groundwater samples collected from wells MW-5 and MW-7 at the substation/former MGP property and MW-9 at the St. John's property were analyzed for the following NA parameters:

- Sulfide by USEPA Method 376.2
- Sulfate by USEPA SW-846 Method 9056
- Nitrate by USEPA SW-846 Method 9056
- Total iron and manganese by USEPA SW-846 Method 6010B
- Dissolved iron and manganese by USEPA SW-846 Method 6010B
- Alkalinity by USEPA Method 310.1
- Unionized hydrogen sulfide by USEPA Method 4500 SF
- Dissolved gasses (carbon dioxide, methane, nitrogen, and oxygen) by Method AM20GAX

Ambient Air, Indoor Air, and Soil Gas

Ambient air, indoor air, and soil gas samples were analyzed for:

- VOCs by USEPA Method TO-15, with an extended analyte list to include 68 compounds.

Headspace above Groundwater and Soil

Samples of groundwater and NAPL-impacted soil were prepared in a headspace chamber under controlled laboratory conditions. The headspace vapors were then analyzed for:

- VOCs by USEPA Method TO-15, with an extended analyte list to include 68 compounds.

5.1.2 Quality Control

To meet the data quality objectives for the RI, NYSDEC Analytical Service Protocols (ASP) were used and all results were reported in Category B deliverables. These analyses were completed by STL-Pittsburgh. Dissolved gases data from groundwater samples collected at select wells were managed by STL-Pittsburgh but analyzed by MicroSeeps of Pittsburgh, Pennsylvania. STL is a current participant in the NYSDOH Environmental Accreditation Program (ELAP) and has current CLP certification for all analyte categories.

Table 5-1 lists the quality assurance/quality control (QA/QC) samples collected during the April, July, and September, 2004 investigation phases. To evaluate laboratory analytical quality and accuracy, RETEC submitted field duplicates for two soil samples, one groundwater sample, and one indoor air sample. To evaluate the effect of the natural chemical composition of the sample medium on the efficiency and accuracy of the analytical methods, RETEC submitted two soil samples and one groundwater sample for matrix spike and matrix spike duplicate analysis. One rinse blank was collected from the down-hole drilling equipment to evaluate the effectiveness of the decontamination procedures and the possibility of cross contamination between samples. In addition, a trip blank accompanied all aqueous VOC samples to determine if environmental conditions encountered during transportation of the samples may have impacted the sample analytical results. The results of the QA/QC samples were used by the laboratory to qualify data and by RETEC in the completion of a DUSR. QA/QC analytical results for the samples mentioned above are included in the analytical summary tables and the analytical reports provided in Appendix G.

The data collected during this RI were managed using the EQuIS data management system. Analytical data was produced by the laboratory in hard copy and electronic data deliverable (EDD) format. The data packages were reviewed by a RETEC chemist, who prepared a DUSR for each data delivery group. The DUSRs are included in Appendix G of this report. As part of the data review process, the analytical results were qualified, as appropriate in accordance with the data review protocols. The data summary tables included in this report reflect the findings of the DUSR. In summary, 14 volatile organic results from soil samples were rejected due to low instrument sensitivity. Some of these rejections were for four non-MGP compounds in samples SB-3 (13-13.5) and SB-4 (4-8). All of the other results were deemed usable with some qualification, as outlined in the DUSR reports.

5.2 Ambient, Indoor Air, and Soil Gas Results

The ambient air, indoor air, and soil gas samples collected on April 12, 2004 were analyzed for VOCs (USEPA Method TO-15) by ATL. The results are summarized in Table 5-2. Analytical laboratory reports are provided in Appendix G.

In Table 5-2, the ambient air results are presented to the left of the table. The two right-most columns present background indoor air values obtained from the New York State analyses of air samples from within typical residences heated with fuel oil. The background values are expressed as the 75th and 90th percentile values derived statistically from the datasets [NYSDOH, 2004]. Values within the 90th percentile are considered to be within the range of typical background, especially considering that the background data were obtained primarily from residences. Apartment buildings, schools, and commercial buildings may contain higher VOC concentrations than residences because of the presence of larger quantities and use of products such as industrial-strength floor tile cleaners, floor polishes, and more frequent use of paints and other products by contractors operating within the buildings.

The following compounds were added to the typical analyte list for USEPA Method TO-15: naphthalene, indene, indan, thiophene, 2-methylpentane, isopentane, 2,3-dimethylpentane, and 2,2,4-trimethylpentane. The 68 VOCs that were analyzed are divided into two categories in Table 5-2:

1) Compounds including such compounds as benzene, naphthalene, and indene, that could possibly be related to MGP sources, but may also be related to non-MGP sources; and

2) Compounds including chlorinated hydrocarbons and MTBE (the gasoline additive) that are certainly not related to MGP sources.

As anticipated based on the results obtained from investigations in similar buildings, VOCs were detected in all of the air samples, including the ambient samples. However, the VOCs were detected at low concentrations, as compared to worker guidance values and as compared to typical VOC concentrations found in residences in New York State.

The VOC concentrations in indoor air were first compared to worker guidance values (the lowest of the OSHA-PEL, NIOSH-REL, or ACGIH-TLV). It is recognized that worker guidance values are not appropriate for evaluation of long-term health considerations for these buildings. The intent of this comparison was to identify immediate health considerations that might warrant immediate corrective action. All of the results were several orders of magnitude below the worker guidance values, and no immediate health concerns were identified.

The VOC concentrations in indoor air were then evaluated to determine whether the measured indoor air concentrations fell within the ranges that are typical of air inside residences. The typical background ranges are provided by the NYSDOH air quality database, and are expressed statistically as percentiles of the range (NYSDOH, 2004). The 90th percentile value means that 90 percent of the background results were below this value, and 10 percent were above this value.

In all of the indoor air samples collected from the St. John's School buildings on April 12, 2004, concentrations of VOCs categorized as Possibly MGP Related were substantively within the range of the 90th percentile of residential background. One compound, 4-methyl-2-pentanone, was detected in one sample at a concentration of 3.4 $\mu g/m^3$, as compared to the 90th percentile value of 3$\mu g/m^3$, and is not significantly different from this value.

Nine VOCs that were categorized as Non-MGP Related had indoor air concentrations exceeding the 90th percentile of residential background. These compounds were 1,1,1-trichloroethane, 1,1-dichloroethene, 1,1-dichloroethane, 1,2-dichloroethane, 1,4 dichlorobenzene, bromomethane, ethanol, tetrachloroethene, and trichloroethene. Sources of these VOCs include cleaning products, deodorants, dry-cleaned clothes, and solvents.

One VOC, categorized as Non-MGP Related, 1,2 dichlorobenzene, was detected in an ambient (outdoor) air sample at a concentration exceeding the 90th percentile of residential background.

The soil gas samples contained VOCs that were categorized as being possibly related to MGP materials, as well as VOCs that were categorized as being non-MGP related. The Possibly MGP-related VOCs detected in soil gas consisted of: 1,2,4-trimethylbenzene, 2,2,4 trimethylpentane, ethylbenzene, toluene, m/p xylenes and o-xylene. The Non-MGP Related VOCs detected in the soil gas consisted of: acetone, ethanol, tetrachloroethene, 2-butanone, methylene chloride, 2-propanol, Freon 12, and chloroform. To evaluate whether the soil gas VOCs were in fact related to MGP materials, the soil gas results were closely examined and compared with the results from the headspace analysis results as described in Section 5.5 of this report.

5.3 Groundwater and Soil Headspace Analyses Results

Shallow groundwater samples and NAPL-impacted soil samples collected during the April 2004 investigation phase and during the IRM activities at the former MGP site in December 2004 were prepared in a headspace chamber under controlled laboratory conditions. The headspace vapors were then analyzed for VOCs (USEPA Method TO-15) by ATL. The results are summarized in Table 5-3. Analytical laboratory reports are provided in Appendix G.

As indicated in Table 5-3, some of the soil headspace concentrations were higher than the instrument calibration range. Therefore, one of the samples, B-108 (36-40) was analyzed both at full volume (designated as "High") and diluted by analyzing a reduced volume aliquot (designated as "Low") to enable a more complete quantitation of the relative concentrations. ATL also analyzed headspace vapors from clean background soils (provided by the laboratory). These are designated as the Soil Blank and Water Blank in Table 5-3.

No VOCs were detected in the groundwater headspace samples. The VOCs detected in the soil headspace samples included 19 of the 23 VOCs categorized as Possibly MGP Related. The Non-MGP Related VOCs tetrachloroethene and acetone were also detected, but at low concentrations. Further discussion of these results is provided in Section 5.5.

5.4 Post-Investigation Ambient and Indoor Air Results

The post-investigation ambient air and indoor air samples collected on April 24, 2004 were analyzed for VOCs (USEPA Method TO-15) by ATL. The sample results are summarized in Table 5-4. Analytical laboratory reports are provided in Appendix G.

Table 5-4 presents the results and the background values for comparison in the same manner as described in Section 5.2 for Table 5-2.

The results of the post-investigation sampling conducted on April 24, 2004 were similar to the results of the April 12, 2004 sampling event, and indicated the investigation had no significant affects on indoor air quality.

The VOC concentrations in indoor air were first compared to worker guidance values (the lowest of the OSHA-PEL, NIOSH-REL, or ACGIH-TLV). It is recognized that worker guidance values are not appropriate for evaluation of long-term health considerations for these buildings. The intent of this comparison was to identify immediate health considerations that might warrant immediate corrective action. All of the results were several orders of magnitude below the worker guidance values.

The VOC concentrations in indoor air were then evaluated to determine whether the measured indoor air concentrations fell within the ranges that are typical of air inside of residential buildings. In all of the indoor air samples, the concentrations of the compounds categorized as Possibly MGP Related were all substantively within the range of the 90^{th} percentile of residential background. One VOC, cyclohexane, was detected in one sample (basement of school, play room) at a concentration of $13 \mu g/m^3$, which is slightly, but not significantly, above the 90^{th} percentile value of $9.1 \mu g/m^3$. Two Non-MGP

Related compounds had indoor air concentrations exceeding the 90th percentile of residential background. These compounds were chloroform and, chloromethane.. The sources of these VOCs include refrigerators, air conditioners, and cleaning products.

The indoor air sample from the boiler room, near where the drums of drilling cutting and decontamination water were temporarily stored, had results that were comparable to ambient air and most other indoor air results, thus indicating that the waste storage had no adverse affects on indoor air quality.

The highest VOC levels were detected in the play room. Isopentane, which was detected at 170 $\mu g/m^3$, is not listed in the NYSDOH values of background concentrations and therefore no comparison to background could be made. Isopentane was not detected in any of the soil gas samples and thus its presence is not attributable to vapor intrusion. It is a common constituent of gasoline (United States Department of Health and Human Services, 1993; Merck, 1989) and it is a low level constituent of natural gas. Its presence is most likely attributable to either natural gas use in the building or a gasoline source such as a staff person who used the room having filled their car or gas-powered equipment (such as a lawnmower or leaf blower).

5.5 Evaluation of Vapor Intrusion

At the Site, the two potential concerns with regard to vapor intrusion were: (1) that MGP-related VOCs could be present in soil gas directly beneath the lowest elevation floor slabs of the school and gymnasium buildings; and (2) that these VOCs could be impacting indoor air quality by the process of upward intrusion of the soil gas vapors through these slabs. These concerns were addressed by examining all of the relevant data collected, including analytical results from the soil gas and indoor air samples, results from analysis of headspace vapors from groundwater and soil samples, and measurements made of the air pressure differential through the lowest elevation floor slabs. In addition, the soil gas results were compared with the headspace vapors of a sample that was collected in the southern former MGP relief holder area of the White Plains Substation property during the IRM activities and that was known to be impacted by MGP tar materials.

The soil gas results indicate that the soil gas samples collected below the floor slabs of the school and gymnasium buildings contained VOCs that were categorized by NYSDOH as being possibly related to MGP materials. In order to evaluate whether these VOCs were related to the MGP materials found at the White Plains substation site and at the St. John's property, the soil gas results were compared to the results of the headspace analyses performed on the MGP-impacted soil sample collected in the southern former relief holder area at the substation property and the four MGP-impacted soil samples collected at depths of 36 to 40 feet beneath the school building. This data comparison indicates that, although the sub-slab soil gas samples from the Site and the headspace above all of the MGP-impacted soil samples all contained toluene, xylenes, and other alkyl benzenes, the composition of the other chemicals in these samples was significantly different, indicating that MGP materials are not responsible for the VOCs detected in the soil gas samples from the Site. Specifically, the headspace of the MGP-impacted soil sample contained very high concentrations of naphthalene, indene, indane, and styrene as well as C-6 to C-11 alkanes that were not detected in the sub-slab soil gas samples from the Site. Additional detail is provided in a report prepared by Dr. Steven Hawthorne of SOTA Analytical, Inc. The report evaluates the chromatographic and mass spectral data and the USEPA TO-15 analyses data for the sub-slab soil gas samples, and soil and groundwater headspace samples. This report is provided in Appendix H.

The above conclusion is further supported by consideration of the soil and groundwater investigation results collected beneath the school building. The MGP-impacted soils were first encountered at a depth of approximately 40 feet below the basement floor. These soils were saturated with groundwater, which was first encountered at a depth of approximately 20 feet below the basement floor, thus eliminating a direct migration pathway of impacted soil vapors to the soil gas. The concentrations of VOCs in the groundwater samples collected at the water table were below detection limit for all MGP-related and possibly MGP-related compounds (as further described in Section 5.7). The concentrations of all VOCs in the headspace vapors from the groundwater samples were also below detection limits. The data therefore, demonstrate there to be no active migration pathway of MGP-related vapors to the soil gas below the school building and gymnasium floor slabs.

To evaluate the potential concern of vapor intrusion of soil gas into indoor air, the soil gas results were closely examined in comparison to the indoor air and ambient results to determine if there was evidence for vapor intrusion. This evaluation focused on 2,2,4-trimethylpentane. This compound, also known as iso-octane, is a common constituent of gasoline, typically comprising approximately 10% of unleaded gasoline (United States. Department of Health and Human Services, 1993; Merck, 1989). All five soil gas samples had very high concentrations of 2,2,4-trimethylpentane. In fact, the highest VOC concentration measured in the soil gas samples was that of 2,2,4-trimethylpentane, which was detected at a concentration of 1,700 $\mu g/m^3$ in the soil gas samples collected beneath the school kitchen and cafeteria floor. Because 2,2,4-trimethylpentane is relatively volatile, it would be expected to be found in indoor air if soil gas was a significant source of the VOCs in indoor air. The potential migration pathway from soil gas through a concrete slab to indoor air is quantified by relating soil gas concentrations to indoor air concentrations by an attenuation factor which is applied to the soil gas concentrations. Using the typical, conservatively high attenuation factor of

0.1, which can be applied to shallow soil gas results for screening purposes (USEPA, 2002), the estimated indoor air concentration of 2,2,4-trimethylpentane within the school cafeteria and kitchen would be 170 $\mu g/m^3$. However, this compound was only detected in one indoor air sample, at a concentration of 3.5 $\mu g/m^3$ (slightly above the detection limit), in the entry of the school basement (STJ2-IA-SB-101). It was not detected in indoor air samples collected from the school cafeteria and kitchen. This suggests that the actual attenuation factor for these areas of the school building is less than 3.5/1,700 or 0.002, indicating that the potential for vapor intrusion into the school building is very low. This also indicates that soil gas is an unlikely source of benzene or any other VOCs found in the indoor air samples. It should be noted that application of an attenuation factor implies that migration of soil gas from the sub-slab soil into the indoor air is occurring. However, the actual presence of this migration pathway was not established in this study.

In addition, the air pressure differential through the slabs was measured at low values, and even negative values, indicating air pressure from the indoor air down into the soil gas. These measurements further support the conclusion that vapor intrusion was not contributing to VOCs detected in indoor air in the buildings.

5.6 Subsurface Soil Results

5.6.1 Laboratory Analytical Results

A summary of the subsurface soil samples collected and analyzed during the April and July 2004 RI are summarized in Table 3-3. VOCs, SVOCs, trace metals, and total and available cyanide analytical results for all soil samples are summarized on Tables 5-5 through 5-7. Given the absence of cyanide in the April 2004 dataset, cyanide samples were not collected during the July investigation phase. The analytical results for total VOCs and SVOCs (compounds commonly associated with the operations of MGPs) detected in subsurface soil are also presented on Figure 5-1. As described below, the soil analytical results are compared to the concentrations listed in NYSDEC Technical Administrative Guidance Memorandum (TAGM) HWR-94-4046 – Determination of Soil Cleanup Objectives and Cleanup Levels ([NYSDEC, 1994). It should be noted that all soil sample depths are referenced to grade, whether it be the basement floor for samples collected inside the school building (borings B-102 through B-108) or the ground surface for samples outside the school building.

VOC and SVOC Results

The BTEX compounds (benzene, toluene, ethylbenzene, and xylenes) and PAHs are typically the most commonly detected VOCs and SVOCs at former MGP sites. These compounds are known to occur in tars, and, therefore, are useful MGP indicator compounds although they are also present in other petroleum hydrocarbons that may or may not be associated with former MGPs.

One or more of the BTEX compounds were detected in five of the 14 subsurface soil samples collected in April 2004 and 11 of the 22 samples collected in July 2004. Beneath the school, total BTEX concentrations ranged from 0.0562 mg/Kg at B-108 (50′-52′) to 478 mg/Kg at B-108 (40′-43′). Outside the school footprint, detected BTEX concentrations ranged from 0.0008 mg/Kg at B-111 (56′-60′) to 213 mg/Kg at B-109 (50′-51.5′). One or more of the PAH compounds were detected in seven of the 14 subsurface soil samples collected in April, and 18 of the 22 samples collected in July 2004. Concentrations of detected total PAHs ranged from 0.11 mg/Kg at B-103 (55.5′-56′) to 8,360 mg/Kg at B-107 (40′-42′). Individual BTEX and PAH compounds were detected above their TAGM recommended soil clean up objectives (RSCOs) in borings B-102, B-103, B-107, B-108, B-109, B-110, B-111, B-113, B-114, and B-117 in samples collected from depths ranging from 39 to 60 feet either below the ground surface for borings placed outside of building footprints or below the basement floor for borings placed within building footprints (Table 5-5 and 5-6). These samples were collected from visually impacted soils. Samples collected from the first apparent clean interval below the impacted zone were below RSCOs at all locations for BTEX compounds and all but three of the boring locations (B-108, B-113, and B-117) for PAHs. At these locations, concentrations in the deeper samples at each boring location were considerably lower in concentration than those detected in the shallower sample interval at the same location (Tables 5-5 and 5-6). Many of the SVOC exceedances at B-108 and B-113 were for two or three PAH compounds with the lowest RSCOs. Despite these exceedances, there are sufficient data from adjacent borings at depth to fully delineate the extent of RSCO exceedances in subsurface soils. One VOC compound (2-Butanone) not contained in the BTEX list was also detected above its RSCO value of 0.3 mg/kg (Table 5-5). Dibenzofuran, a SVOC, was also detected at estimated concentrations above the TAGM RSCO of 8.2 mg/Kg in three samples (B-107, B-108, and B-109) at depths of 40-42 feet, 40-43 feet, and 50-51.5 feet, respectively (Table 5-6).

No VOCs or SVOCs were detected in samples collected from borings B-101, B-104, and B-118, or in samples collected just above the water table (16 to 20 feet bgs) at all borings sampled at this depth interval (B-102 through B-104) beneath the school building. At those borings where VOCs and SVOCs were detected in the saturated soils, the highest concentrations detected were limited to depths ranging from 39 to 43 feet below the basement floor within visibly impacted soils beneath the school and at 50 to 53 feet bgs in borings outside the school footprint, and concentrations below these depths were significantly lower or below analytical detection limits at all boring locations except B-102.

Metals and Cyanide Results

A total of 17 metals were detected in subsurface soils. As shown on Table 5-7, these metals have a relatively consistent distribution indicating that they are likely present from natural soil conditions rather than from an MGP source. In addition, comparison of the metals concentrations with Eastern USA background concentrations (as cited in TAGM 4046) reveals that magnesium was the only metal detected above the specified background range of 100 to 5,000 mg/kg (Table 5-7). Given the widespread exceedances of typical background concentrations for magnesium in the site soil samples, it is inferred that these results represent a localized natural occurrence of higher than normal magnesium concentrations in the White Plains area rather than being associated with the former MGP or activities that have occurred at the St. John's property. This is also supported by the sample collection depths (deep and in natural soils and not likely affected by surface activities). Cyanide concentrations were below detection limits in all samples collected in April 2004 with the exception of an estimated concentration of total cyanide (0.27 mg/Kg) detected at B-102 (36-40). TAGM 4046 does not currently list a RSCO for cyanide; however, the concentration of total cyanide at B-102 is well below typical risk-based screening levels. As stated previously, no cyanide analyses were performed on the samples collected in July 2004 given the general lack of cyanide in worst-case samples collected in April 2004.

5.6.2 NAPL Delineation Results

The approximate horizontal extent of deep subsurface NAPL is illustrated in map view on Figure 5-2. All of the NAPL identified at the site was denser than water. The horizontal limits of NAPL were extrapolated from visual observations made during the recent investigation and from borings installed during the investigation at the former MGP site (Parsons, 2004). As shown on the figure, impacts were observed in four of the six soil borings (B-102, B-103, B-107, and B-108) advanced in April 2004 and six of the 12 borings (B-109 through B-111, B-113, B-114, and B-117) advanced in July 2004. In contrast, no gross-impacts or NAPL were observed at soil borings B-101, B-104, B-112, B-115, B-116, B-118, B-119, and B-120 or borings SB-23, SB-25, SB-28, and SB-29 installed during the investigation of the former MGP site (Figure 5-2).

Visual impacts consisted of elevated PID readings and varying quantities of NAPL-impacted soils or residual NAPL stringers observed from approximately 39 feet bgs at borings along New Street between the former MGP site and the St. John's property to up to 52.75 feet bgs south and west of the school building. No gross visual impacts were noted in the soil above these depths at any of the April 2004 investigation locations. Figures 5-3 and 5-4 show the observed vertical extent of deep subsurface NAPL in two cross-sections across the site. The locations of these cross-sections are shown on Figure 4-1. As shown on Figure 5-3, the NAPL gradually deepens within the unconsolidated deposits. Data presented on Figures 5-3 and 5-4 are also summarized on Table 5-8. All of the borings, with the exception of B-102, were advanced to sufficient depths to vertically delineate the extent of NAPL. At B-102, equipment limitations forced termination of the boring before complete vertical delineation could be obtained. However, complete vertical delineation of NAPL was performed at numerous borings adjacent to and downgradient from B-102 (Figures 5-3 and 5-4, Table 5-8).

The upper most part of the impacted zone consists of thin horizontal bands of residual NAPL, which increase in frequency and thickness with depth until the natural soil coloration is completely stained. The impacts were observed in the fine sand unit with no observation of a confining unit. Despite the lack of an apparent confining layer, the bottom of the impacted zone contains a distinct base, with soils in close proximity to the NAPL being free of visible contamination. These observations are supported by the analytical data presented in Tables 5-5 and 5-6. Examples of the distinct nature of the impact zone are shown in Appendix C. Based on a review of the locations of historical structures at the former MGP site (Figure 2-1), the suspected source of the deep subsurface NAPL beneath the St. John's property is the area including and north of the former southern relief holder located at the substation property. As discussed in Section 2.1, the former southern relief holder and associated impacted materials above the water table have been removed as part of the IRM project recently completed by Con Edison at the former MGP site. In addition, an impermeable NAPL cut-off wall was installed just downgradient of the southern relief holder area to contain and prevent potential migration of any remaining contamination toward the St. John's property. Field PID screening results for VOCs are included on the boring logs in Appendix B. In general, PID readings were less than 10 ppm in the soils with no visual impacts or odors. It should be noted that PID readings less than approximately 10 ppm are considered background due to likely moisture effects within the bagged samples screened for PID readings. PID readings within impacted material typically ranged from 600 ppm to 930 ppm and were as high as 2,470 ppm at B-109. Beneath the impacted zones, PID readings rapidly decreased (Appendix B). As expected, the decrease in PID readings corresponds with decreases in visual impacts. In addition, no elevated PID readings were noted in the soil samples collected at the water table in any of the borings advanced during the RI.

5.7 Groundwater Results

Groundwater sampling locations for this RI are shown on Figure 3-6. A list of the groundwater samples collected and the analyses completed is shown on

Table 3-4. A summary of groundwater purging field parameters is provided on Table 5-9. VOCs, SVOCs, metals, and available cyanide results for groundwater are summarized on Tables 5-10 through 5-12. The analytical results for total VOCs, total SVOCs, and total cyanide detected in groundwater are also presented on Figure 5-5. The following two sections discuss the groundwater analytical results based on a comparison to either guidance values or standards listed in NYSDEC – Division of Water – TOGS (1.1.1) – 6 NYCRR 703.5 (NYSDEC, 1998).

5.7.1 VOC and SVOC Results

The BTEX and PAH compounds, typically the most commonly detected VOCs and SVOCs at former MGP sites, were below detection limits in all shallow groundwater samples collected in April 2004 from borings B-101 through B-104 using the direct-push sampling method. Detected VOC compounds at these locations were limited to trace concentrations of chloroform, a common laboratory contaminant, and tetrachloroethene, a solvent not typically associated with former MGPs. At deep well MW-9, six VOCs and seven SVOCs were detected in September 2004. Of these, the BTEX compounds, styrene, naphthalene, and phenol were detected at concentrations exceeding the NYSDEC standard values.

5.7.2 Metals and Cyanide Results

A total of nine metals were detected in the shallow groundwater samples collected at B-101 through B-104 (Table 5-12). Of these, magnesium was detected in two of the four samples at concentrations in exceedance of the NYSDEC standard values, and sodium was detected in all of the samples at concentrations above the NYSDEC standard value. Both of these metals commonly occur naturally in the environment and are not considered associated with MGP sites. Twelve metals were detected in the groundwater sample from deep well MW-9. In addition to magnesium and sodium, iron and manganese were detected at concentrations in exceedance of the NYSDEC standard values at MW-9. Similar to magnesium and sodium, iron and manganese are considered to be naturally occurring in the site area and are not considered MGP contaminants.

Total cyanide concentrations detected in the shallow groundwater samples ranged from 5 μg/L (estimated) at B-104 to 38 μg/L at B-103. These concentrations are below the NYSDEC groundwater standard value of 200 μg/L. Total cyanide was not detected in well MW-9. Available cyanide was not detected in any of the samples (Table 5-12).

5.7.3 Evaluation of Natural Attenuation

As discussed in Section 3.9.3, groundwater samples were collected at three monitoring wells including MW-5 and MW-7 on and adjacent to the former

MGP site, and well MW-9 at the St. John's property to evaluate the potential for NA at the St. John's School site (Figure 3-6). Wells MW-5 and MW-7 are screened across the water table and MW-9 is screened within the aquifer at depth. Hydrogeologic data presented in this RI show that the aquifer acts as a single aquifer with slight downward gradients (as demonstrated at the MW-8 and RW-4 "well pair"), thus facilitating the comparison of data within the shallow and deeper portions of the aquifer. The purpose of this baseline evaluation was to determine whether NA of dissolved phase impacts is occurring at some level at the site.

Initially, based on historical data and the proximity of the former MGP structures and possible source areas to the upgradient site boundary, MW-7 was chosen as a potential background/cross-gradient well (since MW-6 and MW-5, the other two wells near the upgradient boundary at the substation contained known MGP-impacts), well MW-5 as a potential "source area" well based on the BTEX and PAH concentrations in this well in April 2000 and August 2001, and MW-9 as a downgradient well along the presumed center-line of the groundwater plume. However, during the September 2004 groundwater sampling event, MW-5 contained NA "signatures" more consistent with an upgradient location, resulting in its classification as a combined upgradient/former source area well as described below. In addition, based on the groundwater flow conditions at the substation observed during the September 2004 sampling event, well MW-7 was determined to be hydraulically downgradient of MW-5. This condition, while not reflected in available historical data, resulted in NA "signatures" at MW-7 that were more consistent with a cross-gradient or downgradient well location than a background location as initially selected.

A summary of the geochemical data used to evaluate NA at the site is included on Table 5-9. As shown on the table, wells MW-5, MW-7, and MW-9 were sampled for the full suite of potential TEAs listed in Section 3.9.3, as well as for field water quality parameters including dissolved oxygen (DO), oxidation reduction potential (ORP), temperature, pH, and conductivity. Based on a review of the data presented in Table 5-9, the following key geochemical parameters/TEAs were noted for the site. The significance of these parameters in the evaluation of the potential for NA at the site is discussed following the presentation of these key parameters:

Alkalinity – Increases in alkalinity concentrations across a contaminant plume are potentially an indicator of biological activity (API, 1997).

Oxygen and Oxidation Reduction Potential – Since oxygen is the most thermodynamically favorable TEA, depletion of oxygen in areas of dissolved COI is expected compared to background locations as a result of the use of oxygen as the preferred TEA under aerobic biodegradation processes. Highly positive ORP values indicate areas where natural contaminant biodegradation is taking place under aerobic conditions while lower to negative values indicate areas where anaerobic biodegradation reactions (lower energy yield to microbes) predominate. ORP values tend to be lowest within or immediately downgradient of current or former source areas, and higher in outlying areas.

Nitrate and Ferric Iron – Under anaerobic conditions, microbes may use nitrate and ferric iron (Fe^{+3}) as terminal electron acceptors, resulting in the depletion of nitrate and the accumulation of ferrous iron (Fe^{+2}) in areas of residual dissolved organics or in areas immediately downgradient of these areas.

Carbon Dioxide – Petroleum hydrocarbon degradation under both aerobic and anaerobic processes produces carbon dioxide (API, 1997). An increase in CO2 across a site can therefore be used as an indicator of biological activity. The CO2 produced during these processes can in turn be consumed during further biodegradation through the process known as methanogenesis, or CO2 reduction.

Summary

The key geochemical data (listed above) collected from these wells and summarized on Table 5-9 fit the conceptual model discussed in Section 3.9.3. For example, upgradient/former source area well MW-5 contained the lowest alkalinity concentration, no dissolved iron, the highest nitrate concentrations, and lowest carbon dioxide concentrations. Combined, these results are indicative of background conditions which can be explained by the hydraulically upgradient position of this well within the former MGP site. A "fresh" supply of TEAs are available at this location, and allow for efficient biodegradation of COI to take place under aerobic to sub-aerobic conditions. In comparison, well MW-7 contained elevated alkalinity, dissolved iron, methane; and carbon dioxide concentrations, lower nitrate concentrations, and negative ORP values. These data are typical of groundwater that has been "treated" through NA biological processes (Weidemeier *et. al.*, 2000). In comparison to both MW-5 and MW-7, downgradient well MW-9 contained the highest alkalinity concentration, elevated dissolved iron compared to MW-5, and the highest carbon dioxide concentrations at the site. These findings are indicative of wells located within or directly downgradient of a dissolved phase plume undergoing intrinsic biodegradation. These findings are also consistent with hydraulic data for the site that show slight downward gradients within the aquifer that allow migration of geochemical constituents used to evaluate NA from shallower portions of the aquifer to deeper portions of the aquifer. It should be noted that all three wells exhibited very low levels of dissolved oxygen, which provides evidence that aerobic respiration occurred near to or upgradient of these locations.

Overall, the analysis of the geochemical data collected for the site during the RI indicates that NA of dissolved COI is occurring to some extent in groundwater beneath the site. This conclusion is further supported by decreases in dissolved COI concentrations over time observed at MW-5. At this well, total BTEX concentrations decreased from 701 μg/L in April 2000 (Parsons, 2004) to 128.2 μg/L in August 2001 (the most recent sampling event) and total PAH concentrations decreased from 3,303 μg/L to 1.48 μg/L over the same time period. (While the apparent dramatic decrease in dissolved COI at MW-5 might be related to possible sampling or well installation artifacts [that could artificially elevate the initial sampling data and thus help create the dramatic decrease in COIs noted at this well over time], a review of the analytical data and sampling dates in relation to the installation date for this well and all other wells showed no apparent issues. Well MW-5 was installed in March of 2000 and the initial sampling data were collected in August of 2000, giving ample time for groundwater equilibration.) In addition to the geochemical and COI data, the overall lack of shallow zone impacts the St. John's property compared to the substation area provides indirect evidence that NA is occurring to some extent in the shallow groundwater zone. While NA is likely limiting the horizontal extent of the shallow groundwater plume emanating from the substation, downward vertical gradients in the aquifer (as noted in the MW-8 and RW-4 "well pair") are likely prohibiting the upward migration of deeper groundwater impacts into clean shallow groundwater beneath the St. John's property.

GC/FID Fingerprinting Results

Soil samples collected from borings B-107 (40-42) and B-108 (40-43) were prepared by solvent extraction (USEPA 3570) and fingerprinted by gas chromatography with a flame ionization detector (GC/FID) by META Environmental, Inc. Both samples contained the same material, which was identified as MGP tar, probably from a carbureted water gas process. These findings are generally consistent with the fingerprint work done at the former MGP site, which reported the NAPL as "MGP tar" (Parsons, 2004). The presence of mono-aromatic hydrocarbons (MAHs) and high concentration of naphthalene relative to other analytes indicate that these samples have not been subjected to substantial weathering. The laboratory report is provided in Appendix G.

6 Qualitative Exposure Assessment

This section integrates the data and information gathered during the RI and provides a qualitative assessment of potential risks that could be associated with the subsurface environmental conditions encountered at the Site. This assessment was performed by identifying potential sources, migration routes for the constituents of interest (COI) discussed in Section 5, receptors, and exposure pathways at the Site. A review of the significance of each element identified as being present was then performed. The assessment presented below includes a review of the site setting and identifies and defines site areas of interest according to current building and land uses. The exposure considerations listed below are discussed as they relate to each use area and are summarized in Table 6-1:

- Potential receptors
- Sources of COI
- Exposure medium to the receptors
- Receptor intake routes and exposure pathways
- Significance of the exposure pathway and potential exposure

6.1 Site Setting

The RI focused on the subsurface conditions present at the St. John's property. This investigation included analysis of the potential for migration of vapors from subsurface contamination into the school building, gymnasium, rectory, and church present at the site. Both the buildings and grounds are addressed in this qualitative risk assessment. Receptors associated with New Street, other public streets surrounding the property, and other off-site receptors are not addressed in this risk assessment.

The St. John's property is located in an urban area. The school and associated church, rectory, and grounds comprise nearly the entire block, and is surrounded by city roadways. The northern, eastern, and western portions of the property are covered by buildings and paved parking areas. The central and southern portions of the property are covered by a grass lawn. This lawn area is accessible to members of the school, but it does not appear to be used as a playground or sports field. Fencing surrounds portions of the property; however, the entryways to the property are open and there is no control over pedestrian traffic across the site.

The site is generally flat, with a gradual slope along the west side towards the Bronx River to the west, and a slope at the north side towards the north and northeast. The area along the eastern side of the block slopes to the east, away from the church. No surface water bodies are found on the property.

6.2 Conceptual Site Model

Table 6-1 presents the potential subsurface sources, migration pathways, receptors, and potentially complete exposure pathways for each area of interest. Each of these considerations are identified and discussed below.

6.2.1 Sources and Migration Pathways

The presence of NAPL in the subsurface of the Site presents the potential for exposure to VOCs, PAHs, and metals. This NAPL migrated at depth (>35 feet bgs) onto the property from the former MGP site to the north. The NAPL is located at the center of the site, beneath the school building, and extending to the area beneath the gymnasium at depths ranging from approximately 35 to 53 feet bgs (Figure 5-2). Soils which exceed NYSDEC recommended cleanup objectives are found exclusively at a depth greater than 35 feet below the ground surface near the northern edge of the St. John's property and deepen to depths below 50 feet to the south and southwest.

The contaminants in soil have the potential to impact groundwater or volatilize into soil gas or ambient air. Groundwater is found approximately 20 to 23 feet below the basement floor of the school, and approximately 30 feet bgs at the surrounding areas. Groundwater at the water table is not impacted by MGP-related compounds; however, it is inferred that groundwater in direct contact with the DNAPL-impacted soils does contain dissolved VOCs and SVOCs since groundwater immediately downgradient of the NAPL zone at MW-9 contains BTEX, styrene, naphthalene, and phenols in excess of standard guidance values. The relevance of these impacts is discussed later in this section. Groundwater flow is generally to the southwest, in alignment with the NAPL plume. While the downgradient edge of the dissolved plume has not been confirmed, it is highly unlikely that the plume reaches the nearest discharge location, the Bronx River, given the considerable distance (approximately 900 feet) between the site and the river. Therefore, it is very unlikely that there will be dissolved-phase impact to a receptor via this potential exposure pathway.

As discussed previously, an indoor air quality assessment was conducted at the St. John's school building, gymnasium, and rectory to evaluate potential intrusion of VOCs into the buildings. The results of that assessment showed that no impacts due to the NAPL beneath the school were detected. VOCs were detected in the indoor air; however, the concentrations measured in indoor air were within the range considered typical by NYSDOH for residential buildings.

6.2.2 Receptors and Exposure Pathways

Identification of potential human receptors requires an analysis of complete exposure pathways. A complete pathway is one that meets the following criteria (USEPA, 1989):

- A source of COI must be present;
- Release and transport mechanisms and media must be available to move the chemicals from the source medium (*e.g.*, soil) to the exposure medium (*e.g.*, groundwater);
- An opportunity must exist for receptors to contact the affected media; and
- A means for chemical uptake (*e.g.*, ingestion, inhalation, *etc.*) must exist.

Only exposure pathways that meet all of these four criteria are included in the risk assessment.

Potential current receptors at the Site include the following:

- Students and staff of the St. John's School
- The residents of the St. John's Church Rectory
- Workers who maintain the buildings and grounds
- Utility workers who maintain or repair subsurface utility lines beneath the property
- Visitors to the property, pedestrians who walk on or through the site, and those who attend the St. John's Church

As described above, the primary impacts to site receptors are associated with subsurface soils impacted by NAPL, and groundwater containing dissolved COI. Factors related to both of these media are described below.

Soil Exposure

The relevant potential direct soil exposure pathways for each receptor are described below, and summarized in Table 6-1.

- **Students and Staff**: Students and the school staff occupy the school building, gymnasium, and school and church grounds. These receptors are not exposed to subsurface soil or groundwater.

Surface soils are not expected to be impacted given the discrete nature of the deep soil and groundwater impacts identified beneath the site and the history of site use as residential property and as a school and church (see Section 6.3.1). Therefore, the only potential exposure pathway is by inhalation of indoor air if it has been impacted by intrusion of impacted soil gas.

- **Rectory Residents**: Residents are present in the church rectory, located immediately east of the portion of the site where NAPL is present in the subsurface. As with the school staff and students, the only potentially complete pathway for these residents would be through the intrusion of impacted soil gas from the site soils to the inside of the building.

- **Grounds and Building Maintenance Workers**: Outdoor workers may potentially be exposed to constituents in surface soil via direct contact (*i.e.*, incidental ingestion, dermal contact, and inhalation of volatiles or particulates) while performing light maintenance activities such as lawn care and other landscaping activities. As stated previously and summarized in Section 6.3.1, surface soils are not expected to be impacted given the discrete nature of the deep soil and groundwater impacts identified beneath the site and the history of site use as residential property and as a school and church. Building and grounds workers will not be directly exposed to subsurface soil contamination because contaminants are located at depths greater than 35 feet bgs near the northeastern site boundary and greater than 50 feet in the courtyard area of the school.

- **Utility Workers**: Periodically, utility lines associated with the site buildings may need to be accessed by utility workers for maintenance or repair purposes. The utility workers will not be directly exposed to subsurface soil contamination because contaminants are located at depths greater than 35 feet bgs near the northeastern site boundary and greater than 50 feet in the courtyard area of the school.

- **Churchgoers, Visitors, and Pedestrians**: A number of people enter the grounds of the property for short periods of time. People enter the church building at the southeast side of the site for services; visitors to the school, church, or rectory enter the grounds and buildings; and pedestrians walk through the site as they use it as a shortcut across the neighborhood. No exposure to subsurface soils and groundwater is possible. If any of these receptors enter buildings at the site then they would be exposed to indoor air.

Groundwater Exposure

A number of migration and exposure pathways are potentially relevant for groundwater. These are described below.

- **Groundwater as a Source of Drinking Water**: No water supply wells are present at the site or in the area, and the site and the surrounding areas are serviced by a municipal water supply. This exposure pathway is therefore incomplete and will not be considered further.

- **Incidental Contact with Groundwater**: Groundwater is found 20 feet or more below the basement floor of the school. It is very unlikely that a utility line excavation would extend this deeply.

- **Groundwater to Surface Water Migration Pathway**: There are no surface water bodies at the site or in the immediate vicinity, therefore this migration and exposure pathway is not complete.

- **Volatilization of VOCs from Groundwater**: Deep groundwater in contact with NAPL beneath the school or migrating onto the site from the MGP site contains dissolved VOCs and SVOCs. However, shallow groundwater present at the water table was found not to be impacted by COI. Surface groundwater will not act as a source of contaminants for soil gas, as there is no pathway for COI from the NAPL to the water table.

Soil Gas Exposure

It is important to note that impacted soil gas is not a primary source medium like soil or water, but the result of the volatilization of VOCs from soil or water to air. Impacted soil gas can be generated at a site by releases from source materials, or it may migrate onto a site from other sources. MGP-related soil gas sources for the St. John's property include both on-site source materials, and sources at the adjacent MGP site. The potential exists for migration of impacted soil gas vapors from the MGP site to the property. Note also that soil gas can be impacted by a wide array of non-MGP sources, such as petroleum products. This risk assessment does not address risk associated with non-MGP materials.

6.3 Evaluation of Environmental Data

Soil, groundwater, soil gas, and indoor air were sampled and analyzed during this investigation. In Section 5, soils were compared to the RSCOs and Eastern USA Background concentrations, groundwater data were compared to NYSDEC drinking water guidance and standard values, and soil gas and indoor air data compared to concentrations found inside of typical residential dwellings. A summary and review of the significance of these data is presented below.

6.3.1 Soil

Surface soils

Surface soils were not analyzed during this investigation. Based on the history of site use as residential property and as a school and church, it is likely that the surface soils contain concentrations of COI typical of urban soils. The transport of COI from the MGP site to the school via windblown deposition of contaminated dust was not examined in this RI. However, this is considered an unlikely route for contaminant migration from the MGP site.

Subsurface soils

Subsurface soils exhibited a wide range of conditions. Most subsurface soils did not exhibit evidence of gross contamination. Soils above and below the NAPL plume were found to meet NYSDEC RSCOs for all COI except for PAHs in the deepest samples collected at three of the boring locations. The greatest soil impacts were due to the presence of NAPL at depths from 36 below the basement floor of the school to 53 feet bgs in the school courtyard area. The area extent of NAPL impact is shown on Figure 5-2, and in cross-sections in Figures 5-3 and 5-4. Soils within this NAPL plume contain high concentrations of VOCs and SVOCs.

6.3.2 Groundwater

Groundwater was not sampled from within the NAPL-impacted zone beneath the site. Groundwater sampled at the downgradient edge of this zone contained dissolved phase VOCs and SVOCs above NYSDEC guidance values and standards. These compounds include the more soluble VOCs and SVOCs including benzene, ethylbenzene, toluene, xylenes, styrene, and naphthalene. Despite these impacts at depth, groundwater at the water table was found not to be impacted, indicating that there is no mixing of groundwater from the NAPL zone to the water table. Significant decreases in concentrations of a similar suite of COI at the adjacent former MGP site, coupled with geochemical data collected at the former MGP site and the St. John's property, indicate that natural attenuation is occurring at the site. Source removal at the former MGP site, together with ongoing natural attenuation of COI in groundwater, is expected to further degrade dissolved phase COI in groundwater over time beneath the St. John's property.

Groundwater movement beneath the site is to the southwest towards the Bronx River, approximately 900 feet west of the site. Based on the attenuation of COI in groundwater observed at the site, it is unlikely that any impacts from groundwater would be detectable in the Bronx River.

6.3.3 Soil Gas and Indoor Air

The sampling of soil gas and indoor air indicated the following:

- Concentrations of MGP-Related VOCs in indoor air were substantively within the 90th percentile of residential background concentrations.

- Elevated VOC concentrations were detected in soil gas samples; however, these compounds were attributed to potential gasoline sources.

- A comparison of soil gas to indoor air data indicated that migration of soil gas from the subsurface to indoor air was an unlikely migration pathway.

Note that this is consistent with the groundwater observations. Since COI are not migrating from the NAPL zone to the water table, there is no mechanism for the generation and release of impacted soil gas vapors to the vadose zone.

6.4 Evaluation of Potential Risk

This section presents an evaluation of potential risk for each receptor that could be exposed to COI at the Site. Based on the results of the evaluation of complete exposure pathways, the potential risks to each receptor have been identified and are discussed below.

6.4.1 Students and Staff

This investigation and risk evaluation found that there is no exposure of this receptor group to MGP-related COI due to the factors listed below:

- Although the NAPL plume is located directly beneath the school building, impacted soils and groundwater are not accessible to this receptor group, and the impacts are found at significant depths below the building basement (greater than 30 feet) and the ground surface (greater than 35 feet bgs near the northern site boundary and greater than 50 feet in the courtyard area of the school).

- MGP Related VOCs were not detected in air inside the school building or gymnasium at concentrations in excess of those found in typical residential homes.

Based on the findings of the RI and the indoor air sampling of the school and gymnasium buildings, there are no significant COI levels present within the buildings or at a reasonable depth (up to 20 feet) beneath the buildings. In addition, there are no exposure pathways which would allow students or staff to come into contact with subsurface soil or groundwater which might contain COI.

6.4.2 Rectory Residents

Residents are present at the northeast side of the site in the rectory building. This investigation found that there is no exposure to residents of this building to MGP-related COI due to the factors listed below:

- The rectory is not located over the NAPL and groundwater plume. Although this plume is very close to the western edge of the rectory, it is well below the building and ground surface.

- Indoor air sampling within the rectory and soil gas sampling at an outside adjacent location indicated that MGP-related COI are not present inside or in close proximity beneath the building.

Based on the findings of the RI and the indoor air sampling in the rectory, there are no significant COI levels nor exposure pathways present within or in close proximity to the rectory building.

6.4.3 Indoor and Outdoor Workers

Workers who maintain the school grounds and the exterior of the buildings or indoor workers will not be exposed to MGP-related COI for the same reasons listed in Section 6.4.1. No MGP-related COI were present in indoor air, soil gas, or groundwater samples collected near the water table.

6.4.4 Utility Workers

Subsurface utility lines may need to be accessed by utility workers for maintenance or repair purposes. Workers may also be exposed to soil gas released during excavations. However, no MGP impacts are present above the water table, and NAPL is found at depths greater than 30 feet below the basement of the school, and at greater depths below the ground surface. It is very unlikely that excavations for utility lines or other purposes would be advanced to a depth where MGP impacts would be encountered. Therefore, this exposure pathway is incomplete and exposure is highly unlikely.

6.4.5 Churchgoers, Visitors, and Pedestrians

A number of people enter the grounds of the school, church, and rectory on an infrequent basis or for a short duration. Entry into any of the site buildings will expose visitors and churchgoers to indoor air; however, no exposure or risk is associated with these activities in the school, rectory, or gymnasium buildings due to the absence of MGP-related impacts to soil gas and indoor air. No indoor air or soil gas impacts are anticipated in the church because it is located outside of the area of the identified subsurface NAPL plume.

6.5 Ecological Risks

The Site is located in an urban residential and commercial area. There are no natural areas or surface water bodies at or in the vicinity of the site; therefore there are no ecological receptors which may be impacted by MGP residuals. The nearest receptor for groundwater is the Bronx River, 900 feet downgradient of the site. Source removal activities at the MGP, coupled with natural attenuation of the groundwater plume at depth, would eliminate impacts prior to groundwater discharge into the river.

6.6 Conclusions

NAPL from the White Plains MGP has migrated beneath the St. John's School buildings and grounds. However, there are no migration pathways by which compounds in the NAPL can reach any of the potential receptors at the school or church. Direct testing of the indoor air in the basement of the school building, the gymnasium, and the rectory confirm that MGP COI are not present inside these structures at concentrations substantively above the typical range of VOCs found in residences in New York State. Based on these findings, there is no indication that any of the receptors associated with the St. John's School or Church are at risk from MGP-related compounds. Note that this conclusion excludes any exposure which may be related to surface soil since no testing of surface soil was performed. However, surface soil is not anticipated to be impacted by MGP-related COI based on the history of site use. In addition, the transport of COI from the MGP site to the school via windblown deposition is considered an unlikely contaminant migration route at this site.

7 Summary and Conclusions

This section summarizes the findings of the RI investigation of the St. John's School and Rectory property as a result of its proximity to the White Plains former MGP site. An overview of the nature and extent of COI is presented by media and area, and locations of known or potential source material are identified.

7.1 Site Geology

The soils at the site consist of two units above the bedrock, including:

- A fill unit was observed across the site beneath the ground surface in thicknesses ranging from 5 to 8 feet. This unit is composed primarily of reworked brown, dry, fine sand from the native unit below.

- Beneath the fill is a thick sequence of fine interbedded sands up to approximately 81-feet thick at B-110 (Appendix B). This lower sand unit is comprised of brown and gray, fine sand with trace layers of silt and gravel. The bedding is marked by slight changes in color and composition. Specks of black minerals (mica) are common throughout, giving the material a salt and pepper appearance.

- Weathered bedrock, identified as the Manhattan Schist, was encountered below the interbedded sand unit at approximately 64 feet bgs between the rectory and the school building, where it deepens to approximately 86 feet bgs on the southern edge of the school building.

7.2 Site Hydrogeology

There are no surface water bodies at or in the immediate vicinity of the site. Precipitation at the site drains into the stormwater sewer system or infiltrates to the subsurface in the landscaped areas. The water table is found at a depth of approximately 20 to 23 feet below the school basement and 21 to 30 feet bgs outside of the school building at the St. John's property. Groundwater in the overburden soils is unconfined and flows from northeast to the southwest in the general direction of the Bronx River.

7.3 Nature and Extent of Constituents of Interest

Four media of concern were investigated at the site: subsurface soil, soil gas, air (indoor air and ambient air), and groundwater. A summary of the conclusions related to each media are presented below.

7.3.1 Evaluation of Indoor Air Impacts

As anticipated based on the results obtained from investigations in similar buildings, VOCs were detected in all of the air samples, including the ambient samples. However, the VOCs were detected at low concentrations, as compared to worker guidance values and as compared to typical VOC concentrations found in similar buildings.

The results of the post-investigation sampling conducted on April 24, 2004 were similar to the results of the April 12, 2004 sampling event, and indicated the investigation activities had no adverse affects on indoor air quality. All of the results were several orders of magnitude below the worker guidance values. In all of the indoor air samples collected on April 24, 2004, the concentrations of the compounds categorized as Possibly MGP Related were all substantively within the 90^{th} percentile of residential background.

7.3.2 Evaluation of Potential MGP Vapor Intrusion

At the Site, the two potential concerns with regard to vapor intrusion were: (1) that MGP-related VOCs could be present in soil gas directly beneath the lowest elevation floor slabs of the school and gymnasium buildings; and (2) that these VOCs could be impacting indoor air quality by the process of upward intrusion of the soil gas vapors through these slabs. These concerns were addressed by examining all of the relevant data collected, with the following associated conclusions:

- A comparison of soil gas and indoor air sample results showed that it is unlikely that soil gas is the source of benzene or other VOCs found in the indoor air samples.

- The chemical profile of headspace vapors from MGP-impacted soil samples differed substantially from the chemical profile of the soil gas samples. This indicates that the source of the VOCs detected in the soil gas is not related to MGP impacts.

- The air pressure differential through the lowest elevation floor slabs was measured at low values, and even negative values, indicating air pressure from the indoor air down into the soil gas. These measurements further support the conclusion that vapor intrusion was not contributing to VOCs detected in indoor air in the school or gymnasium buildings.

- The soil and groundwater investigation results indicate that the MGP-impacted soils were first encountered at a depth of approximately 40 feet below the basement slab. These soils were saturated with groundwater, which was first encountered at a depth of approximately 20 feet below the school basement (or approximately 21 to 30 feet bgs outside the school. No COI were detected in soil samples collected at the water table or in shallow groundwater samples (or their headspace vapors) collected at the water table below the slab, thus eliminating a direct migration pathway of impacted soil vapors from deep soil impacts to the shallow groundwater and to the soil gas.

7.3.3 Delineation of Subsurface Soil Impacts

Soil data collected at depth revealed the presence of deep soil impacts (greater than 20 feet bgs) at the southern edge of New Street in the vicinity of boring SB-24 (Parsons, 2004) extending to the south and slightly to the west beneath the majority of the St. John's School building and likely a portion of the eastern edge of the gymnasium building. The results of the laboratory analyses of soil samples were consistent with the field findings presented on Figure 5-2 and show a discrete, thin zone of impacts within the zone of DNAPL-impacted soils. Vertical delineation of these impacts was accomplished by sampling the first zone below the zone of visual impacts. Lateral delineation of deep soil impacts is provided by the existing soil boring network using data from B-101 and B-112 to the east, B-112, B-115, B-116, B-118, and SB-28 to the south and southwest, B-104, SB-29, B-119, and B-120 to the west, and SB-23 and SB-25 to the north (Figure 5-2).

In summary, the data collected from this RI investigation indicate that:

- NAPL impacts are defined laterally and vertically to a thin zone typically only a few inches thick beneath the St. John's property;
- Impacts beneath the St. John's property do not represent a source to groundwater impacts at the water table; and
- The deep soil impacts are not adversely affecting soil gas or indoor air within the school or gymnasium buildings which overlie the deep soil impact zone.

7.3.4 Delineation of Groundwater Impacts

The groundwater data collected during the recent investigation at both the John's property and the adjacent former MGP site indicate the following:

- Groundwater concentrations at well MW-5 near a source area at the former MGP site have decreased significantly over time. Geochemical data used to evaluate NA support this finding and indicate that active biodegradation of dissolved COI is occurring in the site area. The recently completed IRM and planned remediation activities at the former MGP site will further enhance the effectiveness of NA through removal of source material and by further limiting the off-site migration of dissolved COI onto the St. John's property.

- Groundwater data collected at the water table at several locations beneath the footprint of the St. John's School building do not contain any dissolved MGP constituents. The lack of impacts at these locations supports the NA evaluation by showing that dissolved MGP COI are not migrating in the direction of groundwater flow off the MGP site at shallow depths and it provides data to show that the groundwater plume associated with the isolated zone of deep NAPL-impacted soils is isolated and not degrading groundwater quality at the water table.

- Groundwater at depth in contact with the zone of isolated residual NAPL beneath the St. John's property is impacted with dissolved phase COI. The positioning of MW-9 (immediately downgradient and along the centerline of the zone of deep NAPL impacts) provides a good monitoring point to assess groundwater quality at depth beneath the St. John's property and detect possible changes in groundwater concentrations over time. Given the age of the former MGP and the deep NAPL impacts resulting from the MGP, it is likely that the concentrations of dissolved COI within this deep groundwater plume have reached steady state and therefore will remain consistent and/or eventually decrease as a result of ongoing intrinsic biodegradation of dissolved COI over time. Dissolved phase constituents are not expected to migrate a significant distance and the vertical extent of dissolved phase impacts at depth is expected to be limited based on the discrete and thin nature of the impact zone present beneath the site.

7.4 Qualitative Exposure Assessment

A qualitative exposure assessment was completed to assess whether the MGP residuals present beneath the site in soil or groundwater pose a potential threat to human health at the St. John's school. The risk associated with the subsurface contamination is low due to the following factors:

a. No pathway is present for direct exposure of receptor groups to impacted subsurface soil or groundwater contamination.

b. Although the potential for exposure may exist to intrusion of vapors to indoor areas, MGP-related COI were not found in groundwater at the water table, or in soil gas beneath the site.

c. Movement of non-MGP related VOCs in soil gas to indoor air was not found to be occurring; therefore soil gas intrusion is not a complete migration or exposure pathway.

d. MGP-related COI were not found in indoor air in the school, gymnasium, or rectory in concentrations substantively above those found in a typical residence.

e. Surface soil sampling was not performed as part of this RI, therefore the significance of potential exposure to surface soil could not be evaluated. However, surface soils are not expected to be impacted given the discrete nature of the deep soil and groundwater impacts identified beneath the site, and the historical site use as residential property and as a school and church.

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Tables

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Table 3-1
Summary of Ambient and Indoor Air Sample Locations and Collection Parameters
April 12, 2004
St. John's School

Sample ID	Location	Time		Pressure (in. Hg)	
		Start	End	Start	End
AMB-101	Outdoor, near the corner of the intersection of Lexington Avenue and Hamilton Avenue, southwest of the gymnasium.	6:04	7:17	-28.5	-4.0
AMB-102	Outdoor, on New Street, northeast of the rectory.	6:10	7:18	-27.0	-3.0
IA-SB-101	School basement, northeast entry room.	7:29	8:54	-29.5	-3.5
IA-SB-102	School basement kitchen.	7:29	8:56	-30.0	-4.5
IA-SB-103	School basement cafeteria.	7:32	8:50	-29.0	-4.0
IA-SB-104	School basement boiler room.	9:04	10:28	-25.0	-4.0
IA-SB-104FD	Field duplicate of IA-SB-104.	9:04	10:27	-28.5	-3.5
IA-SB-105	Southwest corner of school basement, in the playroom.	7:34	9:17	-30.0	-5.0
IA-G106	Middle of the gymnasium.	7:39	9:06	-30.0	-4.0
IA-S1-101	First floor of the school, in the boys bathroom.	7:28	8:46	-28.5	-3.5
IA-S1-102	First floor of the school, in classroom # 3.	7:27	8:48	-29.5	-4.0
IA-S1-103	First floor of the school, in classroom # 2.	7:23	8:38	-29.0	-4.0
IA-S1-104	First floor of the school, in classroom # 1.	7:25	8:40	-29.0	-4.5
IA-RB-101	Rectory basement hallway.	8:31	9:50	-29.5	-4.0
IA-RB-102	Rectory basement boiler room.	8:32	9:44	-25.0	0.0
IA-R1-101	First floor of the rectory, in the pantry.	8:35	9:35	-29.0	-3.5
IA-R1-102	First floor of the rectory, in the hallway.	8:32	9:37	-29.0	-4.0
AMB-103	Outdoor, near the corner of the intersection of Lexington Avenue and Hamilton Avenue, southwest of the gymnasium.	10:33	12:00	-30.0	-3.0
AMB-104	Outdoor, on New Street, northeast of the rectory.	10:40	11:56	-28.0	-4.0

Table 3-2
Summary of Soil Gas Sample Locations and Collection Parameters
April 12, 2004
St. John's School

Sample ID	Locations and Observations	Differential Pressure (in. H_2O)	Core Thickness (in.)	Time		Pressure (in. Hg)		Final PID Reading
				Start	End	Start	End	
SG-101	Outside, northeast corner of school building.	NA	NA	14:01	15:19	-29.5	-5.0	NA
SG-102	School basement kitchen.	-0.015	6.0	15:15	16:31	-29.5	-4.5	
SG-103	School basement cafeteria.	-0.015	6.5	15:36	16:53	-28.5	-3.0	3.0 ppm
SG-104	School basement boiler room.	+0.00 - 0.015	4.5	16:23	17:39	-29.5	-4.5	1.8 ppm
SG-106	Gymnasium, bottom of the stairs.	0	9.0	17:20	18:27	-28.0	-5.0	2.1 ppm

Note:
Positive values indicate pressure upward from beneath the slab into the building.
NA - Sample taken outdoors, no reading taken.
Differential pressure measured between sub slab soil gas and indoor air.

Table 3-3
Summary of Subsurface Soil Samples Collected, Sample Rationale, and Analyses
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Sample Location	Sample Designation	Sample Rationale	Depth Interval (feet bgs)	Laboratory Analysis Completed
B-101	B101 (16-20)	Determine soil conditions above the water table for comparison to soil gas and indoor air samples, and provide delineation of NAPL Impacts to the southeast of SB-24.	16 - 20	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-101	B101 (36-40)	Provide vertical delineation of NAPL impacts to the southeast of SB-24.	36 - 40	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-101	B101 (60-64)	Determine soil conditions at the bedrock surface and provide delination of NAPL impacts to the southeast of SB-24.	60 - 64	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-102	B102 (16-20)	Determine soil conditions above the water table for comparison to soil gas and indoor air samples, and provide delineation of NAPL impacts to the south of SB-24.	16 - 20*	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-102	B102 (36-40)	Provide vertical delineation of NAPL impacts to the south of SB-24.	36 - 40*	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-103	B103 (16-20)	Determine soil conditions above the water table for comparison to soil gas and indoor air samples, and provide delineation of NAPL impacts to the southwest of SB-24.	16 - 20*	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-103	B103 (40-40.5)	Provide vertical delineation of NAPL impacts to the southwest of SB-24.	40 - 40.5*	VOCs
	B103 (39-40.5)	Provide vertical delineation of NAPL impacts to the southwest of SB-24.	39 - 40.5*	SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-103	B103 (55.5-56)	Provide vertical delineation of NAPL impacts to the southwest of SB-24.	55.5 - 56*	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-104	B104 (16-20)	Determine soil conditions above the water table for comparison to soil gas and indoor air samples, and provide delineation of NAPL impacts detected at B-103.	16 - 20*	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-104	B104 (36-40)	Provide delineation of NAPL impacts along the west wall of the school building SB-24.	36 - 40*	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-107	B107 (40-42)	Provide vertical delineation of NAPL impacts to the south of SB-102	40 - 42*	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-107	B107 (44-48)	Provide vertical delineation of NAPL impacts to the south of SB-102	44 - 48*	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-108	B108 (40-43)	Provide vertical delineation of NAPL impacts to the south of SB-103	40 - 43*	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-108	B108 (50-52)	Provide vertical delineation of NAPL impacts to the south of SB-103	50 - 52*	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide,
B-109	B109 (50-51.5)	Provide vertical delineation of NAPL impacts to the southwest of SB-108	50 - 51.5	VOCS, SVOCs
B-109	B109 (59-60)	Provide vertical delineation of NAPL impacts to the southwest of SB-108	59 - 60	VOCs, SVOCs
B-110	B110 (52)	Evaluate conditions at top of bedrock surface.	52	VOCs, SVOCs
B-110	B110 (60-64)	Provide vertical delineation of NAPL impacts to the south of SB-108	60 - 64	VOCs, SVOCs
B-110	B110 (8488)	Provide vertical delineation of NAPL impacts to the south of SB-108	84 - 88	VOCs, SVOCs

Table 3-3
Summary of Subsurface Soil Samples Collected, Sample Rationale, and Analyses
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Sample Location	Sample Designation	Sample Rationale	Depth Interval (feet bgs)	Laboratory Analysis Completed
B-111	B111 (51-52)	Provide vertical delineation of NAPL impacts to the south of SB-107	51 - 52	VOCs, SVOCs
B-111	B111 (56-60)	Provide vertical delineation of NAPL impacts to the south of SB-107	56 - 60	VOCs, SVOCs
B-112	B112 (51-52)	Provide vertical delineation of NAPL impacts to the southeast of SB-107	51 - 52	VOCs, SVOCs
B-112	B112 (56-60)	Provide vertical delineation of NAPL impacts to the southeast of SB-107	56 - 60	VOCs, SVOCs
B-113	B113 (52.5-53.5)	Provide vertical vertical delineation of NAPL impacts to the south of SB-109	52.5 - 53.5	VOCs, SVOCs
B-113	B113 (56-60)	Provide vertical delineation of NAPL impacts to the south of SB-109	56 - 60	VOCs, SVOCs
B-114	B114 (52-53)	Provide vertical delineation of NAPL impacts to the southwest of SB-109	52 - 53	VOCs, SVOCs
B-114	B114 (58-60)	Provide vertical delineation of NAPL impacts to the southwest of SB-109	58 - 60	VOCs, SVOCs
B-115	B115 (54-56)	Provide verticaldelineation of NAPL impacts to the south of SB-114	54 - 56	VOCs, SVOCs
B-115	B115 (62-64)	Provide vertical delineation of NAPL impacts to the south of SB-114	62 - 64	VOCs, SVOCs
B-116	B116 (54-56)	Provide vertical delineation of NAPL impacts to the south of SB-113	54 - 56	VOCs, SVOCs
B-117	B117 (52-53)	Provide vertical delineation of NAPL impacts to the south of SB-110 and to the east of SB-113	52 - 53	VOCs, SVOCs
B-117	B117 (56-60)	Provide delineation of NAPL impacts to the south of SB-110 and to the east of SB-113	56 - 60	VOCs, SVOCs
B-118	B118 (52-56)	Provide vertical delineation of NAPL impacts to the south of SB-111	52 - 56	VOCs, SVOCs
B-119	B119 (56-60)	Provide vertical delineation of NAPL impacts to the southwest of SB-114	56 - 60	VOCs, SVOCs
B-119	B119 (60-64)	Provide delineation of NAPL impacts to the west and southwest of SB-114	60 - 64	VOCs, SVOCs
B-120	B120 (56-60)	Provide vertical delineation of NAPL impacts to the west and southwest of SB-115	56 - 60	VOCs, SVOCs
B-120	B120 (60-64)	Provide vertical delineation of NAPL impacts to the west and southwest of SB-115	60 - 64	VOCs, SVOCs

Notes: * boring installed inside school basement; depth referenced to basement floor.
VOCs - TCL volatile organic compounds
SVOCs - TCL semivolatile organic compounds
PCBs - polychlorinated biphenyls
TCL - Target Compound List
TAL - Target Analyte List

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Table 3-4
Summary of Groundwater Samples Collected, Sample Rationale, and Analyses
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Sample Designation	Screen Depth (feet bgs)	Approximate Depth to Water (feet bgs)	Sample Rationale	Laboratory Analysis Completed
B101-041304	20 - 24	22	Determine groundwater conditions downgradient of the former MGP and to the southeast of SB-24, and collect groundwater for comparison to the soil, soil gas, and indoor air data.	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B102-041604	20 - 24*	20*	Determine groundwater conditions downgradient of the former MGP and to the south of SB-24, and collect groundwater for comparison to the soil, soil gas, and indoor air data.	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B103-041404	20 - 24*	21*	Determine groundwater conditions downgradient of the former MGP and to the southwest of SB-24, and collect groundwater for comparison to the soil, soil gas, and indoor air data.	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B104-041504	20 - 24*	19.5*	Determine groundwater conditions downgradient of the former MGP and along the west wall of the school building, and collect groundwater for comparison to the soil, soil gas, and indoor air data.	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
MW9-091404	52 - 62	29.63	Determine groundwater conditions at depth downgradient from NAPL impacted soils.	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide, MNA Parameters
MW5-091404	4 - 11	5.92	Determine groundwater conditions within the boundary of the former MGP.	MNA Parameters
MW7-091404	7 - 17	7.88	Determine groundwater conditions upgradient/cross-gradient of the former MGP.	MNA Parameters

Notes:
* boring installed insided school basement; depth referenced to basement floor.
VOCs - TCL volatile organic compounds
SVOCs - TCL semivolatile organic compounds
PCBs - polychlorinated biphenyls
TCL - Target Compound List
TAL - Target Analyte List
Groundwater grab samples collected with direct push temporary slotted tooling screened at the water table.
Grab samples collected with a peristaltic pump following low-flow protocol.

MNA Parameters Include:
nitrate
sulfate
sulfide
total iron and manganese
dissolved iron and manganese
unionized hydrogen sulfide
alkalinity
dissolved gasses (nitogen, oxygen, methane, carbon dioxide)

Table 4-1
Summary of Monitoring Well Construction, Well Survey, and Water Level Gauging Results
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Monitoring Well ID	Top of PVC Riser Elevation (AMSL)	Ground-surface Elevation (AMSL)	Installation Date	Surface Construction	Screen Interval (feet bgs)	Well Diameter (inch)	March 22, 2000		April 6, 2000	
							Depth to Water (feet bgs)	Groundwater Elevation (AMSL)	Depth to Water (feet bgs)	Groundwater Elevation (AMSL)
MW-1	206.35	206.51	March 22, 2000	Flush with Grade	24 - 34	2	27.71	178.64	27.74	178.61
MW-2	190.54	190.72	March 15, 2000	Flush with Grade	7 - 17	2	11.24	179.30	11.26	179.28
MW-3	201.58	202.03	March 21, 2000	Flush with Grade	20 - 30	2	22.60	178.98	22.56	179.02
MW-4	194.92	195.09	March 15, 2000	Flush with Grade	13 - 23	2	15.61	179.31	15.64	179.28
MW-5	189.12	189.56	March 15, 2000	Flush with Grade	4 - 11	2	6.81	182.31	7.13	181.99
MW-6	187.82	188.53	August 16, 2000	Flush with Grade	5 - 15	2	NA	NA	NA	NA
MW-7	189.51	190.27	June 22, 2001	Flush with Grade	7 - 17	2	NA	NA	NA	NA
MW-8	202.08	202.37	August 30, 2000	Flush with Grade	20 - 40	2	NA	NA	NA	NA
MW-9	207.34	207.69	September 2, 2004	Flush with Grade	52 - 62	2	NA	NA	NA	NA
SB-1	189.10	189.41	March 16, 2000	Flush with Grade	0 - 20		NM	NM	8.56	180.54
TB-5	189.50	189.54	March 16, 2000	Flush with Grade	0 - 16.5		NM	NM	6.79	182.71
RW-4	200.90	201.20		Flush with Grade		4	NA	NA	NA	NA
RW-5	200.04	200.42		Flush with Grade		4	NA	NA	NA	NA

Notes:
bgs - below ground surface
Elevations tied to on-site datum of 204.65 ft above mean sea level (AMSL), which is permanently marked on substation
NA - Not Available or not installed
NM - Not Measured
Groundwater gauging data provided by Parsons
Wells MW-1 through MW-8 location within and adjacent to former MGP north of New Street
MW-9 located at St. John's property

Table 4-1

Summary of Monitoring Well Construction, Well Survey, and Water Level Gauging Results
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Monitoring Well ID	Top of PVC Riser Elevation (AMSL)	December 1, 2000		July 16, 2001		July 26, 2001		August 1, 2001	
		Depth to Water (feet bgs)	Groundwater Elevation (AMSL)	Depth to Water (feet bgs)	Groundwater Elevation (AMSL)	Depth to Water (feet bgs)	Groundwater Elevation (AMSL)	Depth to Water (feet bgs)	Groundwater Elevation (AMSL)
MW-1	206.35	28.37	177.98	NA	NA	27.80	178.55	27.85	178.50
MW-2	190.54	11.82	178.72	NA	NA	10.39	180.15	NA	NA
MW-3	201.58	23.11	178.47	NA	NA	22.44	179.14	22.60	178.98
MW-4	194.92	16.17	178.75	NA	NA	15.57	179.35	15.65	179.27
MW-5	189.12	7.89	181.23	NA	NA	5.22	183.90	NA	NA
MW-6	187.82	9.41	178.41	NA	NA	8.75	179.07	NA	NA
MW-7	189.51	NA	NA	8.53	180.98	8.31	181.20	NA	NA
MW-8	202.08	23.65	178.43	NA	NA	23.10	178.98	NA	NA
MW-9	207.34	NA	NA	NA	NA	NA	NA	NA	NA
SB-1	189.10	8.61	180.49	NM	NM	9.00	180.10	NM	NM
TB-5	189.50	8.60	180.90	NM	NM	7.38	182.12	NM	NM
RW-4	200.90	NA	NA	NA	NA	NA	NA	NA	NA
RW-5	200.04	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

bgs - below ground surface

Elevations tied to on-site datum of 204.65 ft above mean sea level (AMSL), which is permanently marked on substation

NA - Not Available or not installed

NM - Not Measured

Groundwater gauging data provided by Parsons

Wells MW-1 through MW-8 location within and adjacent to former MGP north of New Street

MW-9 located at St. John's property

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Table 4-1
Summary of Monitoring Well Construction, Well Survey, and Water Level Gauging Results
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Monitoring Well ID	Top of PVC Riser Elevation (AMSL)	August 3, 2001		August 8, 2001		August 11, 2001		September 14, 2004	
		Depth to Water (feet bgs)	Groundwater Elevation (AMSL)	Depth to Water (feet bgs)	Groundwater Elevation (AMSL)	Depth to Water (feet bgs)	Groundwater Elevation (AMSL)	Depth to Water (feet bgs)	Groundwater Elevation (AMSL)
MW-1	206.35	NA	NA	27.88	178.47	27.91	178.44	NA	NA
MW-2	190.54	11.24	179.30	10.82	179.72	NA	NA	10.22	180.32
MW-3	201.58	NA	NA	22.55	179.03	NA	NA	NA	NA
MW-4	194.92	NA	NA	16.66	178.26	NA	NA	14.80	180.12
MW-5	189.12	7.19	181.93	7.23	181.89	NA	NA	5.88	183.24
MW-6	187.82	NA	NA	NA	NA	NA	NA	5.28	182.54
MW-7	189.51	NA	NA	NA	NA	NA	NA	7.80	181.71
MW-8	202.08	NA	NA	NA	NA	NA	NA	22.42	179.66
MW-9	207.34	NA	NA	NA	NA	NA	NA	29.63	177.71
SB-1	189.10	10.40	178.70	10.47	178.63	NM	NM	7.91	181.19
TB-5	189.50	15.89	173.61	8.66	180.84	NM	NM	5.92	183.58
RW-4	200.90	NA	NA	NA	NA	NA	NA	22.56	178.34
RW-5	200.04	NA	NA	NA	NA	NA	NA	21.61	178.43

Notes:

bgs - below ground surface

Elevations tied to on-site datum of 204.65 ft above mean sea level (AMSL), which is permanently marked on substation

NA - Not Available or not installed

NM - Not Measured

Groundwater gauging data provided by Parsons

Wells MW-1 through MW-8 location within and adjacent to former MGP north of New Street

MW-9 located at St. John's property

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Table 5-1
Summary of Quality Assurance / Quality Control Samples Collected, Sample Rationale, and Analyses
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Sample Location	Sample Designation	Date	Matrix	Sample Rationale	Laboratory Analysis Completed
B-102	B-102 (16-20) Dup	16-Apr-04	S	Field Duplicate Sample of B-102 (16-20)	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-103	B-103D-041404	14-Apr-04	AQ	Duplicate Sample of B-103-041404	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-104	B-104 MS - 041504	15-Apr-04	AQ	Matrix Spike of B-104041504	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-104	B-104 MSD - 041504	15-Apr-04	AQ	Matrix Spike Duplicate of B-104-041504	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-108	B-108 (40-43) MS	17-Apr-04	S	Matrix Spike of B-108 (40-43)	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-108	B-108 (40-43) MSD	17-Apr-04	S	Matrix Spike Duplicate of B-108 (40-43)	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
B-113	Dup01-071604	16-Jul-04	S	Field Duplicate Sample of B-119 (60-64)	VOCs, SVOCs
B-119	B-119 (60-64) MS	22-Jul-04	S	Matrix Spike of B-119 (60-64)	VOCs, SVOCs
B-119	B-119 (60-64) MSD	22-Jul-04	S	Matrix Spike Duplicate of B-119 (60-64)	VOCs, SVOCs
Rinse Blank	RB01-041704	17-Apr-04	AQ	Rinse Blank of Drilling Equipment	VOCs, SVOCs, TAL Metals, Total Cyanide, Available Cyanide
Trip Blank	TB-041704	17-Apr-04	AQ	Trip Blank	VOCs
Trip Blank	Trip Blank	14-Sep-04	AQ	Trip Blank	VOCs
B-104	1A-SB-104FD	12-Apr-04	Air	Field Duplicate Sample of IA-SB-704	VOCs

Notes:
bgs - below ground surface
VOCs - TCL volatile organic compounds
SVOCs - TCL semivolatile organic compounds
PCBs - polychlorinated biphenyls
TCL - Target Compound List
TAL - Target Analyte List

Air - air
S - soil
AQ - aqueous
MS, MSD, and duplicate samples collected one per every 20 groundwater and soil samples
Rinse blanks collected one per twenty soil samples.
Trip Blanks occupied each shipment of VOC samples

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Table 5-2
Summary Table of Ambient, Indoor Air, and Soil Gas Results
St. John's School and Rectory
Resampling Event - April 12, 2004

Compound	CAS number	Sample Number, Location, and Results in ug/m^3																								Background Indoor Air Values[3]	
Type of Sample		Ambient Air	Ambient Air	Ambient Air	Ambient Air	Soil Gas	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	SoilGas	Indoor Air	SoilGas	Indoor Air	Soil Gas	Indoor Air	Indoor Air-FD	Soil Gas	Indoor Air	DOH 75th ug/m^3	DOH 90th ug/m^3
Sample Location		Outdoor Southwest	Outdoor Northeast	Outdoor Southwest	Outdoor Northeast	Gym Floor, at foot of Stairs	Center of Gymnasium	Rectory 1st Floor	Rectory 1st Floor	Rectory Basement	Rectory Basement	1st Floor of School, Men's Restroom	1st Floor of School, Classroom No. 3	1st Floor of School, Classroom No.2	1st Floor of School, Classroom No. 1	Basement of School, Entry	Outside, NE Corner of School Beneath Sidewalk	Basement of School, Kitchen	Basement of School, Kitchen	Basement of School, Cafeteria	Basement of School, Cafeteria	Basement of School, Boiler Room	Field Duplicate Basement of School, BoilerRoom	Basement of School, Boiler Room	Basement of School, Play Room		
Sampling Date		4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004		
Sample ID		AMB-101	AMB-102	AMB-103	AMB-104	SG-106	IA-G106	IA-R1-101	IA-R1-102	IA-RB-101	IA-RB-102	IA-S1-101	IA-S1-102	IA-S1-103	IA-S1-104	IA-SB-101	SG-101	IA-SB-102	SG-102	IA-SB-103	SG-103	IA-SB-104	IA-SB-104FD	SG-104	IA-SB-105		
Possibly MGP Related or Other Sources [1]																											
1,2,4-Trimethylbenzene	95-63-6	-	-	0.88	2.8	16	0.85	-	-	-	-	-	-	-	-	1.9	5.0	0.86	15	4.3	18	0.97	0.74	13	0.77	4.4	11
1,3,5-Trimethylbenzene	108-67-8	-	-	-	0.86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	-	-	-	-	-	1.7	3.8
2,3-Dimethylpentane	565-59-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	7.9
2-Hexanone	591-78-8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
2-Methylpentane	107-83-5	-	-	-	6.3	-	-	-	-	-	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
4-Ethyltoluene	622-96-8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
4-Methyl-2-pentanone	108-10-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.4	-	-	-	-	-	0.98	3
Benzene	71-43-2	1.5	1.0	2.2	2.8	-	1.3	1.8	1.6	-	2.8	1.6	1.3	2.9	1.7	1.5	-	1.5	-	1.6	-	1.5	1.6	-	1.5	5.7	15
Carbon Disulfide	75-15-0	-	-	-	-	-	4.3	-	-	-	-	-	-	-	-	-	-	-	-	3.0	-	-	5.5	-	-	NA	NA
Cyclohexane	110-82-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.9	9.1
Ethylbenzene	100-41-4	-	-	0.71	1.7	-	-	-	-	-	-	-	-	-	-	-	12	-	12	3.4	9.6	-	-	-	-	2.8	7.3
Heptane	142-82-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.7	19
Hexane	110-54-3	-	-	-	3.5	-	-	-	-	-	3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5	19
2,2,4-Trimethylpentane	540-84-1	-	-	-	-	1100	-	-	-	-	-	-	-	-	-	-	580	-	1700	-	1700	-	-	1200	-	2.6	7.3
Indan	496-11-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Indene	95-13-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Isopentane	78-784	-	-	2.6	7.6	-	-	9.9	3.6	-	11	3.9	-	-	-	3.5	-	3.1	-	3.5	-	7.9	7.7	-	11	NA	NA
Naphthalene	91-20-3	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2 J	-	-	-	-	4.2 J	-	-	-	-	-	NA	NA
Styrene	100-42-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.68	1.3
Thiophene	110-02-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Toluene	108-88-3	3.1	3.1	3.9	9.3	59	1.8	3.5	2.5	-	3.1	2.4	1.6	2.0	1.9	4.6	40	2.6	79	6.9	80	2.6	2.6	64	3.7	25	59
m/p-Xylenes	136777-81-2	1.1	2.6	2.0	6.0	21	1.4	1.1 J	1.1 J	-	1.2 J	1.2 J	0.90 J	-	1.0 J	1.9	38	1.2 J	38	8.4	31	1.4	1.4	28	1.2	4.7	12
o-Xylene	95-47-6	-	0.94	0.75	2.3	-	0.61 J	-	-	-	-	-	-	-	-	0.73	10	-	12	3.1	8.8 J	-	-	-	-	3.1	7.9
Not MGP Related [2]																											
1,1,1-Trichloroethane	71-55-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	-	-	-	-	-	-	-	-	-	1.4	3.5
1,1,2,2-Tetrachloroethane	79-34-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.23
1,1,2-Trichloroethane	79-00-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.24
1,1-Dichloroethane	75-34-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.67	-	-	-	-	-	-	-	-	-	0.19	0.23
1,1-Dichloroethene	75-35-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	-	-	-	-	-	-	-	-	-	0.19	0.23
1,2,4-Trichlorobenzene	120-82-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.24	3
1,2-Dibromoethane (EDB)	106-93-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.19	0.23
1,2-Dichlorobenzene	95-50-1	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.24	0.78
1,2-Dichloroethane	107-06-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.2	-	-	-	-	-	-	-	-	-	0.19	0.22
1,2-Dichloropropane	78-87-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.24
1,3-Butadiene	106-99-0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
1,3-Dichlorobenzene	541-73-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.24	0.66
1,4-Dichlorobenzene	106-46-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9	-	-	-	-	-	0.54	1.3
1,4-Dioxane	123-91-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
2-Butanone (MEK)	78-93-3	-	-	2.2	-	-	-	-	-	-	-	-	-	-	-	-	21	-	-	12	-	-	3.2	-	-	7.5	14
Acetone	67-64-1	7.3	6.0	15	11	28	6.9	6.7	12	14	6.0	11	6.8	13	17	8.0	84	6.2	44	14	37	14	17	49	7.8	46	110
Benzyl Chloride	100-44-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Bromodichloromethane	75-27-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Bromoform	75-25-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Bromomethane	74-83-9	-	-	-	-	-	-	-	-	-	-	-	0.59 J	-	-	-	-	-	-	-	-	-	-	-	-	0.24	0.58
Carbon Tetrachloride	56-23-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.68	0.87
Chlorobenzene	108-90-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.19	0.23
Chloroethane	75-00-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.25
Chloroform	67-66-3	-	-	-	-	-	-	-	-	-	1.1	0.75	-	-	-	-	-	-	80	-	-	0.87	0.76	-	-	0.54	1.4
Chloromethane	74-87-3	1.2	1.2	1.0	0.95	-	0.88	1.1	1.1	-	0.92	0.88	0.99	1.3	0.94	1.0	-	0.88	-	1.1	-	0.85	0.92	-	0.91	2	3.3
cis-1,2-Dichloroethene	156-59-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.24
cis-1,3-Dichloropropene	10061-01-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.24
Dibromochloromethane	124-48-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Ethanol	64-17-5	14	4.7	7.0	14	26	5.1	81 J	93 J	3800 J	15	12	8.0	16	32	24	73	15	26	76 J	-	3.8	6.9	22	49 J	610	1600
Trichlorofluoromethane (Freon 11)	75-69-4	2.0	2.0	1.6	1.6	-	1.5	2.5	1.8	-	1.5	1.5	1.6	2.0	1.6	1.5	-	1.4	-	1.5	-	1.5	1.5	-	1.4	5.5	17
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	1.8
1,2-Dichlorotetrafluoroethane	76-14-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.21	0.63
Dichlorodifluoromethane (Freon 12)	75-71-8	3.6	3.8	2.6	2.6	-	2.7	2.8	2.8	-	2.6	2.4	2.8	3.8	2.8	2.8	-	2.7	28	2.5	12	2.7	2.8	-	2.6	5.6	15
Hexachlorobutadiene (C-46)	87-68-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.25	4.8
Methyl tert-Butyl Ether	1634-04-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.7	27
Methylene Chloride (Dichloromethane)	75-09-2	-	-	0.98	3.3	-	-	0.75	1.0	-	0.64	-	-	-	-	1.8	5.6	-	-	-	-	0.71	0.73	-	0.50	6.3	22
2-Propanol	67-63-0	-	-	-	-	-	-	2.8	13	-	-	2.2	1.9	-	-	4.2	31	1.8 J	-	8.8	-	32	-	-	-	NA	NA
Propene	115-07-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Tetrachloroethene	127-18-4	1.2	-	-	-	98	9.2	-	-	-	-	-	-	-	-	2.5	-	-	-	-	24	-	-	22	-	1.2	2.9
Tetrahydrofuran	109-99-9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.3	-	-	-	-	-	0.32	3.3
trans-1,2-Dichloroethene	156-60-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
trans-1,3-Dichloropropene	10061-02-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.18	0.22
Trichloroethene	79-01-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	-	-	-	-	-	-	-	-	-	0.23	0.48
Vinyl Acetate	108-05-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Vinyl Chloride	75-01-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.23

Notes:
[1] These compounds may be related to either MGP sources or non-MGP sources, or both. MGP sources include MGP tars and petroleum feedstocks used in MGP processes, such as the carburetted water gas process. Non-MGP sources include cleaning products, floor wax and polish, vehicle exhaust, construction materials, and cigarette smoke.
[2] These compounds are not related to MGP sources and are present due to non-MGP sources, such as vehicle exhaust, heating and air conditioning systems, cleaning agents, art supplies, paints, etc.
[3] Background Indoor/Outdoor Air Levels of Volatile Organic Compounds in Homes Heated with Fuel Oil. Sampled by the New York State Department of Health, 1997-2003. New York State Department of Health, Bureau of Toxic Substance Assessment, Nov. 16, 2004 [NYSDOH, 2004].
NA - Not Available. No data available for background concentrations of these compounds.
\- Not Detected.
J - Estimated Concentration.

Lab Rev 2

RETEC

Table 5-3
Summary Table of Volatilization Study Headspace Analysis
St. John's School and Rectory
Resampling Event - April 13-17, 2004, and December 1, 2004

Compound	CAS number	Sample Number, Location, and Results in ug/m³											
Type of Sample		Groundwater	Groundwater	Groundwater	Groundwater	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Groundwater
Sample Location		Outside, Northeast Corner of School	Basement of School, Kitchen	Basement of School, Cafeteria	Basement of School, Boiler Room	Basement of School, Kitchen	Basement of School, Cafeteria	Basement of School, Kitchen	Basement of School, Cafeteria	Basement of School, Cafeteria	White Plains Site Excavation	Lab	Lab
Sample Depth		20-23	20-23	20-23	20-23	39.5-40	39-40.5	40-42	36-40	36-40	Relief Holder[8]	NA	NA
Sampling Date		4/13/2004	4/16/2004	4/14/2004	4/15/2004	4/16/2004	4/14/2004	4/15/2004	4/17/2004	4/17/2004	12/1/2004		
Sample ID		B-101	B-102	B-103	B-104	B-102 (39.5-40)	B-103 (39-40.5)	B-107 (40-42)	B-108 (36-40) High	B-108 (36-40) Low[7]	WP-1	Soil Blank	Water Blank
Possibly MGP Related or Other Sources [1]													
1,2,4-Trimethylbenzene	95-63-6	-	-	-	-	260 J[4]	260 J[4]	270 J[4]	310 J[4]	22 J[6]	400	-	-
1,3,5-Trimethylbenzene	108-67-8	-	-	-	-	220 J[4]	220 J[4]	240 J[4]	260 J[4]	8.5 J[6]	770	-	-
2,3-Dimethylpentane	565-59-3	-	-	-	-	300 J[5]	61 J[6]	400 J[5]	140 J[5]	-	-	-	-
2-Hexanone	591-78-6	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylpentane	107-83-5	-	-	-	-	150 J[5]	31 J[6]	170 J[5]	62 J[6]	-	900	-	-
4-Ethyltoluene	622-96-8	-	-	-	-	300 J[4]	310 J[4]	320 J[4]	360 J[4]	10 J[6]	2100	-	-
4-Methyl-2-pentanone	108-10-1	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	71-43-2	-	-	-	-	-	-	-	-	-	4200	-	-
Carbon Disulfide	75-15-0	-	-	-	-	-	-	-	-	-	390	-	-
Cyclohexane	110-82-7	-	-	-	-	140 J[5]	25 J[6]	190 J[5]	68 J[6]	-	2900	-	-
Ethylbenzene	100-41-4	-	-	-	-	480 J[4]	230 J[5]	450 J[4]	520 J[4]	2.5 J[6]	490	-	-
Heptane	142-62-5	-	-	-	-	520 J[4]	280 J[5]	580 J[4]	520 J[5]	-	5900	-	-
Hexane	110-54-3	-	-	-	-	390 J[5]	87 J[5]	460 J[5]	180 J[5]	-	1800	-	-
2,2,4-Trimethylpentane	540-84-1	-	-	-	-	-	-	-	-	-	-	-	-
Indan	496-11-7	-	-	-	-	230 J[5]	190 J[5]	200 J[5]	270 J[5]	5.0 J[6]	9500	-	-
Indene	95-13-6	-	-	-	-	600 J[4]	620 J[4]	610 J[4]	720 J[4]	120 J[5]	-	-	2.6
Isopentane	78-784	-	-	-	-	1.5 J[6]	-	2.1 J[6]	1.9 J[6]	-	-	-	-
Naphthalene	91-20-3	-	-	-	-	2700 J[4]	2400 J[4]	2700 J[4]	3100 J[4]	110 J[5]	990 J	-	9.2 J
Styrene	100-42-5	-	-	-	-	350 J[4]	300 J[4]	370 J[4]	450 J[4]	20 J[4]	84	-	0.53
Thiophene	110-02-1	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	108-88-3	-	-	-	-	38 J[6]	64 J[6]	280 J[4]	400 J[4]	2.8 J[6]	540	-	-
m/p-Xylenes	136777-61-2	-	-	-	-	690 J[4]	540 J[4]	700 J[4]	740 J[4]	21 J[6]	1500	-	0.62 J
o-Xylene	95-47-6	-	-	-	-	570 J[4]	480 J[4]	560 J[4]	650 J[4]	10 J[4]	370	-	-
Not MGP Related [2]													
1,1,1-Trichloroethane	71-55-6	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	79-34-5	-	-	-	-	-	-	-	130 J[6]	-	-	-	-
1,1,2-Trichloroethane	79-00-5	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	75-34-3	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	75-35-4	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	120-82-1	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (EDB)	106-93-4	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	95-50-1	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	107-06-2	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropene	78-87-5	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Butadiene	106-99-0	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	541-73-1	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	106-46-7	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dioxane	123-91-1	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	78-93-3	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	67-64-1	-	-	-	-	2.3 J[6]	2.4 J[6]	3.0 J[6]	2.1 J[6]	-	210	-	-
Benzyl Chloride	100-44-7	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	75-27-4	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	75-25-2	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	74-63-9	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	56-23-5	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	108-90-7	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	75-00-3	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	67-66-3	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	74-87-3	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	156-59-2	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	10061-01-5	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	124-48-1	-	-	-	-	-	-	-	-	-	-	-	-
Ethanol	64-17-5	-	-	-	-	-	-	-	1.4 J[6]	-	-	-	-
Trichlorofluoromethane (Freon 11)	75-69-4	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorotetrafluoroethane	76-14-2	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane (Freon 12)	75-71-8	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene (C-46)	87-68-3	-	-	-	-	-	-	-	-	-	-	-	-
Methyl ter -Butyl Ether	1634-04-4	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride (Dichloromethane)	75-09-2	1.1 U[3]	1.0 U[3]	1.0 U[3]	1.4 U[3]	3.5 U[3]	2.8 U[3]	0.82 U[3]	2.5 U[3]	-	62	1.3	1.7
2-Propanol	67-63-0	-	-	-	-	-	-	-	-	-	-	-	-
Propene	115-07-1	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	127-18-4	-	-	-	-	35 J[6]	24 J[6]	53 J[6]	3.1 J[6]	-	-	-	-
Tetrahydrofuran	109-99-9	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	156-60-5	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	10061-02-6	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	79-01-6	-	-	-	-	-	-	-	-	-	-	-	-
vinyl Acetate	108-05-4	-	-	-	-	-	-	-	-	-	-	-	-
vinyl Chloride	75-01-4	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

[1] These compounds may be related to either MGP sources or non-MGP sources, or both. MGP sources include MGP tars and petroleum feedstocks used in MGP processes, such as the carburetted water gas process. Non-MGP sources include cleaning products, floor wax and polish, vehicle exhaust, construction materials, and cigarette smoke.

[2] These compounds are not related to MGP sources and are present due to non-MGP sources, such as vehicle exhaust, heating and air conditioning systems, cleaning agents, art supplies, paints, etc.

[3] The positive methylene chloride results were qualified "U," as undetected because of laboratory contamination.

[4] The analyte concentration in the headspace saturated the detector. The result was qualified " "J,ȧs an estimate.

[5] One or more surrogate recovenes exceeded the uppr QC limits. The result was qualified "J," as an estimate and may be biased high.

[6] The analyte concentration exceeded the calibration range. The result was qualified "J," as an estimate.

[7] Sample B-108 (36-40) was analyzed at a reduced aliquot because of the high number of compounds that saturated the detector in the full volume aliquot "high" analysis.

[8] From a representative sample of impacted material from pipes associated with the former southern relief holder at the White Plains former MGP site.

- Not detected

J - Estimated Concentration.

Table 5-4
Summary Table of Ambient and Indoor Air Results
St. John's School
Post-Investigation Sampling Event - April 24, 2004

Compound	CAS number	Sample Number, Location, and Results in ug/m³															Background Indoor Air Values[3]	
Type of Sample		Ambient Air	Ambient Air	Ambient Air	Ambient Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air-FD	Indoor Air	Indoor Air	DOH 75th ug/m³	DOH 90th ug/m³
Sample Location		Outdoor Southwest	Outdoor Northeast	Outdoor Southwest	Outdoor Northeast	Center of Gymnasium	1st Floor of School, Men's Restroom	1st Floor of School, Classroom No. 3	1st Floor of School, Classroom No. 2	1st Floor of School, Classroom No. 1	Basement of School, Entry	Basement of School, Kitchen	Basement of School, Cafeteria	Field Duplicate Basement of School, Cafeteria	Basement of School, Boiler Room	Basement of School, Play Room		
Sampling Date		4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004		
Sample ID		STJ2-Amb-101	STJ2-Amb-102	STJ2-Amb-103	STJ2-Amb-104	STJ2-IA-GI-106	STJ2-IA-S1-101	STJ2-IA-SI-102	STJ2-IA-SI-103	STJ2-IA-SI-104	STJ2-IA-SB-101	STJ2-IA-SB-102	STJ2-IA-SB-103	STJ2-IA-SB-103 Dup	STJ2-IA-SB-104	STJ2-IA-SB-105		
Possibly MGP Related or Other Sources[1]																		
1,2,4-Trimethylbenzene	95-63-6	-	1.0	-	-	0.79	1.5	-	-	-	4.1	-	-	-	-	-	4.4	11
1,3,5-Trimethylbenzene	108-67-8	-	-	-	-	-	-	-	-	-	1.1	-	-	-	-	-	1.7	3.8
2,3-Dimethylpentane	565-59-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	7.9
2-Hexanone	591-78-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
2-Methylpentane	107-83-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
4-Ethyltoluene	622-96-8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
4-Methyl-2-pentanone	108-10-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.98	3
Benzene	71-43-2	1.1	0.76	0.83	-	0.76	0.91	1.0	2.2	0.95	0.78	1.1	0.85	0.77	0.63	-	5.7	15
Carbon Disulfide	75-15-0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Cyclohexane	110-82-7	-	-	-	-	-	-	-	-	-	3.3	-	-	-	-	13	2.9	9.1
Ethylbenzene	100-41-4	-	-	-	-	-	-	-	-	-	1.1	-	-	-	-	2.1	2.8	7.3
Heptane	142-82-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.7	19
Hexane	110-54-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5	19
2,2,4-Trimethylpentane	540-84-1	-	-	-	-	-	-	-	-	-	3.5	-	-	-	-	-	2.6	7.3
Indan	496-11-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Indene	95-13-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Isopentane	78-784	-	-	-	-	-	4.2	-	-	4.2	44	10	11	9.7	2.4	170	NA	NA
Naphthalene	91-20-3	-	-	-	-	-	-	-	-	-	4.6 J	-	-	-	-	-	NA	NA
Styrene	100-42-5	-	-	-	-	-	-	-	0.83	0.78	0.99	-	-	-	-	3.9	0.68	1.3
Thiophene	110-02-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Toluene	108-88-3	2.6	2.2	1.4	0.64	2.7	3.9	1.8	3.0	2.3	13	2.1	2.2	2.0	1.3	18	25	59
m/p-Xylenes	136777-61-2	1.2	1.7	0.74	-	1.6	1.8	0.67	0.98	0.98	3.4	1.1	0.85	0.86	0.63	3.5	4.7	12
o-Xylene	95-47-6	-	-	-	-	0.64	0.67	-	-	-	1.4	-	-	-	-	-	3.1	7.9
Not MGP Related[2]																		
1,1,1-Trichloroethane	71-55-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	3.5
1,1,2,2-Tetrachloroethane	79-34-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.23
1,1,2-Trichloroethane	79-00-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.24
1,1-Dichloroethane	75-34-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.19	0.23
1,1-Dichloroethene	75-35-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.19	0.23
1,2,4-Trichlorobenzene	120-82-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.24	3
1,2-Dibromoethane (EDB)	106-93-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.19	0.23
1,2-Dichlorobenzene	95-50-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.24	0.78
1,2-Dichloroethane	107-06-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.19	0.22
1,2-Dichloropropane	78-87-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.24
1,3-Butadiene	106-99-0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
1,3-Dichlorobenzene	541-73-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.24	0.66
1,4-Dichlorobenzene	106-46-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.54	1.3
1,4-Dioxane	123-91-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
2-Butanone (MEK)	78-93-3	-	-	-	-	-	-	-	-	-	2.1	-	-	-	-	-	7.5	14
Acetone	67-64-1	5.4	11	4.3	4.4	6.4	16	8.9	18	12	15	8.4	7.0	12	5.5	40	46	110
Benzyl Chloride	100-44-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Bromodichloromethane	75-27-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Bromoform	75-25-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Bromomethane	74-83-9	-	-	-	-	-	-	-	-	-	0.56	-	-	11	-	-	0.24	0.58
Carbon Tetrachloride	56-23-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.68	0.87
Chlorobenzene	108-90-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.19	0.23
Chloroethane	75-00-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.25
Chloroform	67-66-3	-	-	-	-	-	2.2	-	-	-	3.8	0.79	-	3.0	-	-	0.54	1.4
Chloromethane	74-87-3	0.94	0.92	0.91	0.89	0.87	0.94	1.1	1.3	0.91	1.2	0.94	0.86	7.9	0.99	1.1	2	3.3
cis-1,2-Dichloroethene	156-59-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.24
cis-1,3-Dichloropropene	10061-01-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.24
Dibromochloromethane	124-48-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Ethanol	64-17-5	3.0	3.3	1.9	-	4.2	19	10	21	38	27	18	25	17	3.6	270 J	610	1600
Trichlorofluoromethane (Freon 11)	75-69-4	1.5	1.6	1.6	1.6	1.6	1.6	1.8	1.7	1.7	1.6	1.7	1.6	1.3	1.6	-	5.5	17
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	1.8
1,2-Dichlorotetrafluoroethane	76-14-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.21	0.63
Dichlorodifluoromethane (Freon 12)	75-71-8	2.8	3.1	2.9	2.7	2.9	3.0	3.3	3.1	2.9	3.0	2.9	2.9	2.4	2.8	3.2	5.6	15
Hexachlorobutadiene (C-46)	87-68-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.25	4.8
Methyl tert-Butyl Ether	1634-04-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.7	27
Methylene Chloride (Dichloromethane)	75-09-2	-	-	-	-	-	0.54	-	1.6	0.52	2.2	-	-	0.87	-	-	6.3	22
2-Propanol	67-63-0	-	-	-	-	-	3.5	3.3	3.6	2.6	2.1	2.1	-	8.3	-	8.9	NA	NA
Propene	115-07-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Tetrachloroethene	127-18-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	2.9
Tetrahydrofuran	109-99-9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.32	3.3
trans-1,2-Dichloroethene	156-60-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
trans-1,3-Dichloropropene	10061-02-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.18	0.22
Trichloroethene	79-01-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.23	0.48
Vinyl Acetate	108-05-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA
Vinyl Chloride	75-01-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.23

Notes:
[1] These compounds may be related to either MGP sources or non-MGP sources, or both. MGP sources include MGP tars and petroleum feedstocks used in MGP processes, such as the carburetted water gas process. Non-MGP sources include cleaning products, floor wax and polish, vehicle exhaust, construction materials, and cigarette smoke.
[2] These compounds are not related to MGP sources and are present due to non-MGP sources, such as vehicle exhaust, heating and air conditioning systems, cleaning agents, art supplies, paints, etc.
[3] Background Indoor/Outdoor Air Levels of Volatile Organic Compounds in Homes Heated with Fuel Oil, Sampled by the New York State Department of Health, 1997-2003, New York State Department of Health, Bureau of Toxic Substance Assessment, Nov. 16, 2004 (NYSDOH, 2004).
NA - Not Available. No data available for background concentrations of these compounds.
- Not Detected.
J - Estimated Concentration.

Lab Rev 1

RETEC

Table 5-5
Summary of Analytical Results for VOCs in Subsurface Soil
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Location ID	B-101	B-101	B-101	B-102	B-102	B-102	B-103	B-103	B-103	B-104	B-104	B-107	B-107	B-108	B-108	NYSDEC Recommended Soil Cleanup Objective
Sample ID	B101(16-20)-041304	B101(36-40)-041304	B101(60-64)-041304	B102(16-20)-041604	B102(16-20)-041604DUP	B102(36-40)-041604	B103(16-20)-041404	B103(40-40.5)-041404	B103(55.5-56)-041404	B104(16-20)-041504	B104(36-40)-041504	B107(40-42)-041604	B107(44-48)-041604	B108(40-43)-041704	B108(50-52)-041704	
Sample Date	4/13/2004	4/13/2004	4/13/2004	4/16/2004	4/16/2004	4/16/2004	4/14/2004	4/14/2004	4/15/2004	4/15/2004	4/15/2004	4/16/2004	4/16/2004	4/17/2004	4/17/2004	
Depth Interval (feet)	16 - 20	36 - 40	60 - 64	16 - 20	16 - 20	36 -40	16 - 20	40 - 40.5	55.5 - 56	16 - 20	36 - 40	40 - 42	44 -48	40 - 43	50 - 52	
BTEX (mg/Kg)																
Benzene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	0.06
Ethylbenzene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	**1.9 D**	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	**23**	< 0.006 U	**32**	**0.0022 J**	6
Toluene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	**0.036 J**	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	**28**	< 0.006 U	**56**	**0.012**	2
Xylenes (total)	< 0.017 U	< 0.018 U	< 0.018 U	< 0.016 U	< 0.016 U	**22 D**	< 0.016 U	**2**	< 0.018 U	< 0.017 U	< 0.018 U	**400**	< 0.018 U	**390 D**	**0.042**	1
Total BTEX	0	0	0	0	0	**23.9**	0	2	0	0	0	**451**	0	**478**	**0.0562**	NL
Other VOCs (mg/Kg)																
1,1,1-Trichloroethane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	0.8
1,1,2,2-Tetrachloroethane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	0.6
1,1,2-Trichloro-1,2,2-trifluoroethane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
1,1,2-Trichloroethane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	0.1
1,1-Dichloroethane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
1,1-Dichloroethene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	0.4
1,2,4-Trichlorobenzene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	**0.075 J**	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	**4.7 J**	< 0.006 U	**3**	< 0.0061 U	NL
1,2-Dibromo-3-chloropropane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 UJ	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
1,2-Dibromoethane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
1,2-Dichlorobenzene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
1,2-Dichloroethane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
1,2-Dichloropropane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	0.3
1,3-Dichlorobenzene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
1,4-Dichlorobenzene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
2-Butanone	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 UJ	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	0.3
2-Hexanone	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 UJ	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
4-Methyl-2-pentanone	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	1
Acetone	< 0.022 U	< 0.024 U	< 0.024 U	< 0.021 U	< 0.021 U	< 1.2 U	< 0.021 U	< 1.3 U	< 0.024 U	< 0.022 U	< 0.024 U	< 24 U	< 0.024 U	< 12 U	< 0.025 U	0.2
Bromodichloromethane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
Bromoform	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
Bromomethane	< 0.0056 UJ	< 0.006 UJ	< 0.0059 R	< 0.0052 R	< 0.0053 R	< 0.3 UJ	< 0.0053 UJ	< 0.31 U	< 0.0059 UJ	< 0.0055 R	< 0.006 R	< 6 UJ	< 0.006 R	< 2.9 UJ	< 0.0061 R	NL
Carbon disulfide	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	3
Carbon tetrachloride	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	0.6
Chlorobenzene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	2
Chloroethane	< 0.0056 UJ	< 0.006 UJ	< 0.0059 R	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 UJ	< 0.31 U	< 0.0059 U	< 0.0055 R	< 0.006 R	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 R	2
Chloroform	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	0.3
Chloromethane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
cis-1,2-Dichloroethene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
cis-1,3-Dichloropropene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
Cyclohexane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	**0.29 J**	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	**8.5**	< 0.006 U	**3.8**	< 0.0061 U	NL
Dibromochloromethane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
Dichlorodifluoromethane	< 0.0056 UJ	< 0.006 UJ	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 UJ	< 0.31 U	< 0.0059 UJ	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
Isopropylbenzene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	**6.3**	< 0.006 U	**2.7 J**	< 0.0061 U	NL
Methyl acetate	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 UJ	< 0.0053 UJ	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 UJ	< 2.9 U	< 0.0061 U	NL
Methyl tert-butyl ether	< 0.0056 UJ	< 0.006 UJ	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 UJ	< 0.31 U	< 0.0059 UJ	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
Methylcyclohexane	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	**1.5**	< 0.0053 U	**0.044 J**	< 0.0059 U	< 0.0055 U	< 0.006 U	**31**	< 0.006 U	**14 J**	< 0.0061 U	NL
Methylene chloride	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	0.1
Styrene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	**7.9 D**	< 0.0053 U	**0.68**	< 0.0059 U	< 0.0055 U	< 0.006 U	**210**	< 0.006 U	**260**	**0.028**	NL
Tetrachloroethene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	1
trans-1,2-Dichloroethene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
trans-1,3-Dichloropropene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
Trichloroethene	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	NL
Trichlorofluoromethane	< 0.0056 U	< 0.006 U	< 0.0059 UJ	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 UJ	< 0.006 UJ	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 UJ	NL
Vinyl chloride	< 0.0056 U	< 0.006 U	< 0.0059 U	< 0.0052 U	< 0.0053 U	< 0.3 U	< 0.0053 U	< 0.31 U	< 0.0059 U	< 0.0055 U	< 0.006 U	< 6 U	< 0.006 U	< 2.9 U	< 0.0061 U	0.2
Total VOCs	0	0	0	0	0	**33.7**	0	2.72	0	0	0	**712**	0	**762**	**0.0842**	10

Notes:

U indicates Undetected
J indicates Estimated Concentration
R indicates Rejected Concentration - See DUSR
NL indicates the compound is not listed
MDL is Method Detection Limit

Bolded values are detected compounds
Bolded and Shaded values are detected compounds above the NYSDEC Recommended Soil Cleanup Objective
mg/Kg - milligrams per kilogram
VOCs - volatile organic compounds
Dup - field duplicate

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Table 5-5
Summary of Analytical Results for VOCs in Subsurface Soil
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Location ID Sample ID Sample Date Depth Interval (feet)	B-109 B109(50-51.5)-071504 7/15/2004 50 - 51.5	B-109 B109(59-60)-071504 7/15/2004 59 - 60	B-110 B110(52)-071304 7/13/2004 52	B-110 B110(60-64)071304 7/13/2004 60 - 64	B-110 B110(84-88)-071404 7/14/2004 84 - 88	B-111 B111(51-52)-071404 7/14/2004 51 - 52	B-111 B111(56-60)-071404 7/14/2004 56 - 60	B-112 B112(51-52)-071504 7/15/2004 51 - 52	B-112 B112(56-60)-071504 7/15/2004 56 - 60	B-113 B113(52.5-53.5)-071604 7/16/2004 52.5 - 53.5	B-113 B113(56-60)-071604 7/16/2004 56 - 60	B-113 DUP01-071604 7/16/2004 56 - 60	B-114 B114(52-53)-071604 7/16/2004 52 - 53	B-114 B114(58-60)-071604 7/16/2004 58 - 60	B-115 B115(54-56)-071904 7/19/2004 54 -56	NYSDEC Recommended Soil Cleanup Objective
BTEX (mg/Kg)																
Benzene	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	0.06
Ethylbenzene	**16**	< 0.0062 U	**0.99**	< 0.0064 U	< 0.0055 U	**1.7**	< 0.0062 U	< 0.0059 U	< 0.0062 U	**2.5**	< 0.006 U	< 0.0061 U	**0.52**	< 0.0061 U	< 0.0061 U	6
Toluene	**17**	**0.005 J**	**0.96**	< 0.0064 U	< 0.0055 U	**0.079 J**	**0.00081 J**	**0.0035 J**	**0.0028 J**	**2.5**	< 0.006 U	< 0.0061 U	**0.87**	**0.0088**	< 0.0061 U	2
Xylenes (total)	**180 J**	< 0.019 U	**9.5 J**	< 0.019 U	< 0.017 U	**9.3 J**	< 0.018 U	< 0.018 U	< 0.019 U	**27 J**	< 0.018 U	< 0.018 U	**7.4 J**	< 0.018 U	< 0.018 U	1
Total BTEX	**213**	**0.005**	**11.45**	0	0	**11.079**	**0.00081**	**0.0035**	**0.0028**	**32**	**0**	**0**	**8.79**	**0.0088**	**0**	NL
Other VOCs (mg/Kg)																
1,1,1-Trichloroethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	0.8
1,1,2,2-Tetrachloroethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	0.6
1,1,2-Trichloro-1,2,2-trifluoroethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
1,1,2-Trichloroethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	0.1
1,1-Dichloroethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
1,1-Dichloroethene	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	0.4
1,2,4-Trichlorobenzene	< 5.6 UJ	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 UJ	< 0.006 U	< 0.0061 U	< 0.31 UJ	< 0.0061 U	< 0.0061 UJ	NL
1,2-Dibromo-3-chloropropane	< 5.6 UJ	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 UJ	< 0.006 U	< 0.0061 U	< 0.31 UJ	< 0.0061 U	< 0.0061 UJ	NL
1,2-Dibromoethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
1,2-Dichlorobenzene	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
1,2-Dichloroethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
1,2-Dichloropropane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	0.3
1,3-Dichlorobenzene	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
1,4-Dichlorobenzene	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
2-Butanone	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 UJ	< 0.0055 UJ	**0.53**	< 0.0062 UJ	< 0.0059 UJ	< 0.0062 UJ	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 UJ	< 0.0061 U	0.3
2-Hexanone	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
4-Methyl-2-pentanone	< 5.6 U	< 0.0062 UJ	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 UJ	< 0.0061 UJ	< 0.31 U	< 0.0061 U	< 0.0061 U	1
Acetone	< 22 U	< 0.025 U	< 1.2 U	< 0.026 UJ	< 0.022 UJ	< 1.2 U	< 0.025 UJ	< 0.024 UJ	< 0.025 UJ	< 2.4 U	< 0.024 U	< 0.024 U	< 1.2 U	< 0.024 UJ	< 0.025 U	0.2
Bromodichloromethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
Bromoform	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
Bromomethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 UJ	< 0.0055 UJ	< 0.31 U	< 0.0062 UJ	< 0.0059 UJ	< 0.0062 UJ	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 UJ	< 0.0061 U	NL
Carbon disulfide	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	3
Carbon tetrachloride	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	0.6
Chlorobenzene	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	2
Chloroethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 R	< 0.0055 R	< 0.31 U	< 0.0062 R	< 0.0059 R	< 0.0062 R	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 R	< 0.0061 U	2
Chloroform	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	0.3
Chloromethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
cis-1,2-Dichloroethene	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
cis-1,3-Dichloropropene	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
Cyclohexane	**1.3 J**	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	**0.2 J**	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
Dibromochloromethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
Dichlorodifluoromethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
Isopropylbenzene	**7.4**	< 0.0062 U	**0.42**	< 0.0064 U	< 0.0055 U	**0.81**	< 0.0062 U	< 0.0059 U	< 0.0062 U	**0.82**	< 0.006 U	< 0.0061 U	**0.38**	< 0.0061 U	< 0.0061 U	NL
Methyl acetate	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 UJ	< 0.0055 UJ	< 0.31 U	< 0.0062 UJ	< 0.0059 UJ	< 0.0062 UJ	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 UJ	< 0.0061 U	NL
Methyl tert-butyl ether	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 UJ	< 0.0055 UJ	< 0.31 U	< 0.0062 UJ	< 0.0059 UJ	< 0.0062 UJ	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 UJ	< 0.0061 U	NL
Methylcyclohexane	**5.4 J**	< 0.0062 U	**0.35**	< 0.0064 U	< 0.0055 U	**0.24 J**	< 0.0062 U	< 0.0059 U	< 0.0062 U	**0.78**	< 0.006 U	< 0.0061 U	**0.2 J**	< 0.0061 U	< 0.0061 U	NL
Methylene chloride	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	0.01 U	< 0.31 U	< 0.0062 U	**0.059**	**0.033**	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	0.011 U	< 0.0061 U	0.1
Styrene	**120**	**0.0024 J**	**6.2**	< 0.0064 U	< 0.0055 U	**1.5**	< 0.0062 U	< 0.0059 U	< 0.0062 U	**19**	< 0.006 U	< 0.0061 U	**5.1**	**0.011**	< 0.0061 U	NL
Tetrachloroethene	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	1
trans-1,2-Dichloroethene	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
trans-1,3-Dichloropropene	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
Trichloroethene	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
Trichlorofluoromethane	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	NL
Vinyl chloride	< 5.6 U	< 0.0062 U	< 0.3 U	< 0.0064 U	< 0.0055 U	< 0.31 U	< 0.0062 U	< 0.0059 U	< 0.0062 U	< 0.61 U	< 0.006 U	< 0.0061 U	< 0.31 U	< 0.0061 U	< 0.0061 U	0.2
Total VOCs	**347.1**	**0.0074**	**18.42**	**0**	**0**	**14.159**	**0.00081**	**0.0625**	**0.0358**	**52.8**	**0**	**0**	**14.47**	**0.0198**	**0**	10

Notes:

U indicates Undetected
J indicates Estimated Concentration
R indicates Rejected Concentration - See DUSR
NL indicates the compound is not listed
MDL is Method Detection Limit

Bolded values are detected compounds
Bolded and Shaded values are detected compounds above the NYSDEC Recommended Soil Cleanup Objective.
mg/Kg - milligrams per kilogram
VOCs - volatile organic compounds
Dup - field duplicate

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Table 5-5
Summary of Analytical Results for VOCs in Subsurface Soil
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Location ID / Sample ID / Sample Date / Depth Interval (feet)	B-115 B115(62-64)-071904 7/19/2004 62 - 64	B-116 B116(54-56)-071904 7/19/2004 54 - 56	B-117 B117(52-53)-072104 7/21/2004 53 - 53	B-117 B117(56-60)-072104 7/21/2004 56 - 60	B-118 B118(52-56)-072104 7/21/2004 52-56	B-119 B119(58-60)-072204 7/22/2004 56 - 60	B-119 B119(60-64)-072204 7/22/2004 60 - 64	B-120 B120(56-60)-072204 7/22/2004 56 - 60	B-120 B120(60-64)-072204 7/22/2004 60 - 64	NYSDEC Recommended Soil Cleanup Objective
BTEX (mg/Kg)										
Benzene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	0.06
Ethylbenzene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	6
Toluene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	**0.0016 J**	< 0.0058 U	< 0.0062 U	**0.0017 J**	2
Xylenes (total)	< 0.018 U	< 0.019 U	**0.0073 J**	< 0.018 U	< 0.018 U	< 0.018 U	< 0.017 U	< 0.019 U	< 0.018 U	1
Total BTEX	0	0	0.0073	0	0	0.0016	0	0	0.0017	NL
Other VOCs (mg/Kg)										
1,1,1-Trichloroethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	0.8
1,1,2,2-Tetrachloroethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	0.6
1,1,2-Trichloro-1,2,2-trifluoroethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
1,1,2-Trichloroethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	0.1
1,1-Dichloroethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
1,1-Dichloroethene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	0.4
1,2,4-Trichlorobenzene	< 0.006 UJ	< 0.0062 UJ	< 0.0062 UJ	< 0.0061 UJ	< 0.0062 UJ	< 0.0061 UJ	< 0.0058 UJ	< 0.0062 UJ	< 0.0059 UJ	NL
1,2-Dibromo-3-chloropropane	< 0.006 UJ	< 0.0062 UJ	< 0.0062 UJ	< 0.0061 UJ	< 0.0062 UJ	< 0.0061 UJ	< 0.0058 UJ	< 0.0062 UJ	< 0.0059 UJ	NL
1,2-Dibromoethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
1,2-Dichlorobenzene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
1,2-Dichloroethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
1,2-Dichloropropane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	0.3
1,3-Dichlorobenzene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
1,4-Dichlorobenzene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
2-Butanone	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	0.3
2-Hexanone	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
4-Methyl-2-pentanone	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	1
Acetone	< 0.024 U	< 0.025 U	< 0.025 U	< 0.024 U	< 0.025 U	< 0.024 U	< 0.023 U	< 0.025 U	< 0.024 U	0.2
Bromodichloromethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Bromoform	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Bromomethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Carbon disulfide	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	3
Carbon tetrachloride	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	0.6
Chlorobenzene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	2
Chloroethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	2
Chloroform	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	0.3
Chloromethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
cis-1,2-Dichloroethene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
cis-1,3-Dichloropropene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Cyclohexane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Dibromochloromethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Dichlorodifluoromethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Isopropylbenzene	< 0.006 U	< 0.0062 U	**0.016**	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Methyl acetate	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Methyl tert-butyl ether	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Methylcyclohexane	< 0.006 U	< 0.0062 U	**0.0017 J**	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Methylene chloride	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	0.1
Styrene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	**0.0012 J**	< 0.0058 U	< 0.0062 U	**0.0014 J**	NL
Tetrachloroethene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	1
trans-1,2-Dichloroethene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
trans-1,3-Dichloropropene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Trichloroethene	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Trichlorofluoromethane	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	NL
Vinyl chloride	< 0.006 U	< 0.0062 U	< 0.0062 U	< 0.0061 U	< 0.0062 U	< 0.0061 U	< 0.0058 U	< 0.0062 U	< 0.0059 U	0.2
Total VOCs	0	0	0.025	0	0	0.0028	0	0	0.0031	10

Notes:

U indicates Undetected

J indicates Estimated Concentration

R indicates Rejected Concentration - See DUSR

NL indicates the compound is not listed

MDL is Method Detection Limit

Bolded values are detected compounds

Bolded and Shaded values are detected compounds above the NYSDEC Recommended Soil Cleanup Objective.

mg/Kg - milligrams per kilogram

VOCs - volatile organic compounds

Dup - field duplicate

Table 5-6
Summary of Analytical Results for SVOCs in Subsurface Soil
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Location ID / Sample ID / Sample Date / Depth Interval (feet)	B-101 B101(16-20)-041304 4/13/2004 16 - 20	B-101 B101(36-40)-041304 4/13/2004 36 - 40	B-101 B101(60-64)-041304 4/13/2004 60 - 64	B-102 B102(16-20)-041604 4/16/2004 16 - 20	B-102 B102(16-20)-041604DUP 4/16/2004 16 - 20	B-102 B102(36-40)-041604 4/16/2004 36 - 40	B-103 B103(16-20)-041404 4/14/2004 16 - 20	B-103 B103(39-40.5)-041404 4/14/2004 39 - 40.5	B-103 B103(55.5-56)-041404 4/15/2004 55.5 - 56	B-104 B104(16-20)-041504 4/15/2004 16 - 20	B-104 B104(36-40)-041504 4/15/2004 36 - 40	B-107 B107(40-42)-041604 4/16/2004 40 - 42	B-107 B107(44-48)-041604 4/16/2004 44 - 48	B-108 B108(40-43)-041704 4/17/2004 40 - 43	B-108 B108(50-52)-041704 4/17/2004 50 - 52	NYSDEC Recommended Soil Cleanup Objective
PAH Compounds (mg/Kg)																
2-Methylnaphthalene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**280 D**	< 0.35 U	**0.055 J**	< 0.39 U	< 0.36 U	< 0.39 U	**1100 D**	**0.087 J**	**760 D**	**0.16 J**	36.4
Acenaphthene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**18 J**	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	**71**	< 0.39 U	**44**	< 0.4 U	50
Acenaphthylene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**160**	< 0.35 U	**0.3 J**	< 0.39 U	< 0.36 U	< 0.39 U	**780 D**	**0.23 J**	**490 D**	**0.26 J**	41
Anthracene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**70**	< 0.35 U	**0.54 J**	< 0.39 U	< 0.36 U	< 0.39 U	**280**	**0.14 J**	**150**	**0.16 J**	50
Benzo(a)anthracene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**50**	< 0.35 U	**0.51 J**	< 0.39 U	< 0.36 U	< 0.39 U	**200**	**0.068 J**	**120**	**0.13 J**	0.224/MDL
Benzo(a)pyrene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**42**	< 0.35 U	**0.71 J**	< 0.39 U	< 0.36 U	< 0.39 U	**170**	**0.056 J**	**100**	**0.11 J**	0.061/MDL
Benzo(b)fluoranthene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**32**	< 0.35 U	**2**	< 0.39 U	< 0.36 U	< 0.39 U	**130**	**0.043 J**	**81**	**0.086 J**	1.1
Benzo(ghi)perylene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**20**	< 0.35 U	**1.2**	< 0.39 U	< 0.36 U	< 0.39 U	**85 J**	< 0.39 U	**65**	< 0.4 U	50
Benzo(k)fluoranthene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**12 J**	< 0.35 U	**0.45 J**	< 0.39 U	< 0.36 U	< 0.39 U	**51 J**	< 0.39 U	**30**	< 0.4 U	1.1
Chrysene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**44**	< 0.35 U	**0.88**	< 0.39 U	< 0.36 U	< 0.39 U	**180**	**0.059 J**	**110**	**0.11 J**	0.4
Dibenz(a,h)anthracene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**4.1 J**	< 0.35 U	**0.28 J**	< 0.39 U	< 0.36 U	< 0.39 U	**17 J**	< 0.39 U	**11 J**	< 0.4 U	0.014/MDL
Fluoranthene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**97**	< 0.35 U	**0.77**	< 0.39 U	< 0.36 U	< 0.39 U	**390**	**0.16 J**	**250 DJ**	**0.25 J**	50
Fluorene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**90**	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	**350**	**0.072 J**	**230 DJ**	**0.14 J**	50
Indeno(1,2,3-cd)pyrene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**16 J**	< 0.35 U	**1**	< 0.39 U	< 0.36 U	< 0.39 U	**66 J**	< 0.39 U	**44**	< 0.4 U	3.2
Naphthalene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**760 D**	< 0.35 U	**0.15 J**	**0.05 J**	< 0.36 U	< 0.39 U	**2900 D**	**0.21 J**	**2400 D**	**0.34 J**	13
Phenanthrene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**280 D**	< 0.35 U	**0.37 J**	**0.06 J**	< 0.36 U	< 0.39 U	**1100 D**	**0.6**	**720 D**	**0.62**	50
Pyrene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**120**	< 0.35 U	**0.91**	< 0.39 U	< 0.36 U	< 0.39 U	**510**	**0.22 J**	**370 DJ**	**0.35 J**	50
Total cPAHs	0	0	0	0	0	**#VALUE!**	0	**4.295**	0	0	0	**7546**	**1.719**	**5469**	**2.39**	NL
Total PAH	0	0	0	0	0	**2095**	0	**10.105**	**0.11**	0	0	**8360**	**1.945**	**5965**	**2.716**	NL
Other SVOCs (mg/Kg)																
1,1'-Biphenyl	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**44**	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	**170**	**0.055 J**	**100**	**0.039 J**	NL
2,2'-oxybis(1-Chloropropane)	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
2,4,5-Trichlorophenol	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
2,4,6-Trichlorophenol	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	0.4
2,4-Dichlorophenol	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
2,4-Dimethylphenol	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
2,4-Dinitrophenol	< 1.8 U	< 1.9 U	< 1.9 U	< 1.7 U	< 1.7 U	< 95 U	< 1.7 U	< 3.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 380 U	< 1.9 U	< 94 U	< 2 U	0.2/MDL
2,4-Dinitrotoluene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
2,6-Dinitrotoluene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	1
2-Chloronaphthalene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
2-Chlorophenol	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	0.8
2-Methylphenol	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	0.1/MDL
2-Nitroaniline	< 1.8 U	< 1.9 U	< 1.9 U	< 1.7 U	< 1.7 U	< 95 U	< 1.7 U	< 3.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 380 U	< 1.9 U	< 94 U	< 2 U	0.43/MDL
2-Nitrophenol	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	0.3/MDL
3,3'-Dichlorobenzidine	< 1.8 U	< 1.9 U	< 1.9 U	< 1.7 U	< 1.7 U	< 95 U	< 1.7 U	< 3.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 380 U	< 1.9 U	< 94 U	< 2 U	NL
3-Nitroaniline	< 1.8 U	< 1.9 U	< 1.9 U	< 1.7 U	< 1.7 U	< 95 U	< 1.7 U	< 3.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 380 U	< 1.9 U	< 94 U	< 2 U	0.5/MDL
4,6-Dinitro-2-methylphenol	< 1.8 U	< 1.9 U	< 1.9 U	< 1.7 U	< 1.7 U	< 95 U	< 1.7 U	< 3.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 380 U	< 1.9 U	< 94 U	< 2 U	NL
4-Bromophenyl phenyl ether	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
4-Chloro-3-methylphenol	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	0.24/MDL
4-Chloroaniline	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	0.22/MDL
4-Chlorophenyl phenyl ether	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
4-Methylphenol	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	900
4-Nitroaniline	< 1.8 U	< 1.9 U	< 1.9 U	< 1.7 U	< 1.7 U	< 95 U	< 1.7 U	< 3.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 380 U	< 1.9 U	< 94 U	< 2 U	NL
4-Nitrophenol	< 1.8 U	< 1.9 U	< 1.9 U	< 1.7 U	< 1.7 U	< 95 U	< 1.7 U	< 3.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 380 U	< 1.9 U	< 94 U	< 2 U	0.1/MDL
Acetophenone	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
Atrazine	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
Benzaldehyde	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
bis(2-Chloroethoxy)methane	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
bis(2-Chloroethyl) ether	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
bis(2-Ethylhexyl) phthalate	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	50
Butyl benzyl phthalate	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	50
Caprolactam	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
Carbazole	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	**0.22 J**	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
Dibenzofuran	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	**4.1 J**	< 0.35 U	**0.085 J**	< 0.39 U	< 0.36 U	< 0.39 U	**15 J**	< 0.39 U	**9.8 J**	< 0.4 U	8.1
Diethyl phthalate	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	50
Dimethyl phthalate	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	6.2
Di-n-butyl phthalate	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	7.1
Di-n-octyl phthalate	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	2
Hexachlorobenzene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	0.41
Hexachlorobutadiene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
Hexachlorocyclopentadiene	< 1.8 U	< 1.9 U	< 1.9 U	< 1.7 U	< 1.7 U	< 95 U	< 1.7 U	< 3.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 380 U	< 1.9 U	< 94 U	< 2 U	NL
Hexachloroethane	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
Isophorone	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	4.4
Nitrobenzene	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
N-Nitrosodi-n-propylamine	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	NL
N-Nitrosodiphenylamine	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	0.2/MDL
Pentachlorophenol	< 1.8 U	< 1.9 U	< 1.9 U	< 1.7 U	< 1.7 U	< 95 U	< 1.7 U	< 3.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 380 U	< 1.9 U	< 94 U	< 2 U	1
Phenol	< 0.37 U	< 0.4 U	< 0.39 U	< 0.34 U	< 0.35 U	< 20 U	< 0.35 U	< 0.77 U	< 0.39 U	< 0.36 U	< 0.39 U	< 79 U	< 0.39 U	< 19 U	< 0.4 U	0.03/MDL
Total SVOCs	0	0	0	0	0	**#VALUE!**	0	**4.6**	**0**	0	0	**7731**	**2**	**6579**	**2.43**	< 500

Notes:
U indicates Undetected
J indicates Estimated Concentration
NL indicates the compound is not listed
MDL is Method Detection Limit
Bolded values are detected compounds
Bolded and Shaded values are detected compounds above the NYSDEC Recommended Soil Cleanup Objective.

PAHs - polynuclear aromatic hydrocarbons
cPAHs - carcinogenic polynuclear aromatic hydrocarbons
Carcinogenic PAHs are in italics
SVOCs - semivolatile organic compounds
µg/Kg - micrograms per kilogram
Dup - field duplicate

Table 5-6
Summary of Analytical Results for SVOCs in Subsurface Soil
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Location ID	B-109	B-109	B-110	B-110	B-110	B-111	B-111	B-112	B-112	B-113	B-113	B-113	B-114	B-114	B-115	B-115	B-116	B-117	NYSDEC
Sample ID	B109(50-51.5)-071504	B109(59-60)-071504	B110(52)-071304	B110(60-64)071304	B110(84-88)-071404	B111(51-52)-071404	B111(56-60)-071404	B112(51-52)-071504	B112(56-60)-071504	B113(52.5-53.5)-071604	B113(56-60)-071604	DUP01-071604	B114(52-53)-071604	B114(58-60)-071604	B115(54-56)-071904	B115(62-64)-071904	B116(54-56)-071904	B117(52-53)-072104	Recommended
Sample Date	7/15/2004	7/15/2004	7/13/2004	7/13/2004	7/14/2004	7/14/2004	7/14/2004	7/15/2004	7/15/2004	7/16/2004	7/16/2004	7/16/2004	7/16/2004	7/16/2004	7/19/2004	7/19/2004	7/19/2004	7/21/2004	Soil Cleanup
Depth Interval (feet)	50 - 51.5	59 - 60	52	60 - 64	84 - 88	51 - 52	56 - 60	51 - 52	56 - 60	52.5 - 53.5	56 - 60	56 - 60	52 - 53	58 - 60	54 - 56	62 - 64	54 - 56	52 - 53	Objective
PAH Compounds (mg/Kg)																			
2-Methylnaphthalene	**940**	**0.05 J**	**87**	< 0.42 U	< 0.37 U	**93**	< 0.41 U	< 0.39 U	< 0.41 U	**140**	**0.034 J**	**0.055 J**	**180**	**0.023 J**	**0.016 J**	**0.019 J**	< 0.41 U	**3**	36.4
Acenaphthene	**59 J**	< 0.41 U	**5.7 J**	< 0.42 U	< 0.37 U	**7.8 J**	< 0.41 U	< 0.39 U	< 0.41 U	**12 J**	**0.013 J**	**0.011 J**	**12 J**	**0.014 J**	< 0.41 U	< 0.39 U	< 0.41 U	**1.1**	50
Acenaphthylene	**670**	**0.01 J**	**54**	< 0.42 U	< 0.37 U	**76**	< 0.41 U	< 0.39 U	< 0.41 U	**120**	**0.016 J**	**0.041 J**	**140**	**0.016 J**	**0.011 J**	**0.015 J**	< 0.41 U	**3.2**	41
Anthracene	**270**	< 0.41 U	**28**	< 0.42 U	< 0.37 U	**36**	< 0.41 U	< 0.39 U	< 0.41 U	**58**	< 0.39 U	**0.033 J**	**57**	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	**5.2 D**	50
Benzo(a)anthracene	**180 J**	< 0.41 U	**20**	< 0.42 U	< 0.37 U	**25**	< 0.41 U	< 0.39 U	< 0.41 U	**40**	< 0.39 U	**0.027 J**	**38 J**	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	**3.9 D**	0.224/MDL
Benzo(a)pyrene	**140 J**	< 0.41 U	**16**	< 0.42 U	< 0.37 U	**20**	< 0.41 U	< 0.39 U	< 0.41 U	**32**	< 0.39 U	**0.02 J**	**31 J**	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	**3.3 D**	0.061/MDL
Benzo(b)fluoranthene	**110 J**	< 0.41 U	**11 J**	< 0.42 U	< 0.37 U	**14 J**	< 0.41 U	< 0.39 U	< 0.41 U	**25**	< 0.39 U	**0.015 J**	**22 J**	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	**1.3 DJ**	1.1
Benzo(ghi)perylene	**82 J**	< 0.41 U	**9.6 J**	< 0.42 U	< 0.37 U	**12 J**	< 0.41 U	< 0.39 U	< 0.41 U	**19 J**	< 0.39 U	**0.01 J**	**18 J**	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	**2**	50
Benzo(k)fluoranthene	**34 J**	< 0.41 U	**4.4 J**	< 0.42 U	< 0.37 U	**5.1 J**	< 0.41 U	< 0.39 U	< 0.41 U	**7.3 J**	< 0.39 U	< 0.4 U	**7.1 J**	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	1.1
Chrysene	**160 J**	< 0.41 U	**17**	< 0.42 U	< 0.37 U	**22**	< 0.41 U	< 0.39 U	< 0.41 U	**34**	< 0.39 U	**0.024 J**	**33 J**	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	**3.6 D**	0.4
Dibenz(a,h)anthracene	**6.3 J**	< 0.41 U	**0.83 J**	< 0.42 U	< 0.37 U	**0.88 J**	< 0.41 U	< 0.39 U	< 0.41 U	**1.4 J**	< 0.39 U	< 0.4 U	**1.3 J**	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	**0.47**	0.014/MDL
Fluoranthene	**370**	< 0.41 U	**39**	< 0.42 U	< 0.37 U	**50**	< 0.41 U	< 0.39 U	< 0.41 U	**79**	**0.0098 J**	**0.048 J**	**78**	< 0.4 U	**0.0087 J**	< 0.39 U	< 0.41 U	**8 D**	50
Fluorene	**340**	< 0.41 U	**33**	< 0.42 U	< 0.37 U	**43**	< 0.41 U	< 0.39 U	< 0.41 U	**70**	**0.014 J**	**0.035 J**	**71**	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	**2.9**	50
Indeno(1,2,3-cd)pyrene	**54 J**	< 0.41 U	**6.1 J**	< 0.42 U	< 0.37 U	**7.8 J**	< 0.41 U	< 0.39 U	< 0.41 U	**12 J**	< 0.39 U	< 0.4 U	**11 J**	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	**1.4**	3.2
Naphthalene	**2800 D**	**0.27 J**	**140 D**	< 0.42 U	< 0.37 U	**200 D**	< 0.41 U	< 0.39 U	**0.024 J**	**300 D**	**0.091 J**	**0.073 J**	**490 D**	**0.12 J**	**0.066 J**	**0.039 J**	**0.013 J**	**2.9**	13
Phenanthrene	**950**	**0.039 J**	**89**	< 0.42 U	< 0.37 U	**120**	< 0.41 U	< 0.39 U	< 0.41 U	**180**	**0.05 J**	**0.16 J**	**200**	**0.06 J**	**0.029 J**	< 0.39 U	< 0.41 U	**16 D**	50
Pyrene	**520**	**0.011 J**	**54**	< 0.42 U	< 0.37 U	**70**	< 0.41 U	< 0.39 U	< 0.41 U	**110**	**0.017 J**	**0.084 J**	**110**	< 0.4 U	**0.021 J**	< 0.39 U	< 0.41 U	**13 D**	50
Total cPAHs	684.3	0	75.13	0	0	94.78	0	0	0	151.7	0	0.086	143.4	0	0	0	0	13.97	NL
Total PAH	7685.3	0.38	494.43	0	0	673.58	0	0	0.024	1239.7	0.2448	0.636	1499.4	0.233	0.1517	0.073	0.013	54.77	NL
Other SVOCs (mg/Kg)																			
1,1'-Biphenyl	**160 J**	< 0.41 U	**14**	< 0.42 U	< 0.37 U	**19**	< 0.41 U	< 0.39 U	< 0.41 U	**30**	< 0.39 U	< 0.4 U	**32 J**	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	**1**	NL
2,2'-oxybis(1-Chloropropane)	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
2,4,5-Trichlorophenol	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
2,4,6-Trichlorophenol	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	0.4
2,4-Dichlorophenol	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
2,4-Dimethylphenol	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
2,4-Dinitrophenol	< 900 U	< 2 U	< 58 U	< 2 U	< 1.8 U	< 80 U	< 2 U	< 1.9 U	< 2 U	< 120 U	< 1.9 U	< 1.9 U	< 200 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 2 U	0.2/MDL
2,4-Dinitrotoluene	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
2,6-Dinitrotoluene	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	1
2-Chloronaphthalene	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
2-Chlorophenol	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	0.8
2-Methylphenol	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	0.1/MDL
2-Nitroaniline	< 900 U	< 2 U	< 58 U	< 2 U	< 1.8 U	< 80 U	< 2 U	< 1.9 U	< 2 U	< 120 U	< 1.9 U	< 1.9 U	< 200 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 2 U	0.43/MDL
2-Nitrophenol	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	0.3/MDL
3,3'-Dichlorobenzidine	< 900 U	< 2 U	< 58 U	< 2 U	< 1.8 U	< 80 U	< 2 U	< 1.9 U	< 2 U	< 120 U	< 1.9 U	< 1.9 U	< 200 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 2 U	NL
3-Nitroaniline	< 900 U	< 2 U	< 58 U	< 2 U	< 1.8 U	< 80 U	< 2 U	< 1.9 U	< 2 U	< 120 U	< 1.9 U	< 1.9 U	< 200 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 2 U	0.5/MDL
4,6-Dinitro-2-methylphenol	< 900 U	< 2 U	< 58 U	< 2 U	< 1.8 U	< 80 U	< 2 U	< 1.9 U	< 2 U	< 120 U	< 1.9 U	< 1.9 U	< 200 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 2 U	NL
4-Bromophenyl phenyl ether	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
4-Chloro-3-methylphenol	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	0.24/MDL
4-Chloroaniline	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	0.22/MDL
4-Chlorophenyl phenyl ether	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
4-Methylphenol	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	900
4-Nitroaniline	< 900 U	< 2 U	< 58 U	< 2 U	< 1.8 U	< 80 U	< 2 U	< 1.9 U	< 2 U	< 120 U	< 1.9 U	< 1.9 U	< 200 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 2 U	NL
4-Nitrophenol	< 900 U	< 2 U	< 58 U	< 2 U	< 1.8 U	< 80 U	< 2 U	< 1.9 U	< 2 U	< 120 U	< 1.9 U	< 1.9 U	< 200 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 2 U	0.1/MDL
Acetophenone	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
Atrazine	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
Benzaldehyde	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
bis(2-Chloroethoxy)methane	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
bis(2-Chloroethyl) ether	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
bis(2-Ethylhexyl) phthalate	< 190 U	**0.084 J**	< 12 U	< 0.42 U	**0.071 J**	< 16 U	**0.05 J**	**0.033 J**	**0.037 J**	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	**0.1 J**	**0.071 J**	**0.052 J**	**0.063 J**	50
Butyl benzyl phthalate	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	50
Caprolactam	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
Carbazole	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
Dibenzofuran	**19 J**	< 0.41 U	**1.8 J**	< 0.42 U	< 0.37 U	**1.9 J**	< 0.41 U	< 0.39 U	< 0.41 U	**3.7 J**	< 0.39 U	< 0.4 U	**3.1 J**	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	8.1
Diethyl phthalate	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	50
Dimethyl phthalate	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	6.2
Di-n-butyl phthalate	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	7.1
Di-n-octyl phthalate	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	2
Hexachlorobenzene	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	0.41
Hexachlorobutadiene	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
Hexachlorocyclopentadiene	< 900 U	< 2 U	< 58 U	< 2 U	< 1.8 U	< 80 U	< 2 U	< 1.9 U	< 2 U	< 120 U	< 1.9 U	< 1.9 U	< 200 U	< 2 U	< 2 UJ	< 1.9 UJ	< 2 UJ	< 2 UJ	NL
Hexachloroethane	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
Isophorone	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	4.4
Nitrobenzene	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
N-Nitrosodi-n-propylamine	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	NL
N-Nitrosodiphenylamine	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	0.2/MDL
Pentachlorophenol	< 900 U	< 2 U	< 58 U	< 2 U	< 1.8 U	< 80 U	< 2 U	< 1.9 U	< 2 U	< 120 U	< 1.9 U	< 1.9 U	< 200 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 2 U	1
Phenol	< 190 U	< 0.41 U	< 12 U	< 0.42 U	< 0.37 U	< 16 U	< 0.41 U	< 0.39 U	< 0.41 U	< 24 U	< 0.39 U	< 0.4 U	< 41 U	< 0.4 U	< 0.41 U	< 0.39 U	< 0.41 U	< 0.41 U	0.03/MDL
Total SVOCs	7864.3	0.084	510.23	0	0.071	694.48	0.05	0.033	0.061	1273.4	0.2448	0.636	178.5	0	0.1	0.071	0.052	15.033	< 500

Notes:

U indicates Undetected
J indicates Estimated Concentration
NL indicates the compound is not listed
MDL is Method Detection Limit
Bolded values are detected compounds
Bolded and Shaded values are detected compounds above the NYSDEC Recommended Soil Cleanup Obje Dup - field duplicate

PAHs - polynuclear aromatic hydrocarbons
cPAHs - carcinogenic polynuclear aromatic hydrocarbons
Carcinogenic PAHs are in italics
SVOCs - semivolatile organic compounds
µg/Kg - micrograms per kilogram

Table 5-6
Summary of Analytical Results for SVOCs in Subsurface Soil
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Location ID Sample ID Sample Date Depth Interval (feet)	B-117 B117(56-60)-072104 7/21/2004 56 - 60	B-118 B118(52-56)-072104 7/21/2004 52 - 56	B-119 B119(56- 60)-072204 7/22/2004 56 - 60	B-119 B119(60-64)-072204 7/22/2004 60 - 64	B-120 B120(56-60)-072204 7/22/2004 56 - 60	B-120 B120(60-64)-072204 7/22/2004 60 - 64	NYSDEC Recommended Soil Cleanup Objective
PAH Compounds (mg/Kg)							
2-Methylnaphthalene	< 0.4 U	< 0.41 U	**0.022 J**	< 0.38 U	**0.038 J**	**0.027 J**	36.4
Acenaphthene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	50
Acenaphthylene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	**0.017 J**	**0.013 J**	41
Anthracene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	50
Benzo(a)anthracene	**0.0097 J**	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	0.224/MDL
Benzo(a)pyrene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	0.061/MDL
Benzo(b)fluoranthene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	1.1
Benzo(ghi)perylene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	50
Benzo(k)fluoranthene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	1.1
Chrysene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	0.4
Dibenz(a,h)anthracene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	0.014/MDL
Fluoranthene	**0.014 J**	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	50
Fluorene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	**0.0099 J**	< 0.39 U	50
Indeno(1,2,3-cd)pyrene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	3.2
Naphthalene	< 0.4 U	< 0.41 U	**0.11 J**	< 0.38 U	**0.14 J**	**0.12 J**	13
Phenanthrene	**0.027 J**	< 0.41 U	**0.013 J**	< 0.38 U	**0.023 J**	**0.034 J**	50
Pyrene	**0.027 J**	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	50
Total cPAHs	**0.0097**	**0**	**0**	**0**	**0**	**0**	NL
Total PAH	**0.0777**	**0**	**0.145**	**0**	**0.2279**	**0.194**	NL
Other SVOCs (mg/Kg)							
1,1'-Biphenyl	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
2,2'-oxybis(1-Chloropropane)	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
2,4,5-Trichlorophenol	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
2,4,6-Trichlorophenol	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	0.4
2,4-Dichlorophenol	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
2,4-Dimethylphenol	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
2,4-Dinitrophenol	< 1.9 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 1.9 U	0.2/MDL
2,4-Dinitrotoluene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
2,6-Dinitrotoluene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	1
2-Chloronaphthalene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
2-Chlorophenol	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	0.8
2-Methylphenol	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	0.1/MDL
2-Nitroaniline	< 1.9 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 1.9 U	0.43/MDL
2-Nitrophenol	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	0.3/MDL
3,3'-Dichlorobenzidine	< 1.9 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 1.9 U	NL
3-Nitroaniline	< 1.9 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 1.9 U	0.5/MDL
4,6-Dinitro-2-methylphenol	< 1.9 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 1.9 U	NL
4-Bromophenyl phenyl ether	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
4-Chloro-3-methylphenol	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	0.24/MDL
4-Chloroaniline	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	0.22/MDL
4-Chlorophenyl phenyl ether	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
4-Methylphenol	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	900
4-Nitroaniline	< 1.9 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 1.9 U	NL
4-Nitrophenol	< 1.9 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 1.9 U	0.1/MDL
Acetophenone	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
Atrazine	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
Benzaldehyde	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
bis(2-Chloroethoxy)methane	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
bis(2-Chloroethyl) ether	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
bis(2-Ethylhexyl) phthalate	**0.12 J**	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	**0.095 J**	50
Butyl benzyl phthalate	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	50
Caprolactam	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
Carbazole	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
Dibenzofuran	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	8.1
Diethyl phthalate	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	50
Dimethyl phthalate	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	6.2
Di-n-butyl phthalate	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	7.1
Di-n-octyl phthalate	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	2
Hexachlorobenzene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	0.41
Hexachlorobutadiene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
Hexachlorocyclopentadiene	< 1.9 UJ	< 2 UJ	< 2 UJ	< 1.9 UJ	< 2 U	< 1.9 U	NL
Hexachloroethane	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
Isophorone	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	4.4
Nitrobenzene	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
N-Nitrosodi-n-propylamine	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	NL
N-Nitrosodiphenylamine	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	0.2/MDL
Pentachlorophenol	< 1.9 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 1.9 U	1
Phenol	< 0.4 U	< 0.41 U	< 0.4 U	< 0.38 U	< 0.41 U	< 0.39 U	0.03/MDL
Total SVOCs	**0.1297**	**0**	**0**	**0**	**0**	**0.289**	< 500

Notes:
U indicates Undetected
J indicates Estimated Concentration
NL indicates the compound is not listed
MDL is Method Detection Limit
Bolded values are detected compounds
Bolded and Shaded values are detected compounds above the NYSDEC Recommended Soil Cleanup Objective.

PAHs - polynuclear aromatic hydrocarbons
cPAHs - carcinogenic polynuclear aromatic hydrocarbons
Carcinogenic PAHs are in italics
SVOCs - semivolatile organic compounds
µg/Kg - micrograms per kilogram
Dup - field duplicate

Table 5-7
Summary of Analytical Results for Metals and Cyanide in Subsurface Soil
Remedial Investigation - 2004
Saint John's School
White Plains, NY

RETEC

Location ID / Sample ID / Sample Date / Depth Interval (feet)	B-101 B101(16-20)-041304 4/13/2004 16 - 20	B-101 B101(36-40)-041304 4/13/2004 36 - 40	B-101 B101(60-64)-041304 4/13/2004 60 - 64	B-102 B102(16-20)-041604 4/16/2004 16 - 20	B-102 B102(16-20)-041604DUP 4/16/2004 16 - 20	B-102 B102(36-40)-041604 4/16/2004 36 - 40	B-103 B103(16-20)-041404 4/14/2004 16 - 20	B-103 B103(39-40.5)-041404 4/14/2004 39 - 40.5	Eastern USA Background Concentrations
Metals (mg/Kg)									
Aluminum	**6860**	**4030**	**4380**	**5010**	**4590**	**3190**	**6030**	**2800**	33,000
Antimony	< 1.1 UJ	< 1.2 UJ	< 1.2 UJ	< 1.0 UJ	< 1.1 UJ	< 1.2 UJ	< 1.1 UJ	< 1.2 UJ	N/A
Arsenic	< 1.1 U	< 1.2 U	**0.56 J**	**0.39 J**	**0.43 J**	< 1.2 U	< 1.1 U	< 1.2 U	3 - 12
Barium	**68.3**	**35.4**	**47.7**	**43.6**	**38.6**	**22.9 J**	**50.3**	**22.1 J**	15 - 600
Beryllium	**0.58**	**0.52**	< 0.47 U	**0.54**	**0.54**	**0.60**	**0.53**	< 0.47 U	0 - 1.75
Cadmium	< 0.56 U	< 0.60 U	< 0.59 U	< 0.52 U	< 0.53 U	< 0.60 U	< 0.53 U	< 0.59 U	0.1 - 1
Calcium	**1720 J**	**35700 J**	**20600 J**	**20200 J**	**23600 J**	**25600 J**	**19500 J**	**25000 J**	130 - 35,000
Chromium	**10.5**	**7.0**	**9.2**	**8.3 J**	**7.4 J**	**6.4 J**	**10.0**	**5.9**	1.5 - 40**
Cobalt	**7.9**	< 6.0 U	**5.9**	**5.2**	< 5.3 U	< 6.0 U	**6.4**	< 5.9 U	2.5 - 60**
Copper	**17.8 J**	**8.1 J**	**13.0 J**	**10 J**	**10.1 J**	**5.8 J**	**10.5 J**	**6.4 J**	1 - 50
Iron	**11800**	**6890**	**8400**	**7760 J**	**7250 J**	**5010 J**	**9090**	**5170**	2,000 - 550,000
Lead	**2.2**	**1.9**	**1.8**	**2.0**	**1.9**	**1.4**	**2.0**	**1.5**	200 - 500
Magnesium	**4000**	**20600**	**11200**	**13500**	**14000**	**13700**	**13900**	**13500**	100 - 5,000
Manganese	**181**	**128**	**122**	**119 J**	**112 J**	**69.0 J**	**122**	**79.4**	50 - 5,000
Mercury	< 0.037 UJ	< 0.040 UJ	< 0.039 UJ	< 0.034 UJ	< 0.035 UJ	< 0.039 UJ	< 0.035 UJ	< 0.039 UJ	0.001 - 0.2
Nickel	**11.2**	**6.2**	**8.1**	**8.0**	**7.0**	**4.6 J**	**8.8**	**4.5 J**	0.5 - 25
Potassium	**2750**	**1320**	**1990**	**1700**	**1540**	**862**	**2100**	**770**	8,500 - 43,000
Selenium	< 0.56 U	< 0.60 U	< 0.59 U	< 0.52 U	< 0.53 U	< 0.60 U	< 0.53 U	< 0.59 U	0.1 - 3.9
Silver	< 0.56 U	< 0.60 U	< 0.59 U	< 0.52 U	< 0.53 U	< 0.60 U	< 0.53 U	< 0.59 U	N/A
Sodium	< 558 U	< 603 U	< 591 U	< 520 U	< 526 U	< 595 U	< 531 U	< 586 U	6,000 - 8,000
Thallium	< 1.1 U	< 1.2 U	< 1.2 U	< 1 U	< 1.1 U	< 1.2 U	< 1.1 U	< 1.2 U	N/A
Vanadium	**18.0 J**	**10.7 J**	**13.8 J**	**12.6 J**	**11.7 J**	**8.5 J**	**15.3 J**	**7.8 J**	1 - 300
Zinc	**34.0**	**19.9**	**23.8**	**26.9 J**	**22.2 J**	**17.5 J**	**32.0**	**15.9**	9 - 50
Other (mg/Kg)									
Total Cyanide	< 0.56 U	< 0.60 U	< 0.59 U	< 0.52 U	< 0.53 U	**0.27 J**	< 0.53 U	< 0.59 U	NL
Available Cyanide	< 0.045 U	< 0.048 U	< 0.047 U	< 0.042 U	< 0.042 U	< 0.048 U	< 0.042 U	< 0.047 U	NL

Notes:

U indicates Undetected
J indicates Estimated Concentration
NL indicates the compound is not listed
MDL is Method Detection Limit
Bolded values are detected compounds
N/A indicates that the value is not available
** indicates the New York State Background concentration
- indicates not analyzed
Bolded and Shaded values are detected compounds above the Eastern USA Background Concentrations

SB indicates site background
µg/Kg - micrograms per kilogram
mg/Kg - milligrams per kilogram
Dup - field duplicate
J+ indicates Estimated Concentration biased high due to matrix effects and instrument bias.

RETEC

Table 5-7
Summary of Analytical Results for Metals and Cyanide in Subsurface Soil
Remedial Investigation - 2004
Saint John's School
White Plains, NY

Location ID Sample ID Sample Date Depth Interval (feet)	B-103 B103(55.5-56)-041404 4/15/2004 55.5 - 56	B-104 B104(16-20)-041504 4/15/2004 16 - 20	B-104 B104(36-40)-041504 4/15/2004 36 - 40	B-107 B107(40-42)-041604 4/16/2004 40 - 42	B-107 B107(44-48)-041604 4/16/2004 44 - 48	B-108 B108(40-43)-041704 4/17/2004 40 - 43	B-108 B108(50-52)-041704 4/17/2004 50 - 52	Eastern USA Background Concentrations
Metals (mg/Kg)								
Aluminum	**2490**	**3660**	**4600**	**2670**	**7130**	**3180**	**2270**	33,000
Antimony	< 1.2 UJ	< 1.1 UJ	< 1.2 UJ	< 1.2 UJ	< 1.2 UJ	< 1.2 U	< 1.2 U	N/A
Arsenic	**1.9**	< 1.1 U	**0.44 J**	**0.62 J**	**0.56 J**	**0.87 J**	**0.61 J**	3 - 12
Barium	**26.5**	**29.8**	**44.3**	**29.2**	**73.8**	**25.4**	**19.4 J**	15 - 600
Beryllium	< 0.47 U	< 0.44 U	**0.48**	**0.56**	**0.67**	< 0.47 U	< 0.49 U	0 - 1.75
Cadmium	< 0.59 U	< 0.55 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.59 U	< 0.61 U	0.1 - 1
Calcium	**24300 J**	**21200 J**	**22100 J**	**22900 J**	**22000 J**	**23200**	**21600**	130 - 35,000
Chromium	**7.6**	**5.7**	**7.7**	**4.6 J**	**12.3 J**	**6.4**	**4.4**	1.5 - 40**
Cobalt	< 5.9 U	< 5.5 U	< 6.0 U	< 6.0 U	**7.3**	< 5.9 U	**2.3 J**	2.5 - 60**
Copper	**9.7 J**	**7.2 J**	**10.7 J**	**4.9 J**	**12.7 J**	**7.4**	**5.9**	1 - 50
Iron	**6110**	**5780**	**7820**	**4320 J**	**11200 J**	**5750**	**4330**	2,000 - 550,000
Lead	**1.5**	**1.6**	**2.0**	**1.7**	**2.4**	**1.3**	**1.1**	200 - 500
Magnesium	**11900**	**12700**	**12400**	**12300**	**14300**	**13200**	**10900**	100 - 5,000
Manganese	**87.8**	**113**	**105**	**69.8 J**	**136 J**	**138 J+**	**69.2 J+**	50 - 5,000
Mercury	< 0.039 UJ	< 0.036 UJ	< 0.039 UJ	< 0.040 UJ	< 0.039 UJ	< 0.039 UJ	< 0.040 UJ	0.001 - 0.2
Nickel	**6.9**	**6.6**	**7.8**	**4.1 J**	**10.6**	**5.2**	**4.1 J**	0.5 - 25
Potassium	**857**	**1190**	**1800**	**654**	**3160**	**761**	**462 J**	8,500 - 43,000
Selenium	< 0.59 U	< 0.55 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.59 U	< 0.61 U	0.1 - 3.9
Silver	< 0.59 U	< 0.55 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.59 U	< 0.61 U	N/A
Sodium	< 588 U	< 553 U	< 597 U	< 601 U	< 598 U	**209 J**	**283 J**	6,000 - 8,000
Thallium	< 1.2 U	< 1.1 U	< 1.2 U	< 1.2 U	< 1.2 U	< 1.2 U	< 1.2 U	N/A
Vanadium	**8.6 J**	**9.1 J**	**12.5 J**	**7.0 J**	**18.7 J**	**8.4**	**6.4**	1 - 300
Zinc	**12.5**	**17.5**	**26.9**	**17.0 J**	**35.4 J**	**20.1**	**8.9**	9 - 50
Other (mg/Kg)								
Total Cyanide	< 0.59 U	< 0.55 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.59 UJ	< 0.61 UJ	NL
Available Cyanide	< 0.047 U	< 0.044 U	< 0.048 U	< 0.048 U	< 0.048 U	< 0.047 UJ	< 0.049 UJ	NL

Notes:

U indicates Undetected
J indicates Estimated Concentration
NL indicates the compound is not listed
MDL is Method Detection Limit
Bolded values are detected compounds
N/A indicates that the value is not available
** indicates the New York State Background concentration
- indicates not analyzed
Bolded and Shaded values are detected compounds above the Eastern USA Background Concentrations

SB indicates site background
µg/Kg - micrograms per kilogram
mg/Kg - milligrams per kilogram
Dup - field duplicate
J+ indicates Estimated Concentration biased high due to matrix effects and instrument bias.

Table 5-8
Summary of Soil Boring Sampling Program Results
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Boring ID	Completion Date	Total Depth (feet bgs)	Logged Interval (feet bgs)	Sample Depth (feet bgs)	Impact Zone (feet bgs)	Comments:
B-101	13-Apr-04	64	(0 - 64)	(16-20), (36-40), (60-64)	None	No NAPL detected
B-102	16-Apr-04	40*	(0 - 24) & (36 - 40)*	(16-20), (36-40)*	(39.25-40)	NAPL stringers 39.25 to 39.75 ft, NAPL saturated 39.75 to 40
B-103	15-Apr-04	56*	(0 - 56)*	(16-20), (49.5-40.5), (55.5-56)*	(39.5-41)	NAPL stringers 39.5 to 40 ft, NAPL near saturation 40 to 41 ft
B-104	15-Apr-04	40 *	(0 - 40)*	(16-20), (36-40)*	None	No NAPL detected
B-107	16-Apr-04	48	(0 - 48)	(40-42), (44-48)*	(39.75-42)	NAPL near saturation 40 to 42 ft
B-108	17-Apr-04	52	(0 - 5) & (36 - 52)	(40-43)*	(39.9-43)	NAPL stringers, NAPL saturated 41 to 42.5 ft
B-109	12-Jul-04	60	(36 - 60)	(50-51.5), (59-60)	(50-51.5)	NAPL saturated from 50-51.5
B-110	13-Jul-04	88	(0 - 88)	(52), (60-64)	(52)	NAPL stringer, 1/4-inch thick at 52 ft
B-111	14-Jul-04	60	(32 - 60)	(51-52), (56-60)	(51.5-52.0)	NAPL stringers, (2) 1-inch bands
B-112	15-Jul-04	64	(36 - 64)	(51-52), (56-60)	None	Moved location ~ 25 ft south due to access limitations, approved by NYSDEC while on-site
B-113	16-Jul-04	60	(36 - 60)	(52.5-53.5), (56-60)	(52.5-52.75)	NAPL stringer, 1-inch thick at 52.5 ft.
B-114	16-Jul-04	60	(36 - 60)	(52-53), (58-60)	(52.0-52.5)	NAPL saturated band, 3-inches thick at 52 ft.
B-115	19-Jul-04	64	(40 - 64)	(54-56), (62-64)	None	No NAPL detected, odors from 52-60 ft
B-116	19-Jul-04	60	(40 - 60)	(56-60)	None	No NAPL detected, no odors
B-117	21-Jul-04	64	(40 - 64)	(52-53), (56-60)	(52.5)	One 1 mm thick NAPL stringer at 52.5 ft
B-118	21-Jul-04	60	(40 - 60)	(52-56)	None	No NAPL detected, no odors
B-119	22-Jul-04	64	(40 - 64)	(56-60), (60-64)	None	No NAPL, slight odors from 52-63 ft
B-120	22-Jul-04	64	(40 - 64)	(56-60), (60-64)	None	No NAPL, slight odor from 52-54 ft

Notes: *boring completed inside school basement; depth referenced to basement floor.
ft - feet
NAPL - Non-Aqueous Phase Liquid
Logged interval represents interval inspected by on-site geologist

Table 5-9
Summary of Groundwater Field Parameters and Geochemical Criteria Supportive of Natural Attenuation
Remedial Investigation - 2004
Saint John's School
White Plains, New York

		Laboratory Analytical Results											Dissolved Gasses			
		Dissolved Iron	Total Iron	Dissolved Manganese	Total Manganese	Electrometric pH	Total Alkalinity	Specific Conductance	Nitrate	Sulfate	Total Sulfide	Unionized Hydrogen Sulfide	Carbon Dioxide	Oxygen	Nitrogen	Methane
		6010B	6010B	6010B	6010B	150.1	310.1	120.1	300.0A	300.0A	376.2		AM20GAX			
Well	Date	mg/L	mg/L	mg/L	mg/L	S.U.	mg/L	umhos/cm	mg/L as N	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
B-101	13-Apr-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-102	16-Apr-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-103	14-Apr-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-104	15-Apr-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	14-Sep-04	< 0.10 U	0.65	0.069	0.155	6.8	146	319	0.42	52.3	< 1.0 U	< 0.010 U	33	2.8	14	0.32
MW-7	14-Sep-04	5.72	5.63	1.07	0.971	6.8	434	3620	0.021 J	21.7	< 1.0 U	< 0.010 U	77	2.6	13	0.42
MW-9	14-Sep-04	0.548	0.982 J	3.69	3.75	6.6	476	4110	0.10	86.5	< 1.0 U	< 0.010 U	4,110	0.84	15	0.11

		Field Sampling Parameters					
		Low Flow Purging / Flow Through Cell					Lamott 2020
		Temp.	Spec. Conductance	pH	ORP	DO	Turbidity
Well	Date	°C	uS/cm		mv	mg/L	NTU
B-101	13-Apr-04	16.20	5,120	7.15	239	5.25	1.06
B-102	16-Apr-04	18.03	4,150	7.06	201	5.86	2.75
B-103	14-Apr-04	19.44	4,520	7.30	161	5.06	1.54
B-104	15-Apr-04	17.75	1,660	7.32	364	6.42	10.67
MW-5	14-Sep-04	26.35	312	6.57	68	0.44	5.72
MW-7	14-Sep-04	19.16	3,430	6.80	-16	0.16	15.80
MW-9	14-Sep-04	21.89	3,940	6.66	100	0.11	15.30

Notes: Samples for dissolved manganese, dissolved iron, and hydrogen sulfied were field filtered with a 45 micron in-line barrel filter.
-- = Not Analyzed
DO = Dissolved Oxygen
ORP = Oxidation/Reduction Potential
mg/l. = ~ppm
S.U. - Standard Unit
NTU - Nephelometric Unit
mv - millivolt
umhos/cm =
uS/cm = millisemens per centimeter
Field generated DO values for B-101 through B-104 collected through direct push tooling are were likely elevated compared to static conditions.

Table 5-10
Summary of Analytical Results for VOCs in Groundwater
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Location ID Sample ID Sample Date	B-101 B101-041304 13-Apr-04	B-102 B102-041604 16-Apr-04	B-103 B103-041404 14-Apr-04	B-103 B103-041404DUP 14-Apr-04	B-104 B104-041504 15-Apr-04	MW-9 MW9-091404 14-Sep-04	EB RB01-041704 17-Apr-04	NYSDEC Groundwater Guidance or Standard Value
BTEX (µg/L)								
Benzene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**76**	< 1.0 U	1 s
Ethylbenzene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**48**	< 1.0 U	5 s
Toluene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**490**	< 1.0 U	5 s
Xylenes (total)	< 3.0 U	< 3.0 U	< 3.0 U	< 3.0 U	< 3.0 U	**410**	< 3.0 U	5 s
Total BTEX	**0**	**0**	**0**	**0**	**0**	**1024**	**0**	NL
Other VOCs (µg/L)								
1,1,1-Trichloroethane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	5 s
1,1,2,2-Tetrachloroethane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	5 s
1,1,2-Tri chloro-1,2,2-trifluoroetha	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
1,1,2-Trichloroethane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	1 s
1,1-Dichloroethane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	5 s
1,1-Dichloroethene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	5 s
1,2,4-Trichlorobenzene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
1,2-Dibromo-3-chloropropane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
1,2-Dibromoethane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	0.6 s
1,2-Dichlorobenzene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
1,2-Dichloroethane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	5 s
1,2-Dichloropropane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	1 s
1,3-Dichlorobenzene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
1,4-Dichlorobenzene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
2-Butanone	< 5.0 UJ	< 5.0 U	< 5.0 UJ	< 5.0 UJ	< 5.0 UJ	< 100 U	< 5.0 U	50 g
2-Hexanone	< 5.0 UJ	< 5.0 U	< 5.0 UJ	< 5.0 UJ	< 5.0 U	< 100 U	< 5.0 U	50 g
4-Methyl-2-pentanone	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 100 U	< 5.0 U	NL
Acetone	< 5.0 UJ	< 5.0 U	< 5.0 UJ	< 5.0 UJ	< 5.0 UJ	< 100 U	< 5.0 U	50 g
Bromodichloromethane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	50 g
Bromoform	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	50 g
Bromomethane	< 1.0 UJ	< 1.0 U	< 1.0 UJ	< 1.0 UJ	< 1.0 UJ	< 20 U	< 1.0 U	5 s
Carbon disulfide	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	60 g
Carbon tetrachloride	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	5 g
Chlorobenzene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	5 s
Chloroethane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	5 s
Chloroform	**0.94 J**	**0.31 J**	**0.20 J**	**0.27 J**	< 1.0 U	< 20 U	< 1.0 U	7 s
Chloromethane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	5 s
cis-1,2-Dichloroethene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
cis-1,3-Dichloropropene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	0.4 s*
Cyclohexane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
Dibromochloromethane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	50 g
Dichlorodifluoromethane	< 1.0 U	< 1.0 UJ	< 1.0 UJ	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
Is opropylbenzene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
Methyl acetate	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
Methyl tert-butyl ether	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**8.6 J**	< 1.0 U	10 g
Methylcyclohexane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
Methylene chloride	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	5 s
Styrene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	**360**	< 1.0 U	5 s
Tetrachloroethene	**0.49 J**	**0.46 J**	**0.33 J**	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	5 s
trans-1,2-Dichloroethene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
trans-1,3-Dichloropropene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	0.4 s*
Trichloroethene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	5 s
Trichlorofluoromethane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	NL
Vinyl chloride	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	2 s
Total VOC	**1.43**	0.77	**0.53**	**0.27**	**0**	**1392.6**	0	NL

Notes:

U indicates Undetected
J indicates Estimated Concentration
NL indicates the compound is not listed
MDL is Method Detection Limit
Bolded values are detected compounds
Bolded and Shaded values are detected compounds above the NYSDEC Recommended Guidance or Standard Value
Guidance or Standard Values - NYSDEC, Division of Water, TOGS (1.1.1) - 6 NYCRR 703.5 (NYSDEC, 1998).
VOCs - volatile organic compounds
s = Standard Value
g = Guidance Value
µg/L - microgram per liter
* - applies to the sum of cis- and trans-1,3-dichloropropene

EB - Equipment blank
Dup - field duplicate

Table 5-11
Summary of Analytical Results for SVOCs in Groundwater
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Location ID Sample ID Sample Date	B-101 B101-041304 13-Apr-04	B-102 B102-041604 16-Apr-04	B-103 B103-041404 14-Apr-04	B-103 B103-041404DUP 14-Apr-04	B-104 B104-041504 15-Apr-04	MW-9 MW9-091404 14-Sep-04	EB RB01-041704 17-Apr-04	NYSDEC Groundwater Guidance or Standard Value
PAH Compounds (µg/L)								
2-Methylnaphthalene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	**30**	< 11 U	NL
Acenaphthene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	**1.2 J**	< 11 U	20 g
Acenaphthylene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	**6.4 J**	< 11 U	NL
Anthracene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	50 g
Benzo(a)anthracene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	0.002 g
Benzo(a)pyrene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	ND
Benzo(b)fluoranthene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	0.002 g
Benzo(ghi)perylene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
Benzo(k)fluoranthene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	0.002 g
Chrysene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	0.002 g
Dibenz(a,h)anthracene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
Fluoranthene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	50 g
Fluorene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	50 g
Indeno(1,2,3-cd)pyrene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	0.002 g
Naphthalene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	**600 D**	< 11 U	10 g
Phenanthrene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	**2.2 J**	< 11 U	50 g
Pyrene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	50 g
Total cPAHs	**0**	**0**	**0**	**0**	**0**	**0**	**0**	NL
Total PAHs	**0**	**0**	**0**	**0**	**0**	**639.8**	**0**	NL
Other SVOCs (µg/L)								
1,1'-Biphenyl	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	**2.8 J**	< 11 U	NL
2,2'-oxybis(1-Chloropropane)	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
2,4,5-Trichlorophenol	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
2,4,6-Trichlorophenol	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
2,4-Dichlorophenol	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	5 s
2,4-Dimethylphenol	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	50 g
2,4-Dinitrophenol	< 48 U	< 48 U	< 50 U	< 49 U	< 48 U	< 48 U	< 54 U	10 g
2,4-Dinitrotoluene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	5 s
2,6-Dinitrotoluene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	5 s
2-Chloronaphthalene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	10 g
2-Chlorophenol	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
2-Methylphenol	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
2-Nitroaniline	< 48 U	< 48 U	< 50 U	< 49 U	< 48 U	< 48 U	< 54 U	5 s
2-Nitrophenol	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
3,3'-Dichlorobenzidine	< 48 U	< 48 U	< 50 U	< 49 U	< 48 U	< 48 U	< 54 U	5 s
3-Nitroaniline	< 48 U	< 48 U	< 50 U	< 49 U	< 48 U	< 48 U	< 54 U	5 s
4,6-Dinitro-2-methylphenol	< 48 U	< 48 U	< 50 U	< 49 U	< 48 U	< 48 U	< 54 U	NL
4-Bromophenyl phenyl ether	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
4-Chloro-3-methylphenol	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
4-Chloroaniline	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	5 s
4-Chlorophenyl phenyl ether	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
4-Methylphenol	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
4-Nitroaniline	< 48 U	< 48 U	< 50 U	< 49 U	< 48 U	< 48 U	< 54 U	5 s
4-Nitrophenol	< 48 U	< 48 U	< 50 U	< 49 U	< 48 U	< 48 U	< 54 U	NL
Acetophenone	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
Atrazine	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
Benzaldehyde	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
bis(2-Chloroethoxy)methane	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	5 s
bis(2-Chloroethyl) ether	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	1 s
bis(2-Ethylhexyl) phthalate	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	**4.4 J**	< 11 U	5 s
Butyl benzyl phthalate	< 9.6 UJ	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	50 g
Caprolactam	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
Carbazole	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
Dibenzofuran	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	50 s
Diethyl phthalate	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
Dimethyl phthalate	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	NL
Di-n-butyl phthalate	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	50 g
Di-n-octyl phthalate	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	50 g
Hexachlorobenzene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	0.4 s
Hexachlorobutadiene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	0.5 s
Hexachlorocyclopentadiene	< 48 U	< 48 U	< 50 U	< 49 U	< 48 U	< 48 U	< 54 U	5 s
Hexachloroethane	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	5 s
Isophorone	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	50 g
Nitrobenzene	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	50 g
N-Nitrosodi-n-propylamine	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	50 g
N-Nitrosodiphenylamine	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	< 9.5 U	< 11 U	0.4
Pentachlorophenol	< 48 U	< 48 U	< 50 U	< 49 U	< 48 U	< 48 U	< 54 U	1 s
Phenol	< 9.6 U	< 9.5 U	< 10 U	< 9.8 U	< 9.5 U	**3.8 J**	< 11 U	1 s
Total SVOCs	**0**	**0**	**0**	**0**	**0**	**650.8**	**0**	NL

Notes:

U indicates Undetected
J indicates Estimated Concentration
NL indicates the compound is not listed
MDL is Method Detection Limit
Bolded values are detected compounds
Bolded and Shaded values are detected compounds above the NYSDEC Recommended Guidance or Standard Value
s = Standard Value
g = Guidance Value
Guidance or Standard Values - NYSDEC, Division of Water, TOGS (1.1.1) - 6 NYCRR 703.5 (NYSDEC, 1998).
PAHs - polynuclear aromatic hydrocarbons
cPAHs - carcinogenic polynuclear aromatic hydrocarbons carcinogenic PAHs are in italics
SVOCs - Semivolatile organic hydrocarbons
µg/L - microgram per liter

EB - Equipment blank
Dup - field duplicate

Table 5-12
Summary of Analytical Results for Metals and Cyanide in Groundwater
Remedial Investigation - 2004
Saint John's School
White Plains, New York

Location ID Sample ID Sample Date	B-101 B101-041304 13-Apr-04	B-102 B102-041604 16-Apr-04	B-103 B103-041404 14-Apr-04	B-103 B103-041404DUP 14-Apr-04	B-104 B104-041504 15-Apr-04	MW-9 MW9-091404 14-Sep-04	EB RB01-041704 17-Apr-04	NYSDEC Groundwater Guidance or Standard Value
Metals (µg/L)								
Aluminum	< 200 U	< 200 U	< 200 U	< 200 U	< 200 U	**155 J**	< 200 U	NL
Antimony	< 10.0 U	< 10.0 U	< 10.0 U	< 10.0 U	< 10.0 U	< 10.0 U	< 10.0 U	3 g
Arsenic	< 10.0 U	< 10.0 U	< 10.0 U	< 10.0 U	< 10.0 U	< 10.0 U	< 10.0 U	25 s
Barium	**196 J**	**200**	**153 J**	**148 J**	**91.9 J**	**514**	< 200 U	1,000 s
Beryllium	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	4.0 U	< 4.0 U	3 g
Cadmium	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	10 s
Calcium	**102000**	**85000**	**62500**	**60300**	**83100**	**280000**	**50.6 J**	NL
Chromium	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	**10.4**	< 5.0 U	50 s
Cobalt	< 50.0 U	< 50.0 U	< 50.0 U	< 50.0 U	< 50.0 U	50.0 U	< 50.0 U	NL
Copper	< 25.0 U	< 25.0 U	< 25.0 U	< 25.0 U	< 25.0 U	**2.2 J**	**1.4 J**	200 s
Iron	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	**982 J**	< 100 U	300 s
Lead	< 3.0 U	**1.6 J**	< 3.0 U	< 3.0 U	< 3.0 U	**1.9 J+**	< 3.0 U	25 s
Magnesium	**29700**	**35700**	**24700**	**23900**	**42300**	**138000**	**22.2 J**	35,000 s
Manganese	**64.6**	**69.3**	**112**	**110**	**85.6**	**3750**	**0.27 J**	300 s
Mercury	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	2 s
Nickel	< 40.0 U	< 40.0 U	< 40.0 U	**1.3 J**	< 40.0 U	< 40.0 U	< 40.0 U	NL
Potassium	**11100**	**5250 J**	**6080**	**5890**	< 5000 U	**18900 J+**	< 5000 U	NL
Selenium	< 5.0 U	< 5.0 U	< 5.0 U	**2.6 J**	< 5.0 U	< 5.0 U	< 5.0 U	10 s
Silver	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	50 s
Sodium	**937000**	**668000**	**839000**	**819000**	**182000**	**283000**	< 5000 U	20,000 s
Thallium	< 10.0 U	< 10 U	< 10.0 U	< 10.0 U	< 10 U	< 10 U	< 10.0 U	4 g
Vanadium	< 50.0 U	< 50.0 U	< 50.0 U	< 50.0 U	< 50.0 U	< 50.0 U	< 50.0 U	NL
Zinc	< 20.0 U	< 20.0 U	< 20.0 U	< 20.0 U	< 20.0 U	**17.3 J**	**3.7 J**	300 s
Other (µg/L)								
Total Cyanide	**11.0**	**13.0**	**38.0**	**38.0**	**5.0 J**	< 10.0 U	< 10.0 U	200s
Available Cyanide	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.002	< 0.0020 U	NL

Notes:

EB - Equipment blank
Dup - field duplicate
s = Standard Value
g = Guidance Value
MDL is Method Detection Limit
Bolded values are detected compounds
Bolded and Shaded values are detected compounds above the NYSDEC Recommended Guidance or Standard Value
Guidance or Standard Values - NYSDEC, Division of Water, TOGS (1.1.1) - 6 NYCRR 703.5 (NYSDEC, 1998).
µg/L - micrograms per liter

U indicates Undetected
J indicates Estimated Concentration
J+ indicates Estimated Concentration biased high due to matrix effects and instrument bias.
NL indicates the compound is not listed

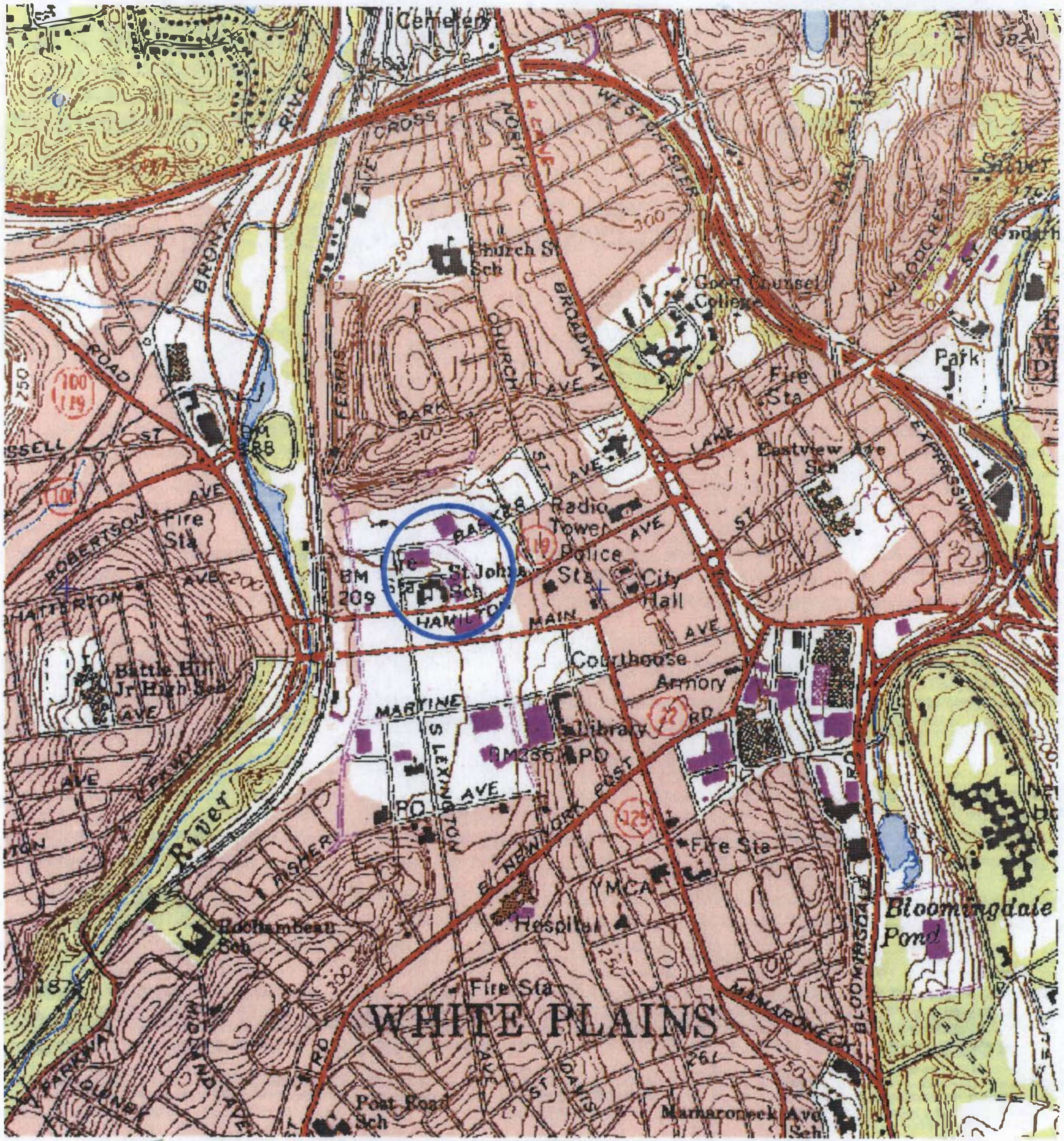
Table 6-1
Summary of Potential Human Health Receptors and Potentially Complete Exposure Pathways
Remedial Investigation - 2004
St. John's School
White Plains, New York

Area of Interest	Source Medium	Exposure Medium	Exposure Pathways	School Children and Staff	Rectory Residents	Subsurface Utility Workers	Outdoor and Maintenance Workers	Churchgoers, Visitors, Pedestrians
School Buildings, Rectory	Soil	Subsurface Soil	Incidental ingestion			X		
		Subsurface Soil	Dermal contact			X		
		Indoor Air	Volitalization/Soil gas intrusion	X	X		X	X
	Groundwater	Groundwater	Incidental ingestion			X		
		Groundwater	Dermal contact			X		
		Indoor Air	Volitalization/Soil gas intrusion	X	X		X	X
Church Building	Soil	Subsurface Soil	Incidental ingestion			X		
		Subsurface Soil	Dermal contact			X		
		Indoor Air	Volitalization/Soil gas intrusion	X	X		X	X
	Groundwater	Groundwater	Incidental ingestion			X		
		Groundwater	Dermal contact			X		
		Indoor Air	Volitalization/Soil gas intrusion	X	X		X	X
School Grounds	Soil	Subsurface Soil	Incidental ingestion					
		Subsurface Soil	Dermal contact					
	Groundwater	Groundwater	Incidental ingestion					
		Groundwater	Dermal contact					
		Outdoor Air	Volatilization					

X - Potentially complete exposure pathway. Significance of the pathway is described in the text.

Note that an evaluation of risk associated with surface soil was not performed.

Figures



New York
Quadrangle

LATITUDE: N42° 02' 00"
LONGITUDE: W73° 46' 16"

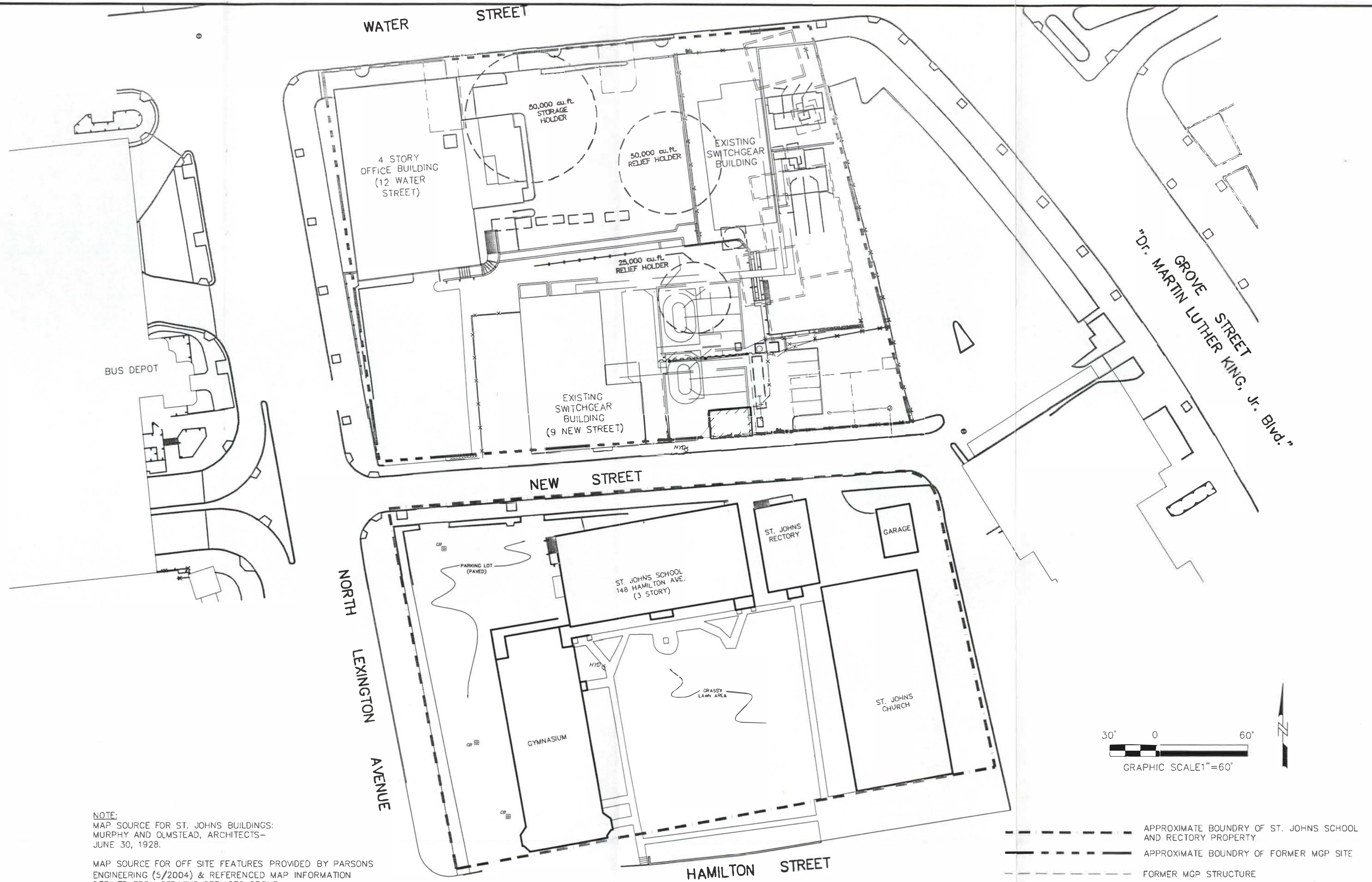
N

Not to Scale

SOURCE:
DeLORME 3-D TOPOQUAD PROGRAM
Provided by
PARSONS ENGINEERING

RETEC

WHITE PLAINS FORMER MGP SITE CECN3-16922-288	SITE LOCATION MAP SAINT JOHNS SCHOOL AND RECTORY WHITE PLAINS, NEW YORK
DATE: 11/10/05 DRWN: NOCAD FILE: 16922-SLOC.ppt	FIGURE: 2-1



NOTE:
MAP SOURCE FOR ST. JOHNS BUILDINGS:
MURPHY AND OLMSTEAD, ARCHITECTS–
JUNE 30, 1928.

MAP SOURCE FOR OFF SITE FEATURES PROVIDED BY PARSONS ENGINEERING (5/2004) & REFERENCED MAP INFORMATION DERIVED FROM STRATUS SERVICES GROUP, ENGINEERING DIVISION, INC., CRANBURY, NEW JERSEY.

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CECN3-16922-CON-CL-004-RI.dwg Layout: HISTORICAL User: BVershon Plotted: Nov 09, 2005 - 4:47pm Xref's:

RETEC

WHITE PLAINS FORMER MGP SITE WHITE PLAINS, NEW YORK CECN3-16922	HISTORICAL USE PLAN ST. JOHNS SCHOOL & RECTORY PROPERTY
DATE: 11/10/05 DRWN: BcV/CON	FIGURE 2-2

NOTE:
MAP SOURCE FOR ST. JOHNS BUILDINGS: MURPHY AND OLMSTEAD, ARCHITECTS– JUNE 30, 1928.

MAP SOURCE FOR OFF SITE FEATURES PROVIDED BY PARSONS ENGINEERING (5/2004) & REFERENCED MAP INFORMATION DERIVED FROM STRATUS SERVICES GROUP, ENGINEERING DIVISION, INC., CRANBURY, NEW JERSEY.

POST INVESTIGATION AIR SAMPLES COLLECTED ON APRIL 24, 2004 WERE TAKEN IN THE SAME LOCATIONS AS THESE SAMPLES AND WERE DISTINGUISHED USING "ST-J2" SAMPLE NAME PREFIX.

RETEC

WHITE PLAINS FORMER MGP SITE
WHITE PLAINS, NEW YORK
CECN3-16922

DATE: 11/10/05 DRWN: BcV/CON

AMBIENT AIR SAMPLE LOCATIONS

ST. JOHNS SCHOOL & RECTORY PROPERTY

FIGURE 3-1

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CECN3-16922-CON-CL-004-RI.dwg Layout: AP-SAMP User: BVershon Plotted: Nov 09, 2005 - 4:47pm Xref's:

INDOOR AIR SAMPLE (APRIL 2004) — IA-

LOCATION OF PID, CYANIDE AND AIR FLOW MEASUREMENTS (SAME LOCATIONS AS 2/03) — ×

SOIL BORING (2001) — △ SB-ID

NOTE:
MAP SOURCE FOR ST. JOHNS BUILDINGS: MURPHY AND OLMSTEAD, ARCHITECTS– JUNE 30, 1928.

MAP SOURCE FOR OFF SITE FEATURES PROVIDED BY PARSONS ENGINEERING (5/2004) & REFERENCED MAP INFORMATION DERIVED FROM STRATUS SERVICES GROUP, ENGINEERING DIVISION, INC., CRANBURY, NEW JERSEY.

POST INVESTIGATION AIR SAMPLES COLLECTED ON APRIL 24, 2004 WERE TAKEN IN THE SAME LOCATIONS AS THESE SAMPLES AND WERE DISTINGUISHED USING "ST-J2" SAMPLE NAME PREFIX.

RETEC

WHITE PLAINS FORMER MGP SITE
WHITE PLAINS, NEW YORK
CECN3-16922

DATE: 11/10/05 DRWN: BCV/CON

INDOOR AIR
BASEMENT SAMPLE LOCATIONS
ST. JOHNS SCHOOL & RECTORY PROPERTY

FIGURE 3-2

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CECN3-16922-CON-CL-004-RI.dwg Layout: BASEMENT User: BVershon Plotted: Nov 10, 2005 - 2:43pm Xrefs:

INDOOR AIR SAMPLE (APRIL 2004) — IA–

MONITORING WELL — MW–8

NOTE:
MAP SOURCE FOR ST. JOHNS BUILDINGS: MURPHY AND OLMSTEAD, ARCHITECTS– JUNE 30, 1928.

MAP SOURCE FOR OFF SITE FEATURES PROVIDED BY PARSONS ENGINEERING (5/2004) & REFERENCED MAP INFORMATION DERIVED FROM STRATUS SERVICES GROUP, ENGINEERING DIVISION, INC., CRANBURY, NEW JERSEY.

POST INVESTIGATION AIR SAMPLES COLLECTED ON APRIL 24, 2004 WERE TAKEN IN THE SAME LOCATIONS AS THESE SAMPLES AND WERE DISTINGUISHED USING "ST–J2" SAMPLE NAME PREFIX.

RETEC

WHITE PLAINS FORMER MGP SITE WHITE PLAINS, NEW YORK CECN3-16922	INDOOR AIR GROUND FLOOR SAMPLE LOCATIONS ST. JOHNS SCHOOL & RECTORY PROPERTY
DATE 11/10/05 DRWN. Bcv/CON	FIGURE 3-3

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CECN3-16922-CON-CL-004-RI.dwg Layout: 1st FLOOR User: BVershon Plotted: Nov 09, 2005 - 4:49pm Xref's:

SOIL GAS SAMPLE (APRIL 2004) ⊕ SG-ID

NOTE:
MAP SOURCE FOR ST. JOHNS BUILDINGS: MURPHY AND OLMSTEAD, ARCHITECTS– JUNE 30, 1928.

MAP SOURCE FOR OFF SITE FEATURES PROVIDED BY FARSONS ENGINEERING (5/2004) & REFERENCED MAP INFORMATION DERIVED FROM STRATUS SERVICES GROUP, ENGINEERING DIVISION, INC., CRANBURY, NEW JERSEY.

RETEC

WHITE PLAINS FORMER MGP SITE
WHITE PLAINS, NEW YORK
CECN3-16922

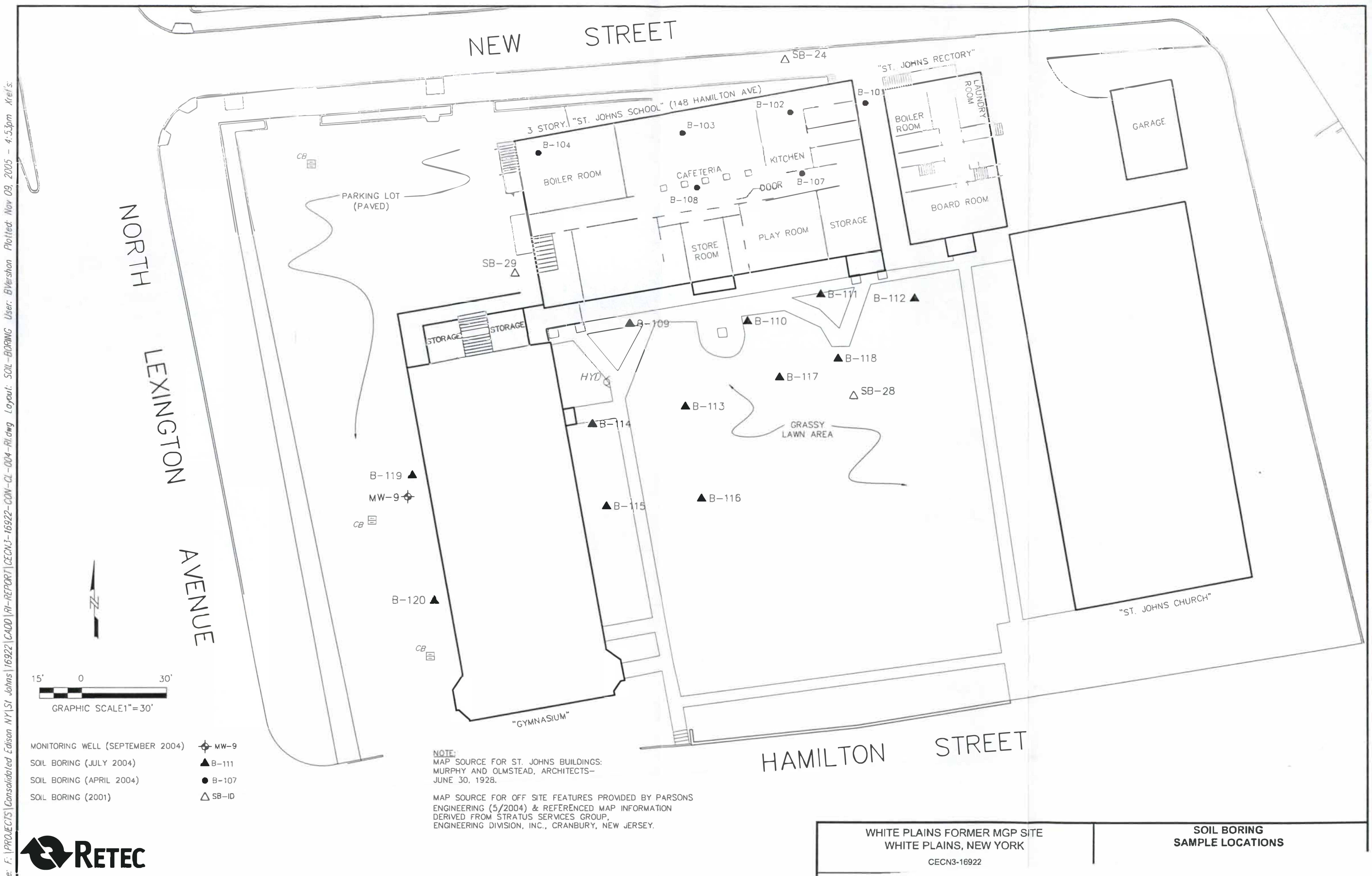
DATE: 11/10/05 | DRWN: BcV/CON

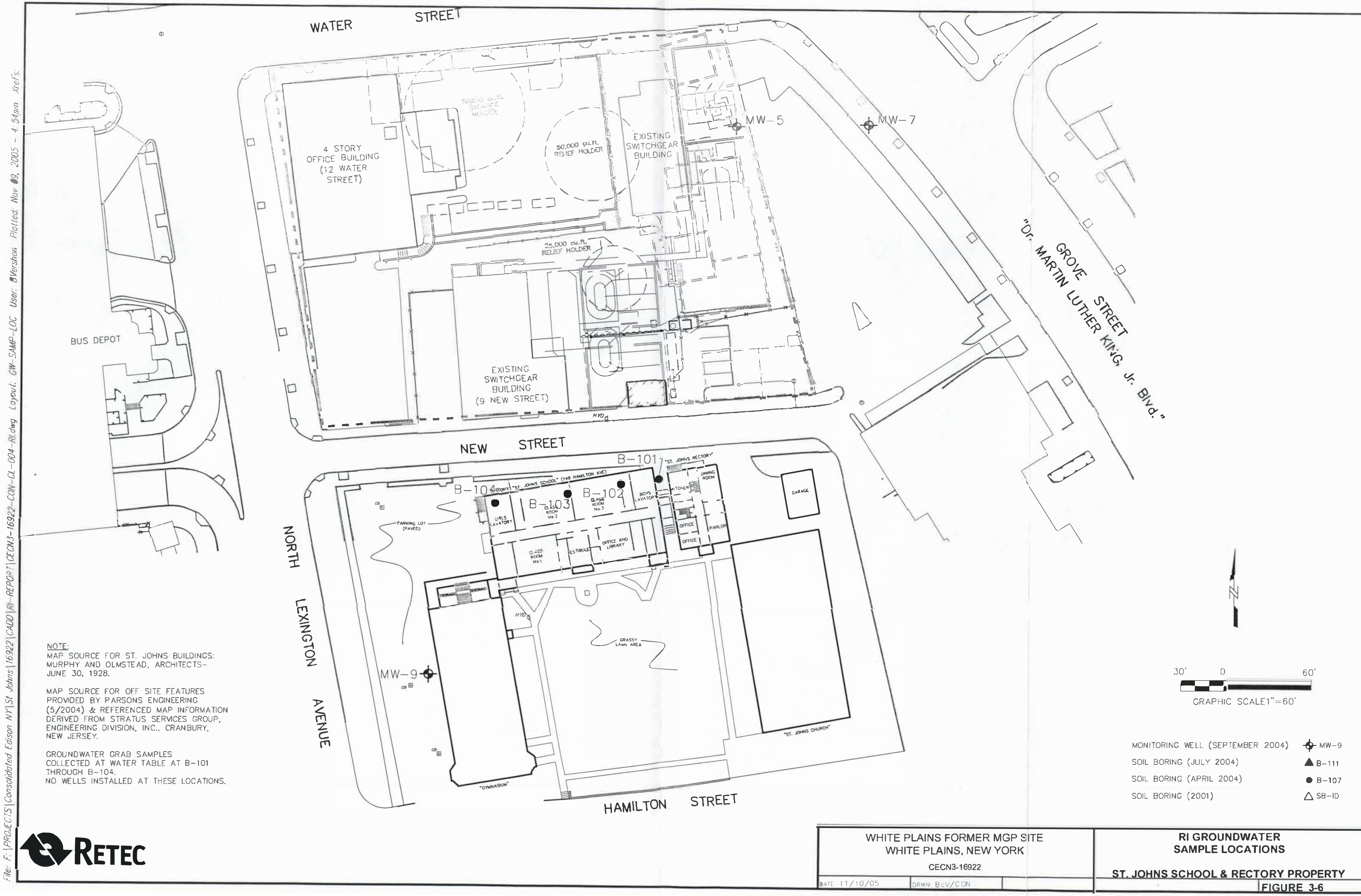
SOIL GAS SAMPLE LOCATIONS

ST. JOHNS SCHOOL & RECTORY PROPERTY

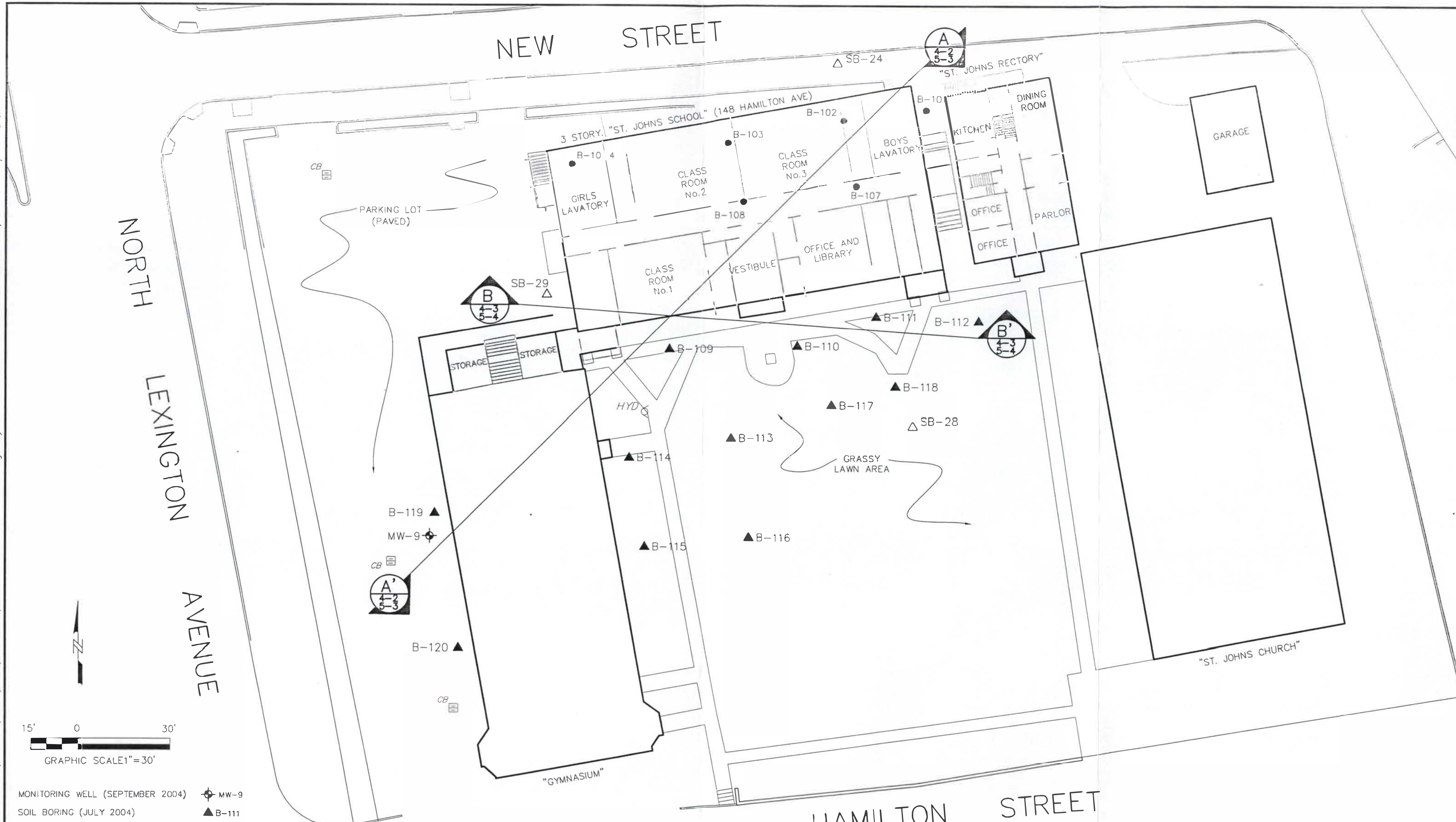
FIGURE 3-4

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CECN3-16922-CON-CL-004-RI.dwg Layout: SOIL-GAS User: BVershon Plotted: Nov 09, 2005 - 4:53pm Xref's:


NEW STREET
NORTH LEXINGTON AVENUE
HAMILTON STREET
SB-24
"ST. JOHNS RECTORY"
3 STORY, "ST. JOHNS SCHOOL" (148 HAMILTON AVE)
B-101
B-102
B-103
B-104
BOILER ROOM
CAFETERIA
KITCHEN
DOOR
B-107
B-108
STORE ROOM
PLAY ROOM
STORAGE
BOILER ROOM
LAUNDRY ROOM
BOARD ROOM
GARAGE
CB
PARKING LOT (PAVED)
SB-29
STORAGE
STORAGE
B-109
B-110
B-111
B-112
B-118
B-117
SB-28
HYD
B-113
B-114
GRASSY LAWN AREA
B-119
MW-9
B-115
B-116
B-120
"ST. JOHNS CHURCH"
"GYMNASIUM"
15' 0 30'
GRAPHIC SCALE1"=30'
MONITORING WELL (SEPTEMBER 2004) MW-9
SOIL BORING (JULY 2004) B-111
SOIL BORING (APRIL 2004) B-107
SOIL BORING (2001) SB-ID
NOTE:
MAP SOURCE FOR ST. JOHNS BUILDINGS:
MURPHY AND OLMSTEAD, ARCHITECTS-
JUNE 30, 1928.
MAP SOURCE FOR OFF SITE FEATURES PROVIDED BY PARSONS
ENGINEERING (5/2004) & REFERENCED MAP INFORMATION
DERIVED FROM STRATUS SERVICES GROUP,
ENGINEERING DIVISION, INC., CRANBURY, NEW JERSEY.
RETEC
WHITE PLAINS FORMER MGP SITE
WHITE PLAINS, NEW YORK
CECN3-16922
SOIL BORING
SAMPLE LOCATIONS



File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CECN3-16922-CON-CL-004-RI.dwg Layout: GW-SAMP-LOC User: BVershon Plotted: Nov 09, 2005 - 4:54pm Xref's:



MONITORING WELL (SEPTEMBER 2004)		MW-9
SOIL BORING (JULY 2004)	▲	B-111
SOIL BORING (APRIL 2004)	●	B-107
SOIL BORING (2001)	△	SB-ID

NOTE:
MAP SOURCE FOR ST. JOHNS BUILDINGS: MURPHY AND OLMSTEAD, ARCHITECTS– JUNE 30, 1928.

MAP SOURCE FOR OFF SITE FEATURES PROVIDED BY PARSONS ENGINEERING (5/2004) & REFERENCED MAP INFORMATION DERIVED FROM STRATUS SERVICES GROUP, ENGINEERING DIVISION, INC., CRANBURY, NEW JERSEY.

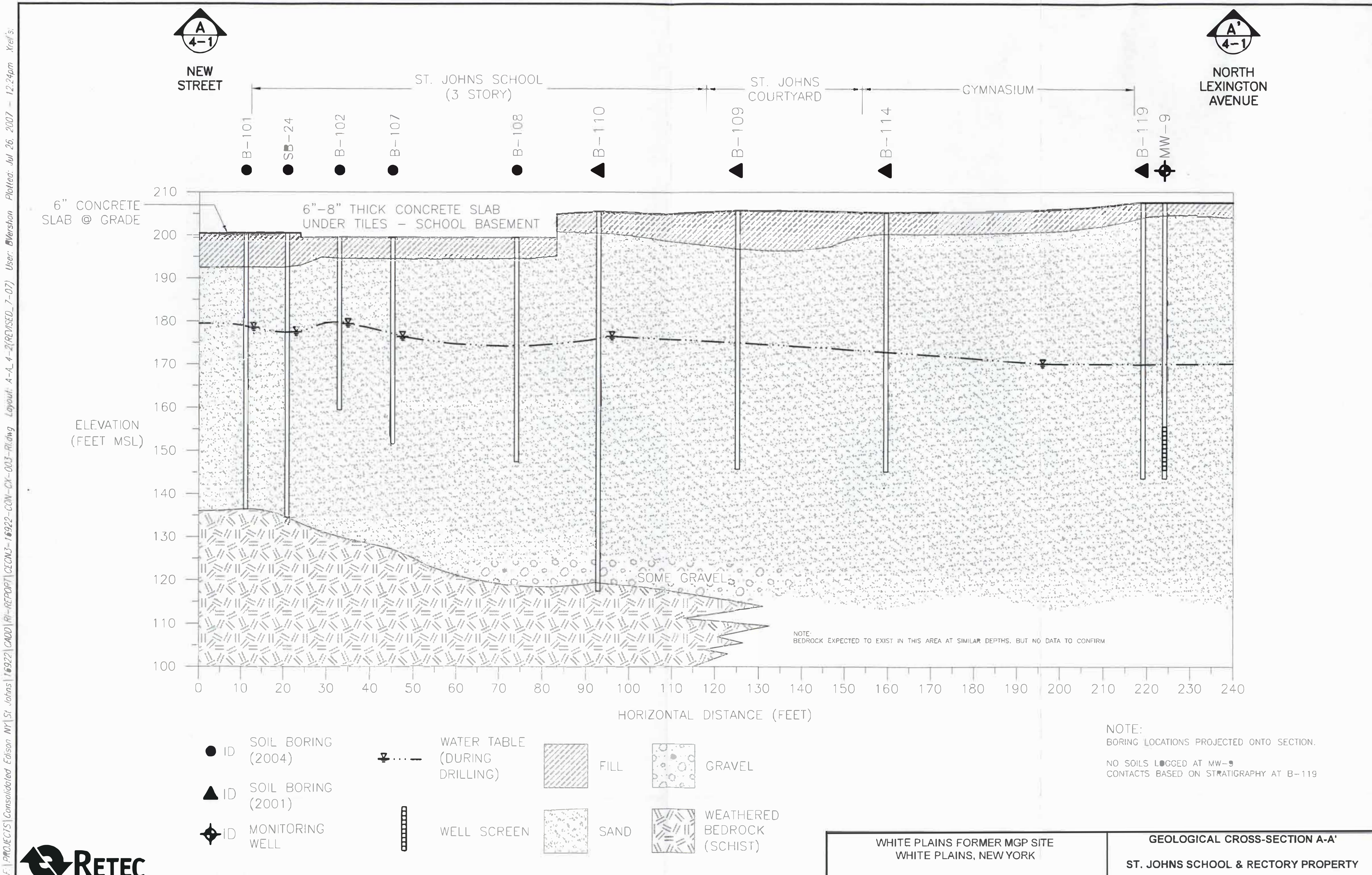
RETEC

WHITE PLAINS FORMER MGP SITE
WHITE PLAINS, NEW YORK
CECN3-16922

DATE: 11/10/05 DRWN: BcV/CON

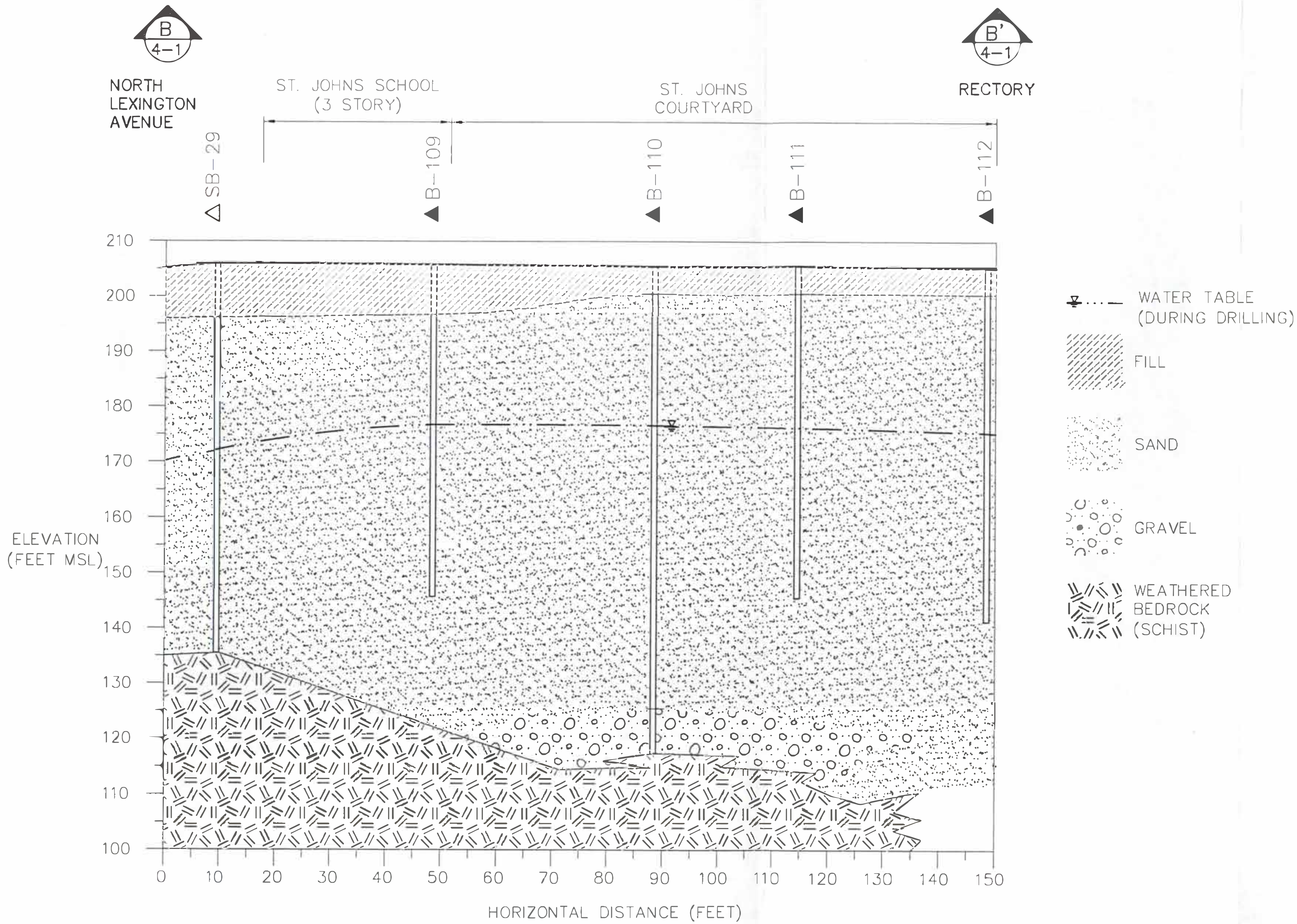
GEOLOGICAL CROSS-SECTION LOCATION PLAN
ST. JOHNS SCHOOL & RECTORY PROPERTY
FIGURE 4-1

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CECN3-16922-CON-CL-004-RI.dwg Layout: X-LOC User: BVershon Plotted: Nov 09, 2005 – 4:55pm Xref's:



WHITE PLAINS FORMER MGP SITE WHITE PLAINS, NEW YORK	GEOLOGICAL CROSS-SECTION A-A' ST. JOHNS SCHOOL & RECTORY PROPERTY
DATE: 07/25/07 DRWN: BcV/CON	FIGURE 4-2

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CECN3-16922-CON-CX-003-R.dwg Layout: A-A_4-2(REVISED_7-07) User: BVersion Plotted: Jul 26, 2007 - 12:24pm Xref's:

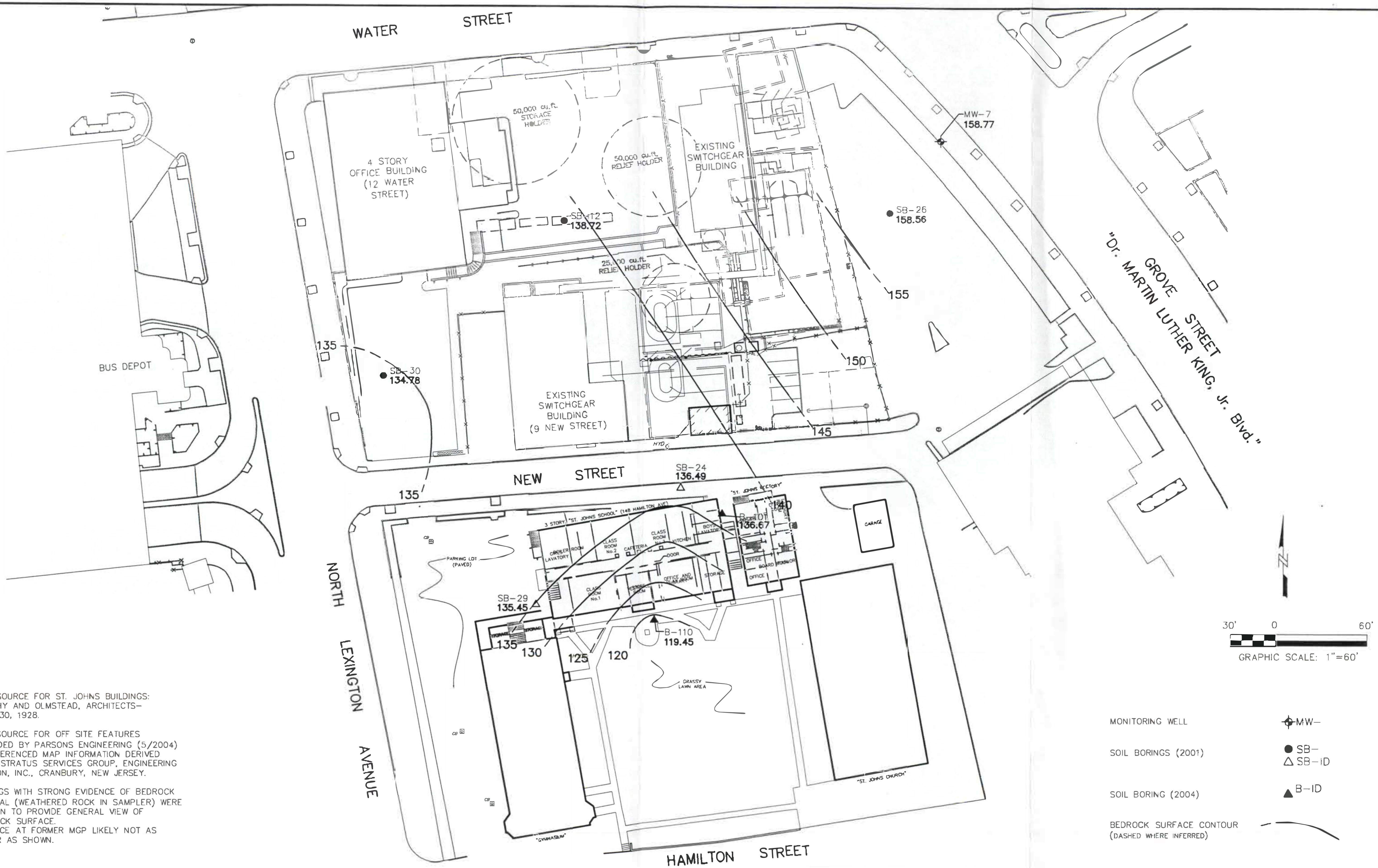


NOTE:
BORING LOCATIONS PROJECTED ONTO SECTION.

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CECN3-16922-CON-CX-003-RI.dwg Layout: B-B_4-3 User: BVershon Plotted: Nov 09, 2005 - 4:58pm Xref's:

RETEC

WHITE PLAINS FORMER MGP SITE WHITE PLAINS, NEW YORK	GEOLOGICAL CROSS SECTION B-B' ST. JOHNS SCHOOL & RECTORY PROPERTY
DATE: 11/10/05 DRWN: Bcv/CON	FIGURE 4-3



NOTE:
MAP SOURCE FOR ST. JOHNS BUILDINGS: MURPHY AND OLMSTEAD, ARCHITECTS– JUNE 30, 1928.

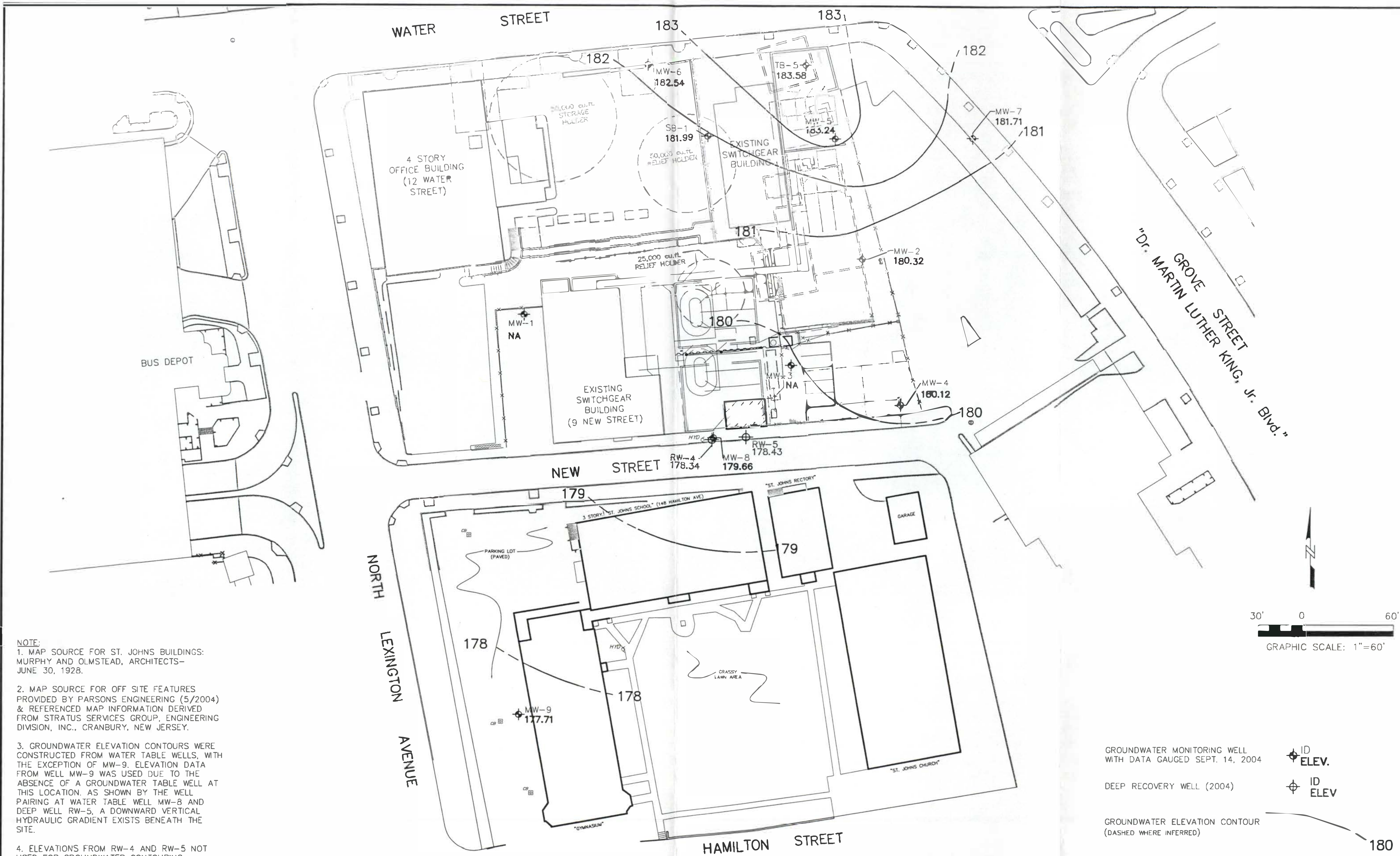
MAP SOURCE FOR OFF SITE FEATURES PROVIDED BY PARSONS ENGINEERING (5/2004) & REFERENCED MAP INFORMATION DERIVED FROM STRATUS SERVICES GROUP, ENGINEERING DIVISION, INC., CRANBURY, NEW JERSEY.

BORINGS WITH STRONG EVIDENCE OF BEDROCK REFUSAL (WEATHERED ROCK IN SAMPLER) WERE CHOSEN TO PROVIDE GENERAL VIEW OF BEDROCK SURFACE.
SURFACE AT FORMER MGP LIKELY NOT AS LINEAR AS SHOWN.

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\PI-REPORT\CECNJ-16922-CON-GL-002-PI.dwg Layout: BR (new) User: BVershon Plotted: Nov 09, 2005 – 5:02pm Xref's:

RETEC

WHITE PLAINS FORMER MGP SITE WHITE PLAINS, NEW YORK	BEDROCK SURFACE CONTOUR MAP ST. JOHNS SCHOOL & RECTORY PROPERTY
DATE: 11/10/05 DRWN: BcV/CON	FIGURE 4-4



NOTE:

1. MAP SOURCE FOR ST. JOHNS BUILDINGS: MURPHY AND OLMSTEAD, ARCHITECTS– JUNE 30, 1928.

2. MAP SOURCE FOR OFF SITE FEATURES PROVIDED BY PARSONS ENGINEERING (5/2004) & REFERENCED MAP INFORMATION DERIVED FROM STRATUS SERVICES GROUP, ENGINEERING DIVISION, INC., CRANBURY, NEW JERSEY.

3. GROUNDWATER ELEVATION CONTOURS WERE CONSTRUCTED FROM WATER TABLE WELLS, WITH THE EXCEPTION OF MW–9. ELEVATION DATA FROM WELL MW–9 WAS USED DUE TO THE ABSENCE OF A GROUNDWATER TABLE WELL AT THIS LOCATION. AS SHOWN BY THE WELL PAIRING AT WATER TABLE WELL MW–8 AND DEEP WELL RW–5, A DOWNWARD VERTICAL HYDRAULIC GRADIENT EXISTS BENEATH THE SITE.

4. ELEVATIONS FROM RW–4 AND RW–5 NOT USED FOR GROUNDWATER CONTOURING.

GROUNDWATER MONITORING WELL WITH DATA GAUGED SEPT. 14, 2004 — ID ELEV.

DEEP RECOVERY WELL (2004) — ID ELEV

GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED) — 180

RETEC

WHITE PLAINS FORMER MGP SITE
WHITE PLAINS, NEW YORK

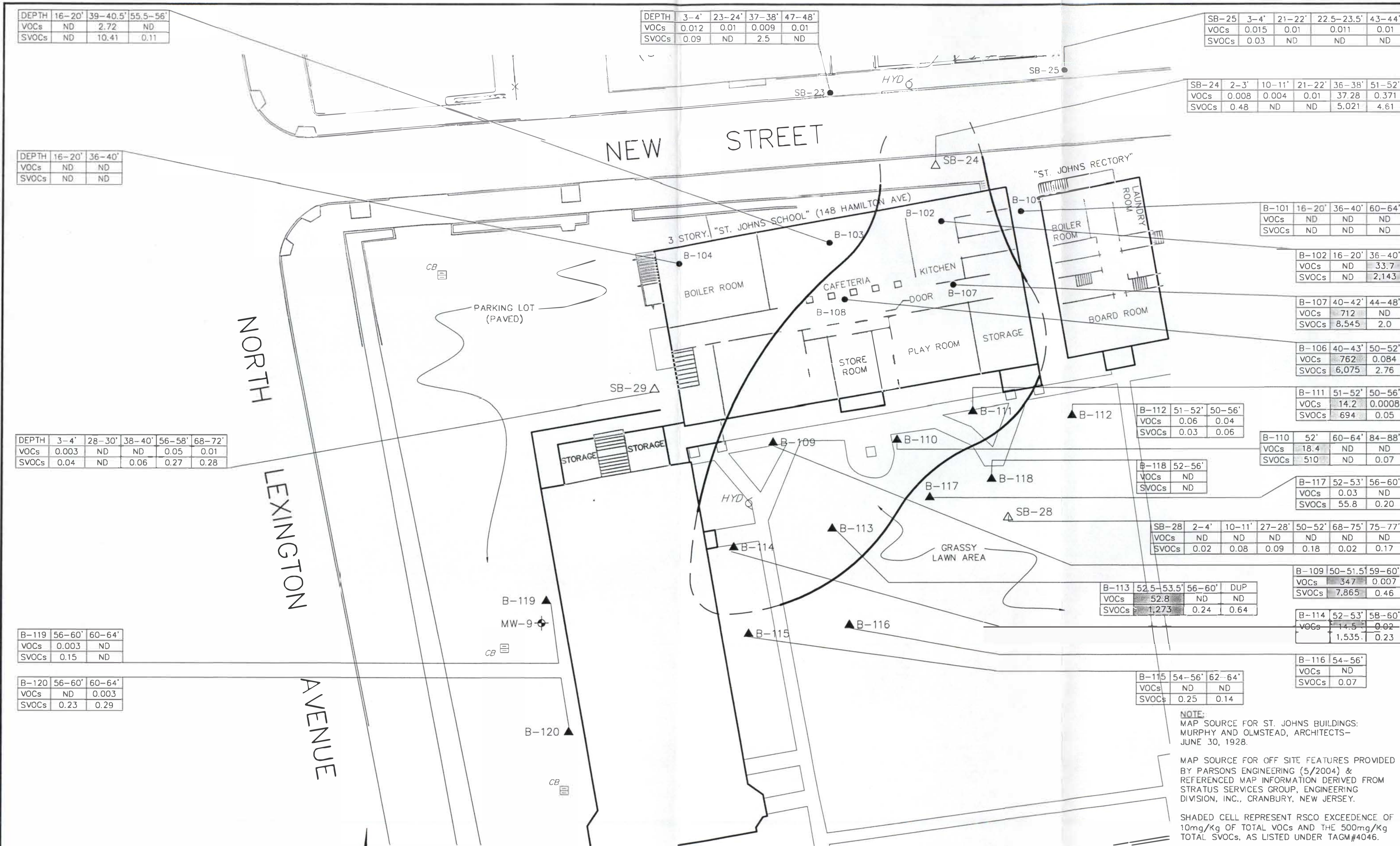
GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 14, 2004
ST. JOHNS SCHOOL & RECTORY PROPERTY

DATE: 11/10/05 | DRWN: BcV/CON

FIGURE 4-5

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CEON3-16922-CON-CL-002-RI.dwg Layout: GW (new) User: BVershon Plotted: Nov 09, 2005 - 5:02pm Xref's:

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CECN3-16922-CON-GL-004-RI.dwg Layout: SSSOIL_BOX-DATA User: BVersion Plotted: Nov 09, 2005 - 5:04pm Xref's:



DEPTH	16–20'	39–40.5'	55.5–56'
VOCs	ND	2.72	ND
SVOCs	ND	10.41	0.11

DEPTH	3–4'	23–24'	37–38'	47–48'
VOCs	0.012	0.01	0.009	0.01
SVOCs	0.09	ND	2.5	ND

SB-25	3–4'	21–22'	22.5–23.5'	43–44'
VOCs	0.015	0.01	0.011	0.01
SVOCs	0.03	ND	ND	ND

SB-24	2–3'	10–11'	21–22'	36–38'	51–52'
VOCs	0.008	0.004	0.01	37.28	0.371
SVOCs	0.48	ND	ND	5,021	4.61

DEPTH	16–20'	36–40'
VOCs	ND	ND
SVOCs	ND	ND

B-101	16–20'	36–40'	60–64'
VOCs	ND	ND	ND
SVOCs	ND	ND	ND

B-102	16–20'	36–40'
VOCs	ND	33.7
SVOCs	ND	2,143

B-107	40–42'	44–48'
VOCs	712	ND
SVOCs	8,545	2.0

B-106	40–43'	50–52'
VOCs	762	0.084
SVOCs	6,075	2.76

B-111	51–52'	50–56'
VOCs	14.2	0.0008
SVOCs	694	0.05

DEPTH	3–4'	28–30'	38–40'	56–58'	68–72'
VOCs	0.003	ND	ND	0.05	0.01
SVOCs	0.04	ND	0.06	0.27	0.28

B-112	51–52'	50–56'
VOCs	0.06	0.04
SVOCs	0.03	0.06

B-110	52'	60–64'	84–88'
VOCs	18.4	ND	ND
SVOCs	510	ND	0.07

B-118	52–56'
VOCs	ND
SVOCs	ND

B-117	52–53'	56–60'
VOCs	0.03	ND
SVOCs	55.8	0.20

SB-28	2–4'	10–11'	27–28'	50–52'	68–75'	75–77'
VOCs	ND	ND	ND	ND	ND	ND
SVOCs	0.02	0.08	0.09	0.18	0.02	0.17

B-109	50–51.5'	59–60'
VOCs	347	0.007
SVOCs	7,865	0.46

B-113	52.5–53.5'	56–60'	DUP
VOCs	52.8	ND	ND
SVOCs	1,273	0.24	0.64

B-114	52–53'	58–60'
VOCs	14.5	0.02
	1,535	0.23

B-119	56–60'	60–64'
VOCs	0.003	ND
SVOCs	0.15	ND

B-116	54–56'
VOCs	ND
SVOCs	0.07

B-120	56–60'	60–64'
VOCs	ND	0.003
SVOCs	0.23	0.29

B-115	54–56'	62–64'
VOCs	ND	ND
SVOCs	0.25	0.14

NOTE:

MAP SOURCE FOR ST. JOHNS BUILDINGS: MURPHY AND OLMSTEAD, ARCHITECTS– JUNE 30, 1928.

MAP SOURCE FOR OFF SITE FEATURES PROVIDED BY PARSONS ENGINEERING (5/2004) & REFERENCED MAP INFORMATION DERIVED FROM STRATUS SERVICES GROUP, ENGINEERING DIVISION, INC., CRANBURY, NEW JERSEY.

SHADED CELL REPRESENT RSCO EXCEEDENCE OF 10mg/Kg OF TOTAL VOCs AND THE 500mg/Kg TOTAL SVOCs, AS LISTED UNDER TAGM#4046.

RETEC

15' 0 30'
GRAPHIC SCALE1"=30'

AREA OF SOILS CONTAINING RSCO EXCEEDENCES AT DEPTH (>35' BGS) DASHED WHERE INFERRED.

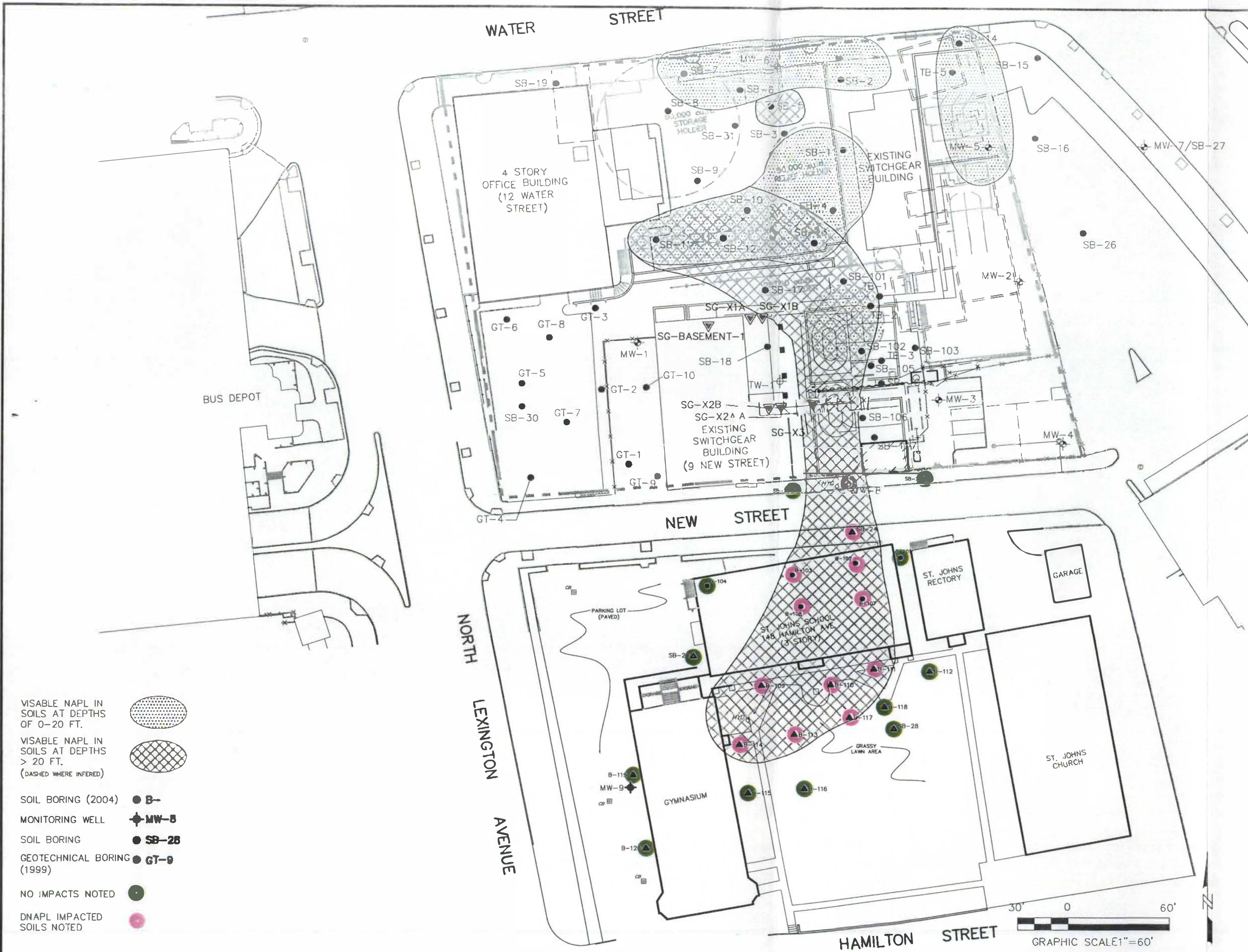
SOIL BORING (2004) ● B-
MONITORING WELL ⌖ MW-8
SOIL BORING (2001) △ SB-ID

WHITE PLAINS FORMER MGP SITE
WHITE PLAINS, NEW YORK

DISTRIBUTION OF TOTAL VOCs AND SVOCs IN SUBSURFACE SOILS (mg\Kg)
ST. JOHNS SCHOOL & RECTORY PROPERTY

DATE: 11/10/05 DRWN: BcV/CON

FIGURE 5-1



NOTE:
MAP SOURCE FOR ST. JOHNS BUILDINGS: MURPHY AND OLMSTEAD, ARCHITECTS– JUNE 30, 1928.

MAP SOURCE FOR OFF SITE FEATURES PROVIDED BY PARSONS ENGINEERING (5/2004) & REFERENCED MAP INFORMATION DERIVED FROM STRATUS SERVICES GROUP, ENGINEERING DIVISION, INC., CRANBURY, NEW JERSEY.

POST INVESTIGATION AIR SAMPLE COLLECTED ON APRIL 24, 2004 WERE TAKEN IN THE SAME LOCATIONS AS THE SAMPLES AND WERE DISTINGUISHED USING "ST-J2" SAMPLE NAME PREFIX.

RETEC

WHITE PLAINS FORMER MGP SITE
WHITE PLAINS, NEW YORK

CECN3-16922

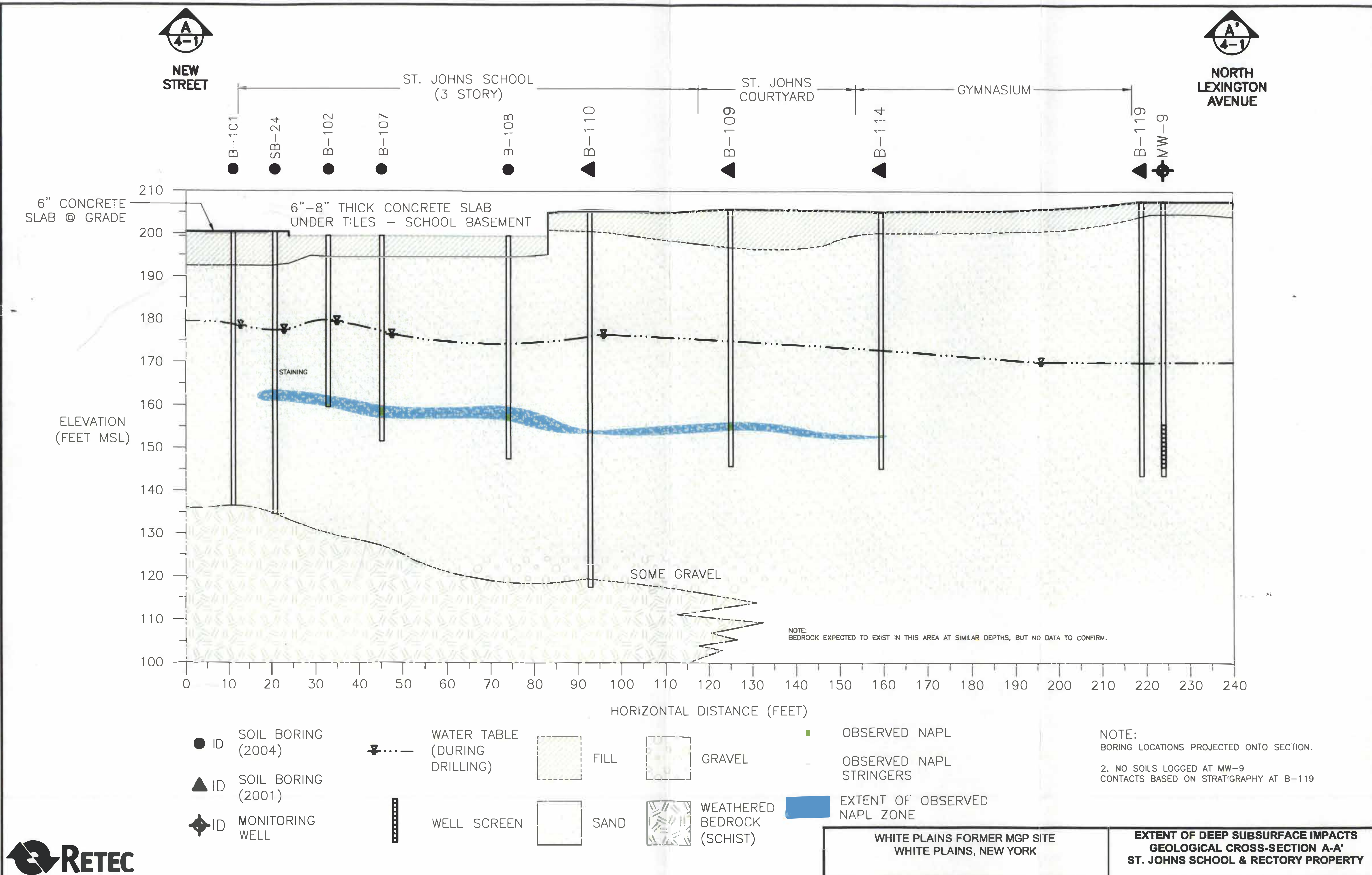
DATE: 11/10/05 | DPWN: BcV/CON

INTERPRETED EXTENT OF DEEP SOIL IMPACTS

ST. JOHNS SCHOOL & RECTORY PROPERTY

FIGURE 5-2

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CECN3-16922-CON-CL-004-RI.dwg Layout: SOIL-DEEP User: BVershon Plotted: Nov 09, 2005 - 5:05pm Xref's:



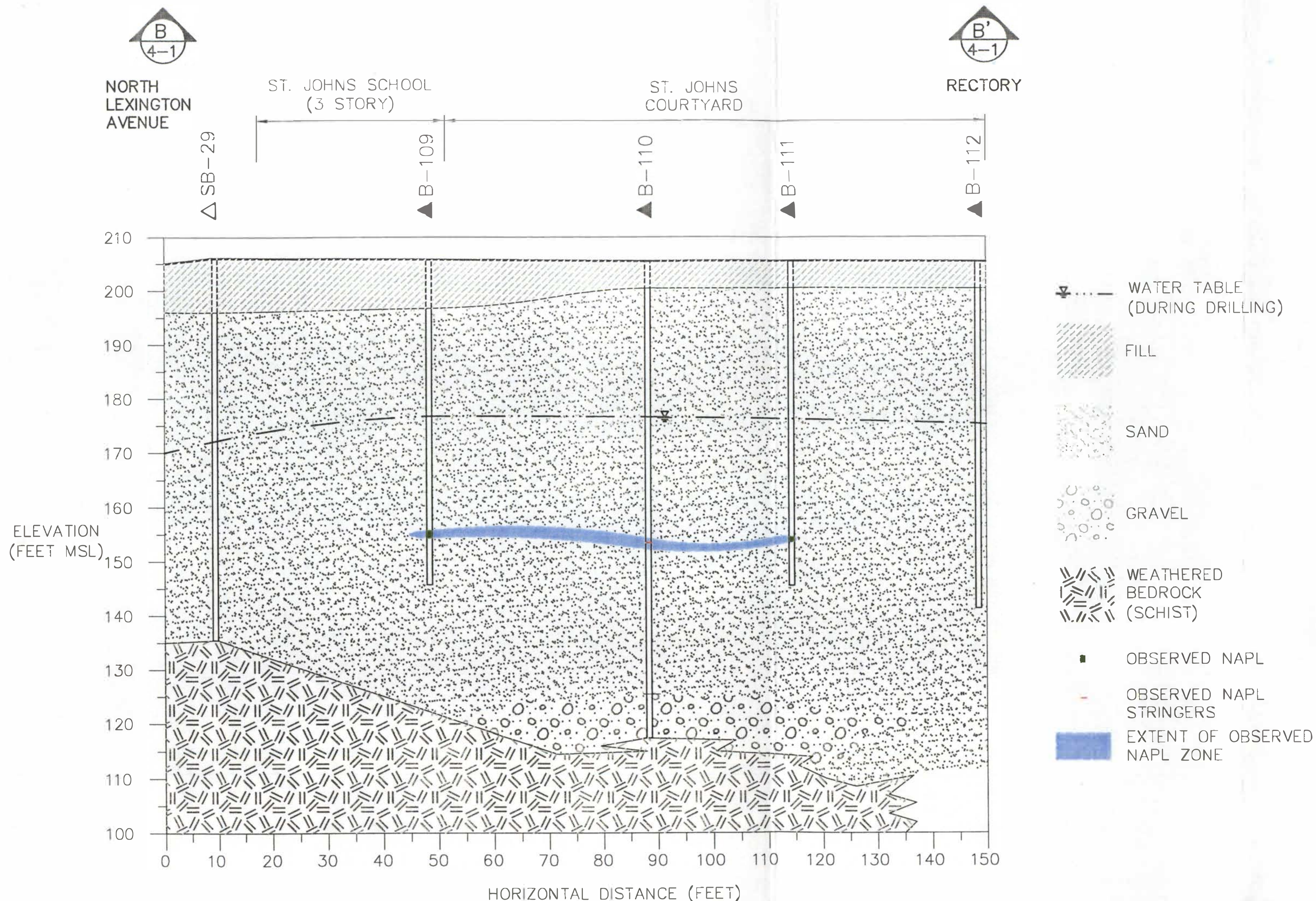
WHITE PLAINS FORMER MGP SITE
WHITE PLAINS, NEW YORK

**EXTENT OF DEEP SUBSURFACE IMPACTS
GEOLOGICAL CROSS-SECTION A-A'
ST. JOHNS SCHOOL & RECTORY PROPERTY**

DATE: 07/25/07 | DRWN: BcV/CON

FIGURE 5-3

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CECNJ-16922-CON-CX-003-RI.dwg Layout: A-A_5-3(REVISED_7-07) User: BVershon Plotted: Jul 26, 2007 - 1:42pm Xref's:

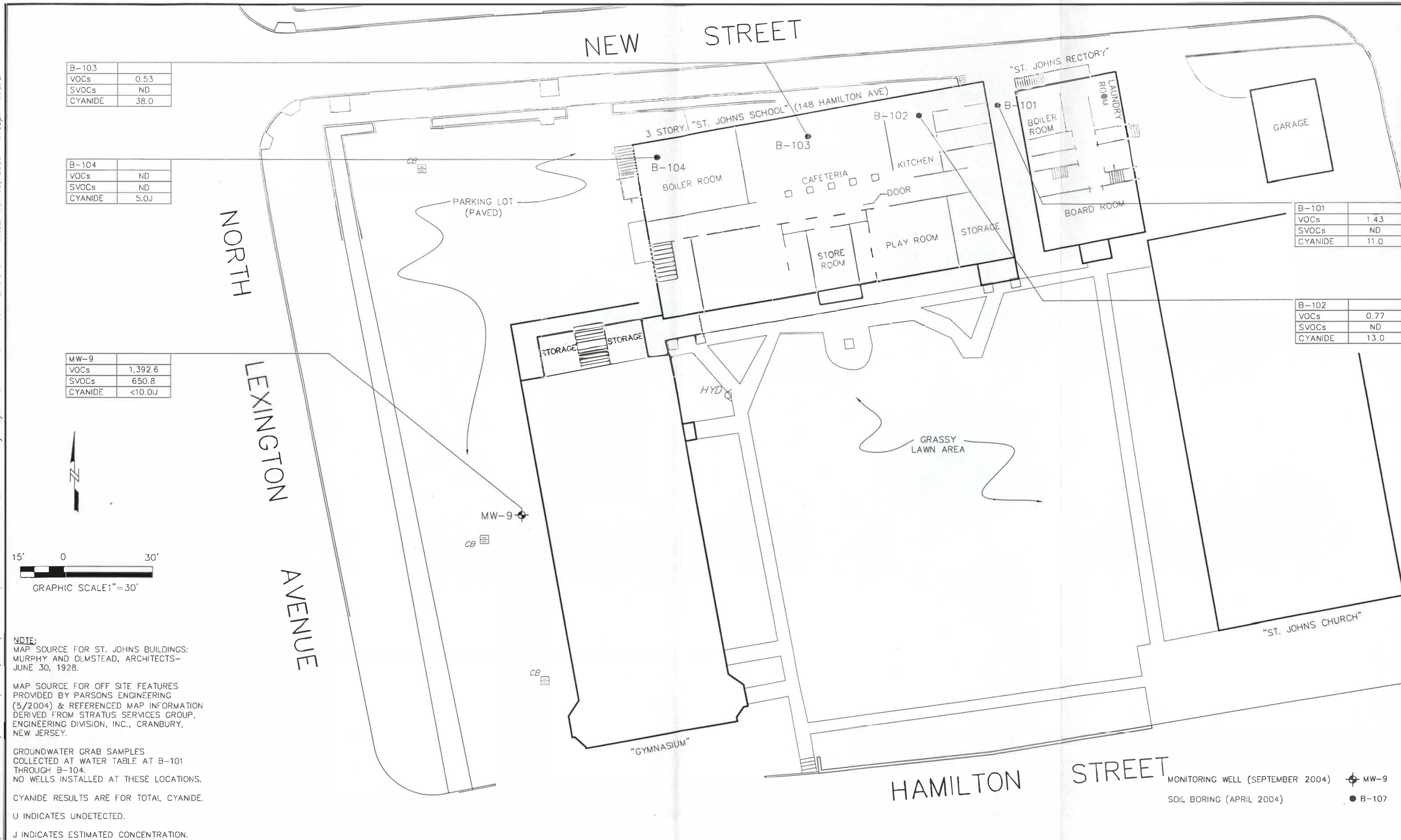


NOTE:
1. BORING LOCATIONS PROJECTED ONTO SECTION.

RETEC

WHITE PLAINS FORMER MGP SITE WHITE PLAINS, NEW YORK	EXTENT OF DEEP SUBSURFACE IMPACTS GEOLOGICAL CROSS SECTION B-B' ST. JOHNS SCHOOL & RECTORY PROPERTY
DATE: 11/10/05 DRWN: BcV/CON	FIGURE 5-4

File: F:\PROJECTS\Consolidated Edison NY\St Johns\16922\CADD\RI-REPORT\CECN3-16922-CON-CX-003-RI.dwg Layout: B-B_5-4 User: BVershon Plotted: Nov 09, 2005 - 5:08pm Xref's:



NOTE:

MAP SOURCE FOR ST. JOHNS BUILDINGS: MURPHY AND OLMSTEAD, ARCHITECTS– JUNE 30, 1928.

MAP SOURCE FOR OFF SITE FEATURES PROVIDED BY PARSONS ENGINEERING (5/2004) & REFERENCED MAP INFORMATION DERIVED FROM STRATUS SERVICES GROUP, ENGINEERING DIVISION, INC., CRANBURY, NEW JERSEY.

GROUNDWATER GRAB SAMPLES COLLECTED AT WATER TABLE AT B-101 THROUGH B-104. NO WELLS INSTALLED AT THESE LOCATIONS.

CYANIDE RESULTS ARE FOR TOTAL CYANIDE.

U INDICATES UNDETECTED.

J INDICATES ESTIMATED CONCENTRATION.

ND INDICATES NONE DETECTED

RETEC

WHITE PLAINS FORMER MGP SITE
WHITE PLAINS, NEW YORK

CECN3-16922

DATE: 11/10/05 DRWN: BcV/CON

DISTRIBUTION OF TOTAL VOCs, SVOCs AND CYANIDE IN GROUNDWATER (ug/L)

ST. JOHNS SCHOOL & RECTORY PROPERTY

FIGURE 5-5

File: F:\PROJECTS\Consolidated Edison NY\St. Johns\16922\CADD\RI-REPORT\CECN3-16922-CON-CL-004-RI.dwg Layout: GW-BOX-DATA User: BVershon Plotted: Nov 09, 2005 - 5:09pm Xref's:

Appendix A

NYSDOH Questionnaires

OSR-3

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH ASSESSMENT
BUREAU OF TOXIC SUBSTANCE ASSESSMENT

INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY

This form must be completed for each residence involved in indoor air testing.

Preparer's Name Dan Shearer (updated Apr 8 2004 by A. Williams) Date Prepared 2/13/2003

Preparer's Affiliation The RETEC Group, Inc. Phone No. 607-277-5716

1. OCCUPANT

Name: St. John's School

Address: 146 Hamilton Avenue

White Plains, New York

County: Westchester

Home Phone No. ________ Office Phone No (914) 949-0439

2. OWNER OR LANDLORD:
(If different than occupant)

Name: Archdiocese of New York

Contact Name: Monsignor Graham

Phone No. (914) 949-0439

A. Building Construction Characteristics

Type (circle appropriate responses): Single Family Multiple Dwelling (Commercial — circled)

Ranch	2-Family
Raised Ranch	Duplex
Split Level	Apartment House ________ Units
Colonial	Number of floors 4
Mobile Home	Other specify School

Residence Age 75 years General Description of Building Construction Materials concrete with brick

Is the building insulated? Yes (circled) / No How air tight is the building Medium

OSR-3 (continued)

B. **Basement construction characteristics (circle all that apply):**

1. Full basement, crawlspace, slab on grade, other ________
2. Basement floor: concrete, dirt, other ________
3. Concrete floor: unsealed, painted, covered; with ________
4. Foundation walls: poured concrete, block, laid up stone, other concrete block
5. The basement is: wet, damp, dry ______ Sump present? y / n yes Water in sump? y / n yes – water is from discharge of boilers.
6. The basement is: finished, unfinished both – some rooms are used on a daily basis (i.e., the cafeteria)
7. Identify potential soil vapor entry points (e.g., cracks, utility ports, etc.) cracks in floor, duct work, utility ports
8. Describe how air tight the basement is substantially air tight

C. **HVAC (circle all that apply):**

1. The type of heating system(s) used in this residence is/are:

Hot Air Circulation	Heat Pump
Hot Water Radiation	Unvented Kerosene Heater
Steam Radiation	Wood stove
Electric Baseboard	Other (specify)________

2. The type(s) of fuel(s) used is/are: Natural Gas Fuel Oil, Electric, Wood, Coal Solar

   Other (specify)________.
3. Is the heating system's power plant located in the basement or another area: Boiler Room.
4. Is there air-conditioning? Yes / No Central Air or Window Units?

   Specify the location ________
5. Are there air distribution ducts present? Yes / No
6. Describe the supply and cold air return duct work in the basement including whether there is a cold air return, the tightness of duct joints
   There is an unpowered external air return

OSR-3 (continued)

D. Potential Indoor Sources of Pollution

1. Has the house ever had a fire? Yes / No
2. Is there an attached garage? Yes / No
3. Is a vehicle normally parked in the garage? Yes / No
4. Is there a kerosene heater present? Yes / No
5. Is there a workshop, hobby or craft area in the residence? Yes / No
6. An inventory of all products used or stored in the home should be performed. Any products that contain volatile organic compounds or chemicals similar to the target compounds should be listed. The attached product inventory form should be used for this purpose.
7. Is there a kitchen exhaust fan? Yes / No Where is it vented? To the outside
8. Has the house ever been fumigated? If yes describe date, type and location of treatment.
   No

E. Water and Sewage (Circle the appropriate response)

Source of Water

Public Water Drilled Well Driven Well Dug Well Other (Specify)__________

Water Well Specifications: Not Applicable

Well Diameter __________ Grouted or Ungrouted __________

Well Depth __________ Type of Storage Tank __________

Depth to Bedrock __________ Size of Storage Tank __________

Feet of Casing __________ Describe type(s) of Treatment __________

Water Quality: Not Applicable

Taste and/or odor problems? y / n If so, describe __________

How long has the taste and/or odor been present? __________

Sewage Disposal: Public Sewer Septic Tank Leach Field Other (Specify) __________

Distance from well to septic system __________ Type of septic tank additive __________

OSR-3 (continued)

F. Plan View

Draw a plan view sketch for each floor of the residence and if applicable, indicate air sampling locations, possible indoor air pollution sources and PID meter readings.

Refer to the site specific work plan.

OSR-3 (continued)

G. Potential Outdoor Sources of Pollution

Draw a sketch of the area surrounding the residence being sampled. If applicable, provide information on the spill location (if known), potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system if applicable, and a qualifying statement to help locate the site on a topographical map.

Typical urban environment. Refer to the site specific work plan and documents for more information.

Household Products Inventory

Occupant / residence St. John's School 146 Hamilton Avenue

Investigator: Ali Williams Date: April 8, 2004

Product description (dispenser, size, manufacturer …)	VOC Ingredients	PID Reading
Kitchen		33 ppb
Moisturizing Hand Cream	N/A	
Hand Soap	N/A	
Cafeteria		57- 75ppb
See attached Chemical Inventory		
Boiler Room		55-60 ppb
See attached Chemical Inventory		
Playroom		55-63 ppb
See attached Chemical Inventory		
Classroom #1		52 ppb
Lysol (1 can)	79% ethanol	
Elmer's Glue (2- 5 oz. Bottles)	Ethyl 2-cyanoacrylate	
Classroom #2		77 ppb
Elmer's Glue (1-1 gal. Tub, 30-5 0z. bottles)	Ethyl 2-cyanoacrylate	
Classroom #3		72 ppb
See attached Chemical Inventory		
Boy's Bathroom		70 ppb
Hand Soap	N/A	

OSR-3

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH ASSESSMENT
BUREAU OF TOXIC SUBSTANCE ASSESSMENT

INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY

This form must be completed for each residence involved in indoor air testing.

Preparer's Name Dan Shearer (updated Apr 8 2004 by A. Williams) Date Prepared 2/13/2003

Preparer's Affiliation The RETEC Group, Inc. Phone No. 607-277-5716

1. OCCUPANT

Name: St. John's Rectory

Address: 148 Hamilton Avenue

White Plains, New York

County: Westchester

Home Phone No. ________ Office Phone No (914) 949-0439

2. OWNER OR LANDLORD:
(If different than occupant)

Name: Archdiocese of New York

Contact Name: Monsignor Graham

Phone No. (914) 949-0439

A. Building Construction Characteristics

Type (circle appropriate responses): Single Family (Multiple Dwelling - circled) Commercial

Ranch	2-Family
Raised Ranch	Duplex
Split Level	Apartment House ______ Units
Colonial	Number of floors 3
Mobile Home	Other specify Rectory

Residence Age 75 years General Description of Building Construction Materials concrete slab floors, wood stairs, brick and stone exterior.

Is the building insulated? (Yes - circled) No How air tight is the building Medium

OSR-3 (continued)

B. Basement construction characteristics (circle all that apply):

1. Full basement, crawlspace, slab on grade, other ________
2. Basement floor: concrete, dirt, other ________
3. Concrete floor: unsealed, painted, covered; with ________
4. Foundation walls: poured concrete, block, laid up stone, other concrete block
5. The basement is: wet, damp, dry ______ Sump present? y / n yes Water in sump? y / n no____
6. The basement is: finished, unfinished ________________________
7. Identify potential soil vapor entry points (e.g., cracks, utility ports, etc.)
   none observed
8. Describe how air tight the basement is substantially air tight ________________________

C. HVAC (circle all that apply):

1. The type of heating system(s) used in this residence is/are:

   Hot Air Circulation — Heat Pump

   Hot Water Radiation — Unvented Kerosene Heater

   Steam Radiation — Wood stove

   Electric Baseboard — Other (specify)________________

2. The type(s) of fuel(s) used is/are: Natural Gas, Fuel Oil, Electric, Wood, Coal Solar

   Other (specify)________________

3. Is the heating system's power plant located in the basement or another area: Rectory Basement, Boiler Room
4. Is there air-conditioning? Yes / No Central Air or Window Units?

   Specify the location 12 units ________________

5. Are there air distribution ducts present? Yes / No
6. Describe the supply and cold air return duct work in the basement including whether there is a cold air return, the tightness of duct joints
   Average, no cold air return

OSR-3 (continued)

D. Potential Indoor Sources of Pollution

1. Has the house ever had a fire? Yes / No
2. Is there an attached garage? Yes / No
3. Is a vehicle normally parked in the garage? Yes / No
4. Is there a kerosene heater present? Yes / No
5. Is there a workshop, hobby or craft area in the residence? Yes / No
6. An inventory of all products used or stored in the home should be performed. Any products that contain volatile organic compounds or chemicals similar to the target compounds should be listed. The attached product inventory form should be used for this purpose.
7. Is there a kitchen exhaust fan? Yes / No Where is it vented? To the outside
8. Has the house ever been fumigated? If yes describe date, type and location of treatment.
Yes, monthly fumigation for roaches

E. Water and Sewage (Circle the appropriate response)

Source of Water

Public Water Drilled Well Driven Well Dug Well Other (Specify)____________

Water Well Specifications: Not Applicable

Well Diameter ____________ Grouted or Ungrouted ____________

Well Depth ____________ Type of Storage Tank ____________

Depth to Bedrock ____________ Size of Storage Tank ____________

Feet of Casing ____________ Describe type(s) of Treatment ____________

Water Quality: Not Applicable

Taste and/or odor problems? y / n If so, describe ____________

How long has the taste and/or odor been present? ____________

Sewage Disposal: Public Sewer Septic Tank Leach Field Other (Specify) ____________

Distance from well to septic system ____________ Type of septic tank additive ____________

OSR-3 (continued)

F. <u>Plan View</u>

Draw a plan view sketch for each floor of the residence and if applicable, indicate air sampling locations, possible indoor air pollution sources and PID meter readings.

Refer to the site specific work plan.

OSR-3 (continued)

G. Potential Outdoor Sources of Pollution

Draw a sketch of the area surrounding the residence being sampled. If applicable, provide information on the spill location (if known), potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system if applicable, and a qualifying statement to help locate the site on a topographical map.

Typical urban environment. Refer to the site specific work plan and documents for more information.

Household Products Inventory

Occupant / residence St. John's Rectory 148 Hamilton Avenue

Investigator: Ali Williams

Date: April 8, 2004

Product description (dispenser, size, manufacturer …)	VOC Ingredients	PID Reading
Boiler Room		45 ppb
Catchmaster cockroach poison	NA	
Basement Hallway		50-79 ppb
"Sweeping compound"	90% aspirin	
1st Floor Hall		55 ppb
See attached Chemical Inventory		
Pantry		120 ppb
See attached Chemical Inventory		

OSR-3

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH ASSESSMENT
BUREAU OF TOXIC SUBSTANCE ASSESSMENT

INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY

This form must be completed for each residence involved in indoor air testing.

Preparer's Name Dan Shearer (updated on Apr 8 2004 by A. Williams) Date Prepared 2/13/2003

Preparer's Affiliation The RETEC Group, Inc. Phone No. 607-277-5716

1. OCCUPANT

Name: St. John's Gymnasium

Address: 146 Hamilton Avenue

White Plains, New York

County: Westchester

Home Phone No. ________ Office Phone No (914) 949-0439

2. OWNER OR LANDLORD:
(If different than occupant)

Name: Archdiocese of New York

Contact Name: Monsignor Graham

____

Phone No. (914) 949-0439

A. Building Construction Characteristics

Type (circle appropriate responses): Single Family Multiple Dwelling (Commercial — circled)

Ranch
Raised Ranch
Split Level
Colonial
Mobile Home

2-Family
Duplex
Apartment House ________ Units
Number of floors 1
Other specify Gymnasium

Residence Age 75 years General Description of Building Construction Materials concrete with brick

____

Is the building insulated? (Yes — circled) / No How air tight is the building Medium

____

OSR-3 (continued)

B. Basement construction characteristics (circle all that apply):

1. Full basement, crawlspace, slab on grade, other ________
2. Basement floor: concrete, dirt, other ________
3. Concrete floor: unsealed, painted, covered; with ______
4. Foundation walls: poured concrete, block, laid up stone, other concrete block
5. The basement is: wet, damp, dry ______ Sump present? y / n yes Water in sump? y / n yes – water is from discharge of boilers.
6. The basement is: finished, unfinished both – some rooms are used on a daily basis (i.e., the cafeteria)
7. Identify potential soil vapor entry points (e.g., cracks, utility ports, etc.) cracks in floor, duct work, utility ports
8. Describe how air tight the basement is substantiall y air tight

C. HVAC (circle all that apply):

1. The type of heating system(s) used in this residence is/are:

Hot Air Circulation	Heat Pump
Hot Water Radiation	Unvented Kerosene Heater
Steam Radiation	Wood stove
Electric Baseboard	Other (specify)________

2. The type(s) of fuel(s) used is/are: Natural Gas, Fuel Oil, Electric, Wood, Coal Solar

   Other (specify)________

3. Is the heating system's power plant located in the basement or another area: Boiler Room.
4. Is there air-conditioning? Yes / No Central Air or Window Units?

   Specify the location ________

5. Are there air distribution ducts present? Yes / No
6. Describe the supply and cold air return duct work in the basement including whether there is a cold air return, the tightness of duct joints
   There is an unpowered external air return

OSR-3 (continued)

D. Potential Indoor Sources of Pollution

1. Has the house ever had a fire? Yes / No
2. Is there an attached garage? Yes / No
3. Is a vehicle normally parked in the garage? Yes / No
4. Is there a kerosene heater present? Yes / No
5. Is there a workshop, hobby or craft area in the residence? Yes / No
6. An inventory of all products used or stored in the home should be performed. Any products that contain volatile organic compounds or chemicals similar to the target compounds should be listed. The attached product inventory form should be used for this purpose.
7. Is there a kitchen exhaust fan? Yes / No   Where is it vented? To the outside
8. Has the house ever been fumigated? If yes describe date, type and location of treatment.
   No

E. Water and Sewage (Circle the appropriate response)

Source of Water

Public Water   Drilled Well   Driven Well   Dug Well   Other (Specify)__________

Water Well Specifications: Not Applicable

Well Diameter __________   Grouted or Ungrouted __________

Well Depth __________   Type of Storage Tank __________

Depth to Bedrock __________   Size of Storage Tank __________

Feet of Casing __________   Describe type(s) of Treatment __________

Water Quality: Not Applicable

Taste and/or odor problems? y / n   If so, describe __________

How long has the taste and/or odor been present? __________

Sewage Disposal: Public Sewer   Septic Tank   Leach Field   Other (Specify) __________

Distance from well to septic system __________ Type of septic tank additive __________

OSR-3 (continued)

F. **Plan View**

Draw a plan view sketch for each floor of the residence and if applicable, indicate air sampling locations, possible indoor air pollution sources and PID meter readings.

Refer to the site specific work plan.

OSR-3 (continued)

G. Potential Outdoor Sources of Pollution

Draw a sketch of the area surrounding the residence being sampled. If applicable, provide information on the spill location (if known), potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system if applicable, and a qualifying statement to help locate the site on a topographical map.

Typical urban environment. Refer to the site specific work plan and documents for more information.

Household Products Inventory

Occupant / residence St. John's Gymnasium 146 Hamilton Avenue

Investigator: Ali Williams

Date: April 8, 2004

Product description (dispenser, size, manufacturer ...)	VOC Ingredients	PID Reading
Gymnasium		40-42 ppb
None		

Chemical Inventory
for
St. John the Evangelist Catholic School
146 Hamilton Avenue
White Plains, New York
for
Consolidated Edison Co. of New York, Inc.
RETEC Project Number CECN3-16922
April 9, 2004

<u>Rectory Kitchen</u>

1. Lysol, All-Purpose cleaner, Lemon Breeze
   Benzyl Ammonium Chlorides

2. Mop and Glo
   Rickitt Benckiser Inc.

3. Easy Off Heavy Duty
   Rickitt Benckiser Inc

4. Fantastic Spray Cleaner
   National Brands Inc.

5. Windex
   Drackett Professionals

6. Comet
   Procter and Gamble

7. Brillo Soap Pads
   Katy Ind.

8. Spic and Span
   Procter and Gamble

<u>Rectory Basement Hallway</u>

9. Sweeping Compound, 2 one hundred pound drums
   90% Aspirin

<u>Rectory Boiler Room</u>

10. Catchmaster Roach Poison

School Classroom #1

11. Lysol
    Dimethylbenzyl Ammonium Saccharinate
    Ethanol 79%

12. Elmer's School Glue
    www.elmers.com

School Classroom #3

13. Elmer's School Glue
    www.elmers.com

Chemical Inventory
for
St. John the Evangelist Catholic School
146 Hamilton Avenue
White Plains, New York
for
Consolidated Edison Co. of New York, Inc.

Clayton Project No. 40-03372.00

February 21, 2003

RECTORY

1. Countertop Magic Cleaner polish for formica
   Magic American Corp.
   Cleveland, Ohio

2. Glade, one spray container
   SC Johnson Wax

3. Wisk, two 1-gallon containers

4. Downey Fabric Softener, two 20-ounce containers

5. Windex spray bottle, 5-ounce container

6. Shout, one 60-ounce bottle

7. Bleach, one gallon container

8. Clorox powder detergent, 1 box

9. Niagara Professional Finish Spray Starch
   CPC International

SCHOOL

Basement Shop

10. Wood Finishers Pride Varnish Stripping Gel
    Wm Barr
    Memphis, Tennessee

Chemical Inventory (continued)
for
St. John the Evangelist Catholic School
146 Hamilton Avenue
White Plains, New York
for
Consolidated Edison Co. of New York, Inc.

Clayton Project No. 40-03372.00

February 21, 2003

SCHOOL

Basement Shop

11. Brasso

12. 3-in-1 Oil

13. Acrylic latex semi-gloss paint, one gallon
    Wallauer's

14. Benjamin Moore premium latex interior #592

15. Bernzomatic propane

Boiler Room

16. Spray enamel, gold, one can
    Chase Products
    Maywood, Illinois

17. Zep Reach, one bottle

Basement Play Room

18. Fantastik lemon power, antibacterial
    SC Johnson

Cafeteria

19. Green liquid detergent, one container

20. Grease Relief oven cleaner

Chemical Inventory (continued)
for
St. John the Evangelist Catholic School
146 Hamilton Avenue
White Plains, New York
for
Consolidated Edison Co. of New York, Inc.

Clayton Project No. 40-03372.00

February 21, 2003

SCHOOL

Cafeteria

21. Fantastic spray cleaner

Basement – Storage

22. Spray paints

23. 3M spray adhesive Super 77

24 Wood Finish Products

25. 3M Wax removal

26. Paint thinner

27. Interior and exterior paints, 15 gallons

28. Floor stripper, 10 gallons

First Floor – Classroom #3

29. Elmers Glue

30. Washable paints

31. Rauch Blitz snow spray

First Floor – Classroom #2

32. Formula 409
Clorox Company

Chemical Inventory (continued)
for
St. John the Evangelist Catholic School
146 Hamilton Avenue
White Plains, New York
for
Consolidated Edison Co. of New York, Inc.

Clayton Project No. 40-03372.00

February 21, 2003

SCHOOL

First Floor – Classroom #1

33. Elmers Glue

Basement Storage Closet in Stairwell

34. Trouble Shooter Sunshine, one 5-gallon container
Strauss
(914) 937-0604

Basement Storage Closet in Stairwell

35. Prime Source Oxygen Bleach Cleaner, 19 containers, 21 ounces in each
--Sodium linear alkylbenzene sulfonate
--Sodium carbonate
--Sodium perbonate
Prime Source
St. Louis, Montana 63141

36. Ajax Oxygen Bleach Cleaner Easy Rinse Formula, five 21-ounce containers
--$CaCO_3$
--Na_2CO_3
--Dodecylbenzene sulfonate
Colgate-Palmolive
Morristown, New Jersey 07962

37. Twinkle Stainless Steel Cleaner and Polish, two 17-ounce containers
The Drackett Products Company
Professional Products Division
5020 Spring Grove Avenue
Cincinnati, Ohio 45232-1988

Chemical Inventory (continued)
for
St. John the Evangelist Catholic School
146 Hamilton Avenue
White Plains, New York
for
Consolidated Edison Co. of New York, Inc.

Clayton Project No. 40-03372.00

February 21, 2003

SCHOOL

Basement Storage Closet in Stairwell

38. Febreeze, one 500 milliliter container
Proctor & Gamble
Cincinnati, Ohio 45202

39. Elite Ammonia

40. Gum Remover, Part #04198, one 12-ounce container
--pentane
--1,1,1,2 tetrafluoroethane
SC Johnson Professional

41. Quik Freeze Chewing Gum and Candle Wax Remover, one 5.5-ounce container
--water
--acrylic copolymer
--polydimethyl siloxane
--triethanolamine
Proall Products
Division of Chase Products
P.O. Box 7502
Westchester, Illinois 60154

42. Cello Brite Defoamer, Part #582, one quart container
Sherwin Williams Diversified Brands
1354 Old Post Road
Moure de Grace, Maryland 21078-0366
800-638-4850

Chemical Inventory (continued)
for
St. John the Evangelist Catholic School
146 Hamilton Avenue
White Plains, New York
for
Consolidated Edison Co. of New York, Inc.

Clayton Project No. 40-03372.00

February 21, 2003

SCHOOL

Basement Storage Closet in Stairwell

43. Hydro Sheen Kitchen Metal Polish, one 18-ounce container
--butane
--mineral oil, CAS # 8072-47-5
--propane
--water
Proall

44. Calcium Lime and Rust Remover, Part # HDRust 32, one 32-ounce container
ZEP
P.O. Box 1060
Catersville, Georgia 30120-1060
Website: ZEPcommercial.com

45. D/T Bowl Cleaner, one 32-ounce container
--hydrogen chloride
--n-alkyl(C_{14}60%, C_{16}30%, C_{12}5%, C_{6}5%) dimethylbenzyl ammonium chlorides
--n-alkyl (C_{12}68%, C_{14}32%) dimethyl ethylbenzyl ammonium chlorides
Canberra Corporation
3610 Holland-Sylvania Road
Toledo, Ohio 43615

46. Windex, Part #43664 (00/61), one gallon container
--2-butoxy ethanol
--Ammonium hydroxide
--water
The Drackett Products Company

Chemical Inventory (continued)
for
St. John the Evangelist Catholic School
146 Hamilton Avenue
White Plains, New York
for
Consolidated Edison Co. of New York, Inc.

Clayton Project No. 40-03372.00

February 21, 2003

SCHOOL

Basement Storage Closet in Stairwell

47. Butcher's Major Wax Spray Buff, two 1-gallon containers
--water
--dipropylene glycol
--triethylene glycol
Butcher Company
Marlborough, MA 01752

48. Quantum Spray Buff, Part #MA1900-1, one gallon container
--Blended Acrylic Polymer Latex, CAS#62180-77-2
--Diethylene Glycol Methyl Ether, CAS#111-72-3
--Dibutyl Phthalate, CAS#84-74-2
--polyethylene emulsion
Quantum Products
Carteret, New Jersey 07008
800-922-1998

49. Paint Thinner, one 16-ounce container
EE Zimmerman Company
Pittsburgh, Pennsylvania 15233
412-963-0949

50. Bissell One Step Wood Floor Care, one 32-ounce container
Penn Champ, Inc.
Butler, Pennsylvania 16001

51. Wood Finisher's Pride, one 64-ounce container
Creative Tech Group, Inc.
Greenville, South Carolina 29601
800-45-PRIDE

Chemical Inventory (continued)
for
St. John the Evangelist Catholic School
146 Hamilton Avenue
White Plains, New York
for
Consolidated Edison Co. of New York, Inc.

Clayton Project No. 40-03372.00

February 21, 2003

SCHOOL

Basement Storage Closet in Stairwell

52. Mop & Glo, Part# 360258, one 32-ounce container
Reckitt & Coleman
Household Products Division
Montvale, New Jersey 07645

53. MinWax Anchoring Cement, Part# 12-48205-000, one 5-pound container
MinWax
15 Mercedes Drive 07645
Montvale, New Jersey 07645

54. AD-52, one gallon container
Congoleum
861 Sloan Avenue
Trenton, New Jersey 08619

55. DAP wallboard joint compound, three 1-gallon containers

56. Paint, one gallon container

57. Behr Premium Plus Interior Semi-Gloss Enamel Wall & Trim, Part# 3400, two 5-gallon containers

58. US Gypsum Sheetrock All-purpose Joint Compound, three 5-gallon containers
914-948-4000

59. Wallauer's Wall-Pro Wall & Ceiling Vinyl Flat Paint, Part# 3250-5, one 5-gallon container

60. Presumably paint, three 5-gallon containers
All-Pro

Chemical Inventory (continued)
for
St. John the Evangelist Catholic School
146 Hamilton Avenue
White Plains, New York
for
Consolidated Edison Co. of New York, Inc.

Clayton Project No. 40-03372.00

February 21, 2003

SCHOOL

Basement Storage Closet in Stairwell

61. Unbelievable Stain Remover and Deodorizer, one gallon container
P.O. Box 669
Canton, Texas 75103
800-925-CORE

62. Professional Spot Lifter, Part# PRSL-1G, two 1-gallon containers
--water
--d-limonene
--2-butoxyethanol
--Alpha Olefin Sulfonate, CAS# 68439-57-6
--Synthetic Isoparaffinic hydrocarbon, CAS# 64742-48-9
Chem Spec
800-638-7370

63. Butcher's Revolver, one gallon container
—water
--naphthalene sodium sulfonate
--viable bacterial cultures, diethylene glycol monobutyl ether, CAS# 1128-34-5
Butcher

64. Hy Gloss Floor Finish, one 5-gallon container
Strauss Paper Company
10 Slater Street
Port Chester, New York 10573
714-937-0004
Fax: 800-833-3538

Chemical Inventory (continued)
for
St. John the Evangelist Catholic School
146 Hamilton Avenue
White Plains, New York
for
Consolidated Edison Co. of New York, Inc.

Clayton Project No. 40-03372.00

February 21, 2003

SCHOOL

Basement Storage Closet in Stairwell

65. Butcher's Breakdown, two 1-gallon containers
--water
--fragrance mix
--viable bacterial cultures, linear primary alcohol ethoxylate, CAS# 34398-01-1
Butcher

Appendix B

Subsurface Soil Boring Logs

The RETEC Group, Inc.
300 Baker Ave, Suite 302
Concord, MA 01742-2851
(978) 371-1422 Phone
(978) 371-1448 Fax
www.retec.com

BOREHOLE LOG

ID: B-101

RETEC

Project Number: CECN3-16922-202	**Drilling Co.:** Aquifer Drilling and Testing	**Surface Elevation:** 200.52 NAVD88
Client: Con Edison	**Driller:** Mark Larable	**Water Level During Drilling:** 22' bgs
Site Location: St. John's School	**Casing ID:** 2-inch	**Stickup:** NA
Start Date: April 13, 2004	**Method:** Direct-Push (GeoProbe on ATV)	**MP Elevation:**
Completion Date: April 13, 2004	**Logged By:** Joshua Millard	**Total Depth:** 64' bgs
Location: Between School Building and Rectory		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
0					Ground Surface CONCRETE
0 - 5	NA	0.5	NA		FILL (0 - 2' bgs) - Light brown, dry, SAND, little fine Gravel size slag-like pieces. (2 - 5' bgs) - Moderate brown, damp, dense, medium to fine SAND, trace brown Silt, no staining, no odor.
5 - 8	100	6.0	NA		(5 - 8' bgs) - Moderate brown, damp, soft, fine SAND, trace Silt.
8 - 12	100	2.7	NA		SAND (8 - 12' bgs) - Moderate brown, damp, soft, fine SAND, interlayered grain sizes, some Silt, trace roots.
12 - 16	100	5.3	NA		(12 - 16' bgs) - SAA, lighter brown interlayered with tan Silt.
16 - 20	100	3.0	NA		(16 - 20' bgs) - SAA, dry.

Remarks: Discrete sampler used below water table
1. bgs - below ground surface
2. SAA - Same as Above
3. groundwater collected 22 - 24' bgs
4. Well point sampled by low flow
5. Heavy rain during drilling
6. NA - Not Applicable
7. Samples w/ < 100% recovery referenced to base of sample for consistency - actual sample depths may be from anywhere w/in the sample interval.
8. Soil gas sample collected from 0-2' bgs

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www.retec.com

BOREHOLE LOG

ID: B-101

RETEC

Project Number: CECN3-16922-202	Drilling Co.: Aquifer Drilling and Testing	Surface Elevation: 200.52 NAVD88
Client: Con Edison	Driller: Mark Larabie	Water Level During Drilling: 22' bgs
Site Location: St. John's School	Casing ID: 2-inch	Stickup: NA
Start Date: April 13, 2004	Method: Direct-Push (GeoProbe on ATV)	MP Elevation:
Completion Date: April 13, 2004	Logged By: Joshua Millard	Total Depth: 64' bgs
Location: Between School Building and Rectory		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
20–24	100	5.1	NA		(20 - 24' bgs) - SAA, wet at 22' bgs.
24–28	75	4.3	NA		(24 - 28' bgs) - Brown, wet, fine SAND, well sorted, trace Silt, some black heavy minerals (micas).
28–32	100	6.1	NA		(28 - 30' bgs) - SAA, soft, wet, fine SAND. (30 - 32' bgs) - Brown, wet, fine SAND, some Silt, upper 1 foot of spoon is coarse Sand.
32–36	100	4.1	NA		(32 - 36' bgs) - Brown, wet, soft, medium to fine SAND.
36–40	100	6.0	NA		(36 - 40' bgs) - Wet, soft, coarse to medium SAND, some black heavy minerals (mica).

Remarks: Discrete sampler used below water table
1. bgs - below ground surface
2. SAA - Same as Above
3. groundwater collected 22 - 24' bgs
4. Well point sampled by low flow
5. Heavy rain during drilling
6. NA - Not Applicable
7. Samples w/ < 100% recovery referenced to base of sample for consistency - actual sample depths may be from anywhere w/in the sample interval.
8. Soil gas sample collected from 0-2' bgs

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BOREHOLE LOG

ID: B-101

RETEC

Project Number: CECN3-16922-202	Drilling Co.: Aquifer Drilling and Testing	Surface Elevation: 200.52 NAVD88
Client: Con Edison	Driller: Mark Larabie	Water Level During Drilling: 22' bgs
Site Location: St. John's School	Casing ID: 2-inch	Stickup: NA
Start Date: April 13, 2004	Method: Direct-Push (GeoProbe on ATV)	MP Elevation:
Completion Date: April 13, 2004	Logged By: Joshua Millard	Total Depth: 64' bgs
Location: Between School Building and Rectory		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
40-44	60	1.6	NA		(40 - 44' bgs) - SAA, wet
44-48	60	1.5	NA		(44 - 48' bgs) - SAA
48-52	80	1.5	NA		(48 - 52' bgs) - SAA
52-56	100	1.7	NA		(52 - 56' bgs) - SAA
56-60	60	4.0	NA		(56 - 60' bgs) - SAA

Remarks: Discrete sampler used below water table
1. bgs - below ground surface
2. SAA - Same as Above
3. groundwater collected 22 - 24' bgs
4. Well point sampled by low flow
5. Heavy rain during drilling
6. NA - Not Applicable
7. Samples w/ < 100% recovery referenced to base of sample for consistency - actual sample depths may be from anywhere w/in the sample interval.
8. Soil gas sample collected from 0-2' bgs

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BOREHOLE LOG

ID: B-101

RETEC

Project Number: CECN3-16922-202	**Drilling Co.:** Aquifer Drilling and Testing	**Surface Elevation:** 200.52 NAVD88
Client: Con Edison	**Driller:** Mark Larabie	**Water Level During Drilling:** 22' bgs
Site Location: St. John's School	**Casing ID:** 2-inch	**Stickup:** NA
Start Date: April 13, 2004	**Method:** Direct-Push (GeoProbe on ATV)	**MP Elevation:**
Completion Date: April 13, 2004	**Logged By:** Joshua Millard	**Total Depth:** 64' bgs
Location: Between School Building and Rectory		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
60–64	100	13.4	NA		(60 - 63.75' bgs) - SAND. (63.75 - 63.85' bgs) - Light grey, fine SAND and SILT.
64					**WEATHERED BEDROCK** (63.85 - 64.00' bgs) - Crushed stone / Bedrock. Bottom of Borehole

Depth scale: 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80

Remarks: Discrete sampler used below water table
1. bgs - below ground surface
2. SAA - Same as Above
3. groundwater collected 22 - 24' bgs
4. Well point sampled by low flow
5. Heavy rain during drilling
6. NA - Not Applicable
7. Samples w/ < 100% recovery referenced to base of sample for consistency - actual sample depths may be from anywhere w/in the sample interval.
8. Soil gas sample collected from 0-2' bgs

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BOREHOLE LOG

ID: B-102

RETEC

Project Number: CECN3-16922-202	**Drilling Co.:** Aquifer Drilling and Testing	**Surface Elevation:** 199.42 NAVD88
Client: Con Edison	**Driller:** Mark Larabie and Lloid	**Water Level During Drilling:** 20' bgs
Site Location: St. John's School	**Casing ID:** 2-Inch	**Stickup:** NA
Start Date: April 16, 2004	**Method:** Direct-Push (JH and Geoprobe)	**MP Elevation:**
Completion Date: April 16, 2004	**Logged By:** J. Millard and Jesse Lloyd	**Total Depth:** 40 ' bgs
Location: In the Kitchen, basement of school		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
0					Basement Floor **CONCRETE** Six inches of concrete over 4-inch tile.
0–5	NA	6.2	NA		**FILL** (0 - 5' bgs) -Tan, dry (damp at 4' bgs), medium to fine SAND, little medium to fine Gravel.
5–8	50	7.7	NA		**SAND** (5 - 6.5' bgs) - Interbedded tan and light brown, loose, medium to fine SAND. (6.5 - 8' bgs) - Light brown, damp, medium to fine SAND, little Silt.
8–12	90	7.8	NA		(8 - 9' bgs) - Interbedded brown and tan, damp, medium dense, fine SAND, little Silt. (9 - 10' bgs) - Brown, dry, loose, medium to fine SAND. (10 - 12' bgs) - Interbedded brown, damp, medium to fine SAND and tan, moist, fine SAND, little Silt, medium dense.
12–16	90	5.8	NA		(12 - 16' bgs) - Interbedded tan and brown, dry, medium dense, fine to medium SAND.
16–20	90	1.0	NA		(16 - 20' bgs) - Tan, moist, medium dense, medium to fine SAND, few thin beds of brown, fine to medium SAND.
20–					(20 - 24' bgs) - Tan, wet, dense, fine to medium SAND. 23.5' bgs - Three-inch lens of rounded, medium GRAVEL and SAND.

Remarks: Discrete sampler used below water table

1. bgs - below ground surface / **floor**
2. SAA - Same as Above
3. Groundwater collected from 20-24' bgs
4. Geoprobe well sampled by low flow
5. NA - Not Applicable
6. JH - Jackhammer
7. Samples w/ <100% recovery referenced to base of sample for consistency - actual depths may be from anywhere w/in the sample interval.
8. Soil gas sample collected from 0-2' bgs

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BOREHOLE LOG

ID: B-102

RETEC

Project Number: CECN3-16922-202	**Drilling Co.:** Aquifer Drilling and Testing	**Surface Elevation:** 199.42 NAVD88
Client: Con Edison	**Driller:** Mark Larable and Lloid	**Water Level During Drilling:** 20' bgs
Site Location: St. John's School	**Casing ID:** 2-inch	**Stickup:** NA
Start Date: April 16, 2004	**Method:** Direct-Push (JH and Geoprobe)	**MP Elevation:**
Completion Date: April 16, 2004	**Logged By:** J. Millard and Jesse Lloyd	**Total Depth:** 40 ' bgs
Location: In the Kitchen, basement of school		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
22–24	90	0.9	NA		
24–36					No Samples Collected 24 - 36' bgs to save time where sufficient data had been collected to characterize zone.
36–40	33	600	NA		(39.25 - 39.75' bgs) - Grey brown, wet, medium to fine SAND, thin veins of residual NAPL increasing in frequency with depth. (39.75 - 40' bgs) - Black, wet, soft, medium to fine SAND, residual NAPL throughout (near saturation).
40–42					Bottom of Borehole

Remarks: Discrete sampler used below water table

1. bgs - below ground surface / floor
2. SAA - Same as Above
3. Groundwater collected from 20-24' bgs
4. Geoprobe well sampled by low flow
5. NA - Not Applicable
6. JH - Jackhammer
7. Samples w/ <100% recovery referenced to base of sample for consistency - actual depths may be from anywhere w/in the sample interval.
8. Soil gas sample collected from 0-2' bgs

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BOREHOLE LOG

ID: B-103

RETEC

Project Number: CECN3-16922-202	Drilling Co.: Aquifer Drilling and Testing	Surface Elevation: 199.44 NAVD88
Client: Con Edison	Driller: Mark Larable	Water Level During Drilling: 21' bgs
Site Location: St. John's School	Casing ID: 2-inch	Stickup: NA
Start Date: April 14, 2004	Method: Direct-Push (GeoProbe on ATV)	MP Elevation:
Completion Date: April 15, 2004	Logged By: Joshua Millard	Total Depth: 56' bgs
Location: Inside Cafeteria, basement of school		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
0					Basement Floor
0–1					**CONCRETE** Six-inches of concrete over four inch red tile.
0–5	NA	1.5	NA		**FILL** (0.8 - 5' bgs) - Light brown, dry, fine SAND.
5–8	60	1.3	NA		(5 - 8' bgs) - Brown and moderate brown, damp, loose, medium to fine SAND.
8–12	85	0.6	NA		**SAND** (8 - 12' bgs) - Light tan and moderate brown, dry, soft, bedded fine SAND (likely top of natural depositional surface).
12–16	95	1.2	NA		(12 - 16' bgs) - SAA. At 14' bgs - material becomes grey, black heavy minerals (mica) scattered throughout (salt and pepper appearance).
16–20	95	1.6	NA		(16 - 20' bgs) - SAA, interbedded with dark grey beds.

Remarks: Discrete sampler used below water table
1. bgs - below ground surface / **floor**
2. SAA - Same as Above
3. Groundwater collected from 20-24' bgs
4. Well point sampled by low flow
5. NA - Not Applicable
6. ATV - All Terrain Vehicle
7. Samples w/ <100% recovery referenced to base of sample for consistency - actual depths may be from anywhere w/in the sample interval.
8. Soil gas sample collected from 0-2' bgs

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BOREHOLE LOG

ID: B-103

RETEC

Project Number: CECN3-16922-202	**Drilling Co.:** Aquifer Drilling and Testing	**Surface Elevation:** 199.44 NAVD88
Client: Con Edison	**Driller:** Mark Larabie	**Water Level During Drilling:** 21' bgs
Site Location: St. John's School	**Casing ID:** 2-inch	**Stickup:** NA
Start Date: April 14, 2004	**Method:** Direct-Push (GeoProbe on ATV)	**MP Elevation:**
Completion Date: April 15, 2004	**Logged By:** Joshua Millard	**Total Depth:** 56' bgs
Location: Inside Cafeteria, basement of school		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
20–24	100	1.6	NA		(20 - 21' bgs) - SAA.dry. (21 - 24' bgs) - Brown, wet, soft, medium to fine SAND, dark grey to tan, coarse to medium Sand in 3 - 4" bands layered with 3 - 4" bands of fine Sand.
24–28	25	1.4	NA		(24 - 28' bgs) - Brown, wet, dense, medium to fine SAND.
28–32	100	4.0	NA		(28 - 29' bgs) - SAA. (29 - 32' bgs) - Layered brown, wet, fine SAND with some black and opaque mica, and fine SAND with little Silt.
32–36	100	11.5	NA		(32 - 36' bgs) - Brown, wet, soft, medium to fine SAND few grey layers, black heavy minerals throughout.
36–40	100	15.8 295	NA		(36 - 39.5' bgs) - Brown, wet, medium dense, medium to fine SAND. (39.5 - 40' bgs) - SAA with three horizontal 1/4-inch thick layers of residual NAPL, strong petroleum-like odor.

Remarks: Discrete sampler used below water table

1. bgs - below ground surface / floor
2. SAA - Same as Above
3. Groundwater collected from 20-24' bgs
4. Well point sampled by low flow
5. NA - Not Applicable
6. ATV - All Terrain Vehicle
7. Samples w/ <100% recovery referenced to base of sample for consistency - actual depths may be from anywhere w/in the sample interval.
8. Soil gas sample collected from 0-2' bgs

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BOREHOLE LOG

ID: B-103

RETEC

Project Number: CECN3-16922-202	**Drilling Co.:** Aquifer Drilling and Testing	**Surface Elevation:** 199.44 NAVD88
Client: Con Edison	**Driller:** Mark Larabie	**Water Level During Drilling:** 21' bgs
Site Location: St. John's School	**Casing ID:** 2-inch	**Stickup:** NA
Start Date: April 14, 2004	**Method:** Direct-Push (GeoProbe on ATV)	**MP Elevation:**
Completion Date: April 15, 2004	**Logged By:** Joshua Millard	**Total Depth:** 56' bgs
Location: Inside Cafeteria, basement of school		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
40–44	15	930	NA		(40 - 41' bgs) - Grey, wet, fine SAND, multiple thin veins of residual NAPL throughout, near saturation, strong MGP-like odor.
44–48	25	26.21	NA		(44 - 44.5' bgs) - Grey brown, wet, fine SAND, moderate MGP-like odor.
48–52	50	1.1	NA		(48 - 52' bgs) - Grey brown, wet, medium to fine SAND, slight MGP-like odor.
52–56	50	2.5 1.1	NA		(52 - 54' bgs) - SAA. (54 - 56' bgs) - Grey, wet, soft, fine SAND, very slight MGP-like odor.
56–60					Bottom of Borehole

Remarks: Discrete sampler used below water table
1. bgs - below ground surface / floor
2. SAA - Same as Above
3. Groundwater collected from 20-24' bgs
4. Well point sampled by low flow
5. NA - Not Applicable
6. ATV - All Terrain Vehicle
7. Samples w/ <100% recovery referenced to base of sample for consistency - actual depths may be from anywhere w/in the sample interval.
8. Soil gas sample collected from 0-2' bgs

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BOREHOLE LOG

ID: B-104

RETEC

Project Number: CECN3-16922-202	**Drilling Co.:** Aquifer Drilling and Testing	**Surface Elevation:** 196.22 NAVD88
Client: Con Edison	**Driller:** Lloid	**Water Level During Drilling:** 19.5' bgs
Site Location: St. John's School	**Casing ID:** 2-inch	**Stickup:** NA
Start Date: April 15, 2004	**Method:** Direct-Push (Jackhammer)	**MP Elevation:**
Completion Date: April 15, 2004	**Logged By:** Jesse Lloyd	**Total Depth:** 40' bgs
Location: Inside Boiler Room, basement of school		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
0					Basement Floor
0 – 1					**CONCRETE** Four inches of concrete floor.
0 – 5	NA	0.9	NA		**FILL** (0 - 5' bgs) - Tan, damp, medium to fine SAND.
5 – 8	75	0.9	NA		**SAND** (5 - 8' bgs) - Light tan and brown, moderately dense, interbedded medium to fine SAND.
8 – 12	95	1. 4	NA		(8 - 12' bgs) - Tan and light borwn, damp, moderately dense, interbedded medium to fine SAND beds; brown beds 1/4 to 1/2-inch thick, tan beds 1/2 to 1-inch thick.
12 – 16	100	1.6	NA		(12 - 13' bgs) - Grey brown, damp, fine SAND. (13 - 15.5' bgs) - Grey brown, medium to fine SAND. (15.5 - 16' bgs) - Tan, moist, fine SAND.
16 – 20	100	1.4	NA		(16 - 20' bgs) - Brown and greyish brown, mixed medium to fine SAND. Wet at 19.5' bgs.
20 – 21					(20 - 24' bgs) - Brown, wet, dense, SAND.

Remarks: Discrete sampler used below water table

1. bgs - below ground surface / floor
2. SAA - Same as Above
3. Groundwater collected from 20-24' bgs
4. Geoprobe well sampled by low flow
5. NA - Not Available
6.
7. Samples w/ <100% recovery referenced to base of sample for consistency - actual depths may be from anywhere w/in the sample interval.
8. Soil gas sample collected from 0-2' bgs

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BOREHOLE LOG

ID: B-104

RETEC

Project Number: CECN3-16922-202	Drilling Co.: Aquifer Drilling and Testing	Surface Elevation: 196.22 NAVD88
Client: Con Edison	Driller: Lloid	Water Level During Drilling: 19.5' bgs
Site Location: St. John's School	Casing ID: 2-Inch	Stickup: NA
Start Date: April 15, 2004	Method: Direct-Push (Jackhammer)	MP Elevation:
Completion Date: April 15, 2004	Logged By: Jesse Lloyd	Total Depth: 40' bgs
Location: Inside Boiler Room, basement of school		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
22–24	75	0.8	NA		
24–28	95	0.6	NA		(24 - 25' bgs) - Brown, wet, fine to medium SAND, 1/8-inch lense of fine Gravel at 24.25' bgs. (25 - 26' bgs) - Brown, wet, dense, fine SAND. (26 - 28' bgs) - Brown, wet, dense, medium to fine SAND.
28–32	85	0.9	NA		(28- 31' bgs) - Brown, wet, dense, medium to fine SAND and medium to fine GRAVEL, trace medium Sand (quartz) pieces. (31 - 32' bgs) - SAA with 2-inch thick lens of brown, wet, fine SAND (31.25' bgs).
32–36	75	6.8	NA		(32- 34' bgs) - Brown, wet, fine SAND, some medium Sand, some medium to fine Gravel, trace quartz pieces. (34- 35' bgs) - Brown, wet, fine SAND, some medium Sand, trace Silt. (35 - 36' bgs) - SAA with a 1 1/2-inch thick layer of brown, wet dense, fine SAND and SILT.
36–40	50	5.0	NA		(36 - 40' bgs) - Brown, wet, dense, fine to medium SAND.
40–42					Bottom of Borehole

Remarks: Discrete sampler used below water table
1. bgs - below ground surface / floor
2. SAA - Same as Above
3. Groundwater collected from 20-24' bgs
4. Geoprobe well sampled by low flow
5. NA - Not Available
6.
7. Samples w/ <100% recovery referenced to base of sample for consistency - actual depths may be from anywhere w/in the sample interval.
8. Soil gas sample collected from 0-2' bgs

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BOREHOLE LOG

ID: B-107

RETEC

Project Number: CECN3-16922-202	Drilling Co.: Aquifer Drilling and Testing	Surface Elevation: 199.41 NAVD88
Client: Con Edison	Driller: Mark Larabie	Water Level During Drilling: 23' bgs
Site Location: St. John's School	Casing ID: 2-inch	Stickup: NA
Start Date: April 15, 2004	Method: Direct-Push (GeoProbe on ATV)	MP Elevation:
Completion Date: April 16, 2004	Logged By: Joshua Millard	Total Depth: 48 ' bgs
Location: In Hallway, basement of school		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
0					Basement Floor
0 - 1					**CONCRETE** Eight inches of concrete over four-inch red tile.
0 - 5	NA	NA	NA		**FILL** (0 - 5' bgs) - Brown, dry, SAND, loose concrete block at 2.5' bgs.
5 - 8	60	0.4	NA		**SAND** (5 - 8' bgs) - Interbedded, dry, loose, tan and brown medium to fine SAND.
8 - 12	100	0.4	NA		(8 - 12' bgs) - Finely interbedded, medium to fine SAND, some tan very fine Sand beds, some grey brown medium beds.
12 - 16	60	0.4	NA		(12 - 16' bgs) - SAA
16 - 20	60	1.7	NA		(16 - 20' bgs) - SAA

Remarks: Discrete sampler used below water table

1. bgs - below ground surface / floor
2. SAA - Same as Above
3. ATV - All Terrain Vehicle
4. NA - Not Applicable
5. Samples w/ <100% recovery referenced to
6. depths may be from anywhere w/in the
7. sample interval.
8.

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BOREHOLE LOG

ID: B-107

RETEC

Project Number: CECN3-16922-202	**Drilling Co.:** Aquifer Drilling and Testing	**Surface Elevation:** 199.41 NAVD88
Client: Con Edison	**Driller:** Mark Larable	**Water Level During Drilling:** 23' bgs
Site Location: St. John's School	**Casing ID:** 2-inch	**Stickup:** NA
Start Date: April 15, 2004	**Method:** Direct-Push (GeoProbe on ATV)	**MP Elevation:**
Completion Date: April 16, 2004	**Logged By:** Joshua Millard	**Total Depth:** 48' bgs
Location: in Hallway, basement of school		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
20–24	60	1.8	NA		(20 - 24' bgs) - Grey brown, damp (wet at 23' bgs), medium to fine SAND, some fine Sand, interbedded from 23 to 24' bgs.
24–28	50	0.3	NA		(24 - 28' bgs) - Grey brown, wet, fine SAND, varved.
28–32	40	0.7	NA		(28 - 32' bgs) - Grey brown, wet, very soft, fine SAND, little Silt, mucky.
32–36	40	7.4	[illegible]		(32 - 36' bgs) - Grey brown, wet, soft, fine SAND.
36–40	15	16.7 300	NA		(39.5 - 39.75' bgs) - Layered fine SAND, no odor. (39.75 - 40' bgs) - Fine SAND with 1/4-inch thick bands of residual NAPL, strong MGP-like odor.

Remarks: Discrete sampler used below water table

1. bgs - below ground surface / floor
2. SAA - Same as Above
3. ATV - All Terrain Vehicle
4. NA - Not Applicable
5. Samples w/ <100% recovery referenced to
6. depths may be from anywhere w/in the
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BOREHOLE LOG

ID: B-107

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Project Number: CECN3-16922-202	**Drilling Co.:** Aquifer Drilling and Testing	**Surface Elevation:** 199.41 NAVD88
Client: Con Edison	**Driller:** Mark Larable	**Water Level During Drilling:** 23' bgs
Site Location: St. John's School	**Casing ID:** 2-inch	**Stickup:** NA
Start Date: April 15, 2004	**Method:** Direct-Push (GeoProbe on ATV)	**MP Elevation:**
Completion Date: April 16, 2004	**Logged By:** Joshua Millard	**Total Depth:** 48 ' bgs
Location: In Hallway, basement of school		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
40–44	40	837	NA		(40 - 42' bgs) - Black, wet, medium dense, medium to fine SAND, residual NAPL near saturation, two 1 mm thick unstained veins, strong MGP-like odor. (42 - 42.5' bgs) - Grey brown, wet, medium to fine SAND, scattered veins of residual NAPL decreasing in frequency with depth.
44–48	40	19.28	NA		(44 - 48' bgs) - Grey brown, wet, soft, medium to fine SAND, no staining, very slight MGP-like odor.
48–60					Bottom of Borehole

Remarks: Discrete sampler used below water table

1. bgs - below ground surface / floor
2. SAA - Same as Above
3. ATV - All Terrain Vehicle
4. NA - Not Applicable
5. Samples w/ <100% recovery referenced to
6. depths may be from anywhere w/in the
7. sample interval.
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BOREHOLE LOG

ID: B-108

RETEC

Project Number: CECN3-16922-202	**Drilling Co.:** Aquifer Drilling and Testing	**Surface Elevation:** 199.38 NAVD88
Client: Con Edison	**Driller:** Mark Larabie	**Water Level During Drilling:** NA
Site Location: St. John's School	**Casing ID:** 2-inch	**Stickup:** NA
Start Date: April 17, 2004	**Method:** Direct-Push (GeoProbe on ATV)	**MP Elevation:**
Completion Date: April 17, 2004	**Logged By:** Joshua Millard	**Total Depth:** 52' bgs
Location: In Hallway, basement of school		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
					Basement Floor
0					**CONCRETE** Six inches concrete over four-inch red tile.
1					**FILL** (0 - 5' bgs) - Tan, dry, fine to medium SAND.
2					
3					
4					
5					No Samples Collected 5 - 36' bgs to save time where suficient data had been collected to characterize sone.
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Remarks: Discrete sampler used below water table
1. bgs - below ground surface / floor
2. SAA - Same as Above
3. NA - Not Applicable
4. ATV - All Terrain Vehicle
5. Samples w/ <100% recovery referenced to
6. depths may be from anywhere w/in the
7. sample interval.
8.

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BOREHOLE LOG

ID: B-108

RETEC

Project Number: CECN3-16922-202	**Drilling Co.:** Aquifer Drilling and Testing	**Surface Elevation:** 199.38 NAVD88
Client: Con Edison	**Driller:** Mark Larable	**Water Level During Drilling:** NA
Site Location: St. John's School	**Casing ID:** 2-Inch	**Stickup:** NA
Start Date: April 17, 2004	**Method:** Direct-Push (GeoProbe on ATV)	**MP Elevation:**
Completion Date: April 17, 2004	**Logged By:** Joshua Millard	**Total Depth:** 52' bgs
Location: In Hallway, basement of school		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					**SAND**
37					(38 - 39.5' bgs) - Grey brown, wet, soft, medium to fine SAND, very slight MGP-like odor. (39.5 - 39.9' bgs) - SAA with thin 1 mm to 1/4-inch veins of medium SAND with residual NAPL.
38	40		NA		
39		493			
40					

Remarks: Discrete sampler used below water table

1. bgs - below ground surface / floor
2. SAA - Same as Above
3. NA - Not Applicable
4. ATV - All Terrain Vehicle
5. Samples w/ <100% recovery referenced to
6. depths may be from anywhere w/in the
7. sample interval.
8.

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BOREHOLE LOG

ID: B-108

RETEC

Project Number: CECN3-16922-202	**Drilling Co.:** Aquifer Drilling and Testing	**Surface Elevation:** 199.38 NAVD88
Client: Con Edison	**Driller:** Mark Larabie	**Water Level During Drilling:** NA
Site Location: St. John's School	**Casing ID:** 2-Inch	**Stickup:** NA
Start Date: April 17, 2004	**Method:** Direct-Push (GeoProbe on ATV)	**MP Elevation:**
Completion Date: April 17, 2004	**Logged By:** Joshua Millard	**Total Depth:** 52' bgs
Location: In Hallway, basement of school		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description
40 - 44	80	889	NA		(40 - 43' bgs) - Grey brown, wet, soft, medium to fine SAND, bottom 14" has residual NAPL near saturation, strong MGP-like odor.
44 - 48	40	54.4	NA		(44 - 48' bgs) - Brown grey, wet, medium to fine SAND, moderate MGP-like odor, no sheens, no staining, no residual NAPL.
48 - 52	29	14.3	NA		(48 - 52' bgs) - Grey brown, wet, soft, medium to fine SAND, no staining, slight MGP-like odor.
52 - 60					Bottom of Borehole

Remarks: Discrete sampler used below water table

1. bgs - below ground surface / **floor**
2. SAA - Same as Above
3. NA - Not Applicable
4. ATV - All Terrain Vehicle
5. Samples w/ <100% recovery referenced to
6. depths may be from anywhere w/in the
7. sample interval.
8.

RETEC
2550 Eisenhower Avenue
Eagleville, Pennsylvania 19403

Boring ID: B-109

Project Name:	Con Edison	**Boring Location:**	Northwest corner of Courtyard
Location:	St. John's School	**State Permit Number:**	NA
Project Number:	CECN3-16922-202	**Ground Elevation (ft/msl):**	205.76 NAVD88
Date Started:	7/12/04	**Total Depth (ft):**	60 ft/bgs
Date Finished:	7/12/04	**Boring Diameter Outer/Inner (in):**	2-inch
Drilling Company:	Zebra	**Water Level During Drilling (ft/bgs):**	NA
Drilling Method:	Direct-Push	**Weather Conditions:**	
Sampling Method:	4-foot macrocore/piston sampler	**Logged By:**	J. Millard

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
0 – -1							SM	SILT AND SAND: 0-1' bgs Moderate brown, dry, SILT and SAND, high organic content topsoil.	NA = Not Applicable
-1 – -5			1.8				SP	SAND: 1-5' bgs Yellow brown, dry, loose, medium-grained to fine-grained SAND, some fine-grained Gravel.	NM = Not Measured
-5 – -28	NM		1.1					5-36' bgs Geoprobe advanced to 36' bgs.	bgs = below ground surface SAA = Same As Above

Depth scale: 0, -1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -28

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2550 Eisenhower Avenue
Eagleville, Pennsylvania 19403

Boring ID: B-109

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
-36 to -40		31/48	6.5				SP	SAND: 36-40' bgs Gray brown, wet, layered, fine-grained SAND, some medium-grained Sand bands displayed by grain size and mica flakes, no odor.	
-40 to -44		28/48	16.9				SP	SAND: 40-44' bgs Tan brown, wet, dense, coarse-grained to medium-grained SAND.	
-44 to -48		28/48	18.1				SP	SAND: 44-48' Tan, gray, brown, wet, dense, layered, medium-grained to fine-grained SAND, no odor.	
-48 to -49		30/48					SP	SAND: 48-49' bgs SAA	
-49 to -50			19.5				SP	SAND: 49-50' bgs SAA, gray brown, fine-grained, and thinly banded.	
-50 to -51.5			2470		■		SP	SAND: 50-51.5' bgs SAA, black stained, medium-grained to fine-grained, saturated with NAPL.	
-51.5 to -52			55.7				SP	SAND: 51.5-52' bgs SAA, fine-grained, with little Silt.	
-52 to -56		27/48	52.8				SP	SAND: 52-56' bgs SAA, banded, strong MGP-like odor.	
-56 to -60		27/48	25.8		■ (59-60)		SP	SAND: 56-60' bgs SAA, moderate MGP-like odors 56-57' bgs, odors barely detectable at 57-58' bgs. Bottom of boring 60' bgs.	

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Eagleville, Pennsylvania 19403

Boring ID: B-110

Project Name:	Con Edison	**Boring Location:**	South of school building
Location:	St. John's School	**State Permit Number:**	NA
Project Number:	CECN3-16922-202	**Ground Elevation (ft/msl):**	205.45 NAVD88
Date Started:	7/12/04	**Total Depth (ft):**	88 ft/bgs
Date Finished:	7/13/04	**Boring Diameter Outer/Inner (in):**	2-inch
Drilling Company:	Zebra	**Water Level During Drilling (ft/bgs):**	29.0 ft/bgs
Drilling Method:	Direct-Push	**Weather Conditions:**	
Sampling Method:	4-foot macrocore/piston sampler	**Logged By:**	J. Millard

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
0 to -1	NM	NM					SM	SILT AND SAND: 0-1' bgs Brown, dry, SILT and SAND, topsoil.	
-1 to -5			1.0 1.4 1.6 3.1 3.1				SP	SAND: 1-5' bgs Yellow brown, dry, loose, medium-grained to fine-grained SAND, little fine-grained Gravel. At 1' bgs piece of slag, unknown origin.	NA = Not Applicable NM = Not Measured
-5 to -8		12/36	6.6				SP	SAND: 5-8' bgs Orange brown, dry, layered fine-grained to medium-grained SAND.	bgs = below ground surface
-8 to -10							SP	SAND: 8-10' bgs SAA	SAA = Same As Above
-10 to -12		18/48	6.6				SP	SAND: 10-12' bgs Tan to light gray, fine-grained to medium-grained SAND grading into medium-grained Sand.	
-12 to -16		20/48	6.3				SP	SAND: 12-16' bgs SAA, interlayered with tan and iron stained, medium-grained and fine-grained Sand.	
-16 to -20		22/48	5.7				SM	SAND AND SILT: 16-20' bgs Gray and tan, fine-grained SAND and SILT layers with finely interbedded Sand.	
-20 to -24		18/48	7.1				SM	SAND AND SILT: 20-24' bgs SAA	
-24 to -28		24/48	7.5				SP	SAND: 24-28' bgs Tan and gray finely layered SAND and fine-grained Sand.	
-28								SAND: 28-32' bgs SAA, wet.	

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Boring ID: B-110

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
-29 to -32		30/48	4.9				SP		
-32 to -36		26/48	3.9				SP	SAND: 32-36' bgs SAA	
-36 to -40		28/48	5.3				SP	SAND: 36-40' bgs SAA with iron staining from 37-37.5' bgs.	
-40 to -44		27/48	6.8				SP	SAND: 40-44' bgs SAA, fine Silt layers, gray color towards 44' bgs.	
-44 to -48		26/48	3.2				SP	SAND: 44-48' SAA	
-48 to -50		23/48	1407				SP	SAND: 48-50' bgs SAA	
-50 to -52			336				SP	SAND: 50-52' bgs Gray brown, wet, dense, fine-grained, SAND, at 52' bgs medium-grained Sand with NAPL (1/4" thick).	
-52 to -56		27/48	29.2				SP	SAND: 52-56' bgs Gray brown, wet, soft, fine-grained, layered, SAND, no NAPL, light MGP-like odor.	
-56 to -60		14/48	16				SP	SAND: 56-60' bgs Gray, wet, soft, fine-grained SAND, very slight MGP-like odor.	
-60 to -64		23/48	11.2				SP	SAND: 60-64' bgs SAA, no odor.	

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Boring ID: B-110

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
-64 to -68		16/48	11.1				SP	SAND: 64-68' bgs SAA, very slight MGP-like odor, may be carry down from 50-52' bgs interval.	
-68 to -72		13/48	11.4				SP	SAND: 68-72' bgs SAA	
-72 to -76		24/48	8.8				SP	SAND: 72-76' bgs SAA.	
-76 to -80		19/48	15.7				SP	SAND: 76-80' SAA, very fine-grained.	
-80 to -84		19/48	9.1				GM	SAND AND GRAVEL: 80-84' bgs Gray brown wet, dense, SAND and angular GRAVEL.	
-84 to -86		18/48	17.8				GM	SAND AND GRAVEL: 84-86' bgs SAA	
-86 to -88								SCHIST: 86-88' bgs Weathered, olive green mica SCHIST. Bottom of boring 88' bgs.	

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Boring ID: B-111

Project Name:	Con Edison	**Boring Location:**	South of school building
Location:	St. John's School	**State Permit Number:**	NA
Project Number:	CECN3-16922-202	**Ground Elevation (ft/msl):**	205.54 NAVD88
Date Started:	7/12/04	**Total Depth (ft):**	60 ft/bgs
Date Finished:	7/14/04	**Boring Diameter Outer/Inner (in):**	2-inch
Drilling Company:	Zebra	**Water Level During Drilling (ft/bgs):**	NA
Drilling Method:	Direct-Push	**Weather Conditions:**	
Sampling Method:	4-foot macrocore/piston sampler	**Logged By:**	J. Millard

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
0								0-32' bgs Shallow lithology defined by nearby soil boring locations B-110 and B-112. No sampling from 5-32' bgs.	
-1			2.1						NA = Not Applicable
-2			3.3						
-3			2.6						
-4			3.0						
-5	NM	NM	4.2						bgs = below ground surface
-6									
-7									NM = Not Measured
-8			NM						
-9									SAA = Same As Above
-10									
-11									
-12									
-13									
-14									
-15									
-16									
-17									
-18									
-19									
-20									
-21									
-22									
-23									
-24									
-25									
-26									
-27									
-28									

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Boring ID: B-111

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
-32 to -36		29/48	8.9				SP	SAND: 32-36' bgs Tan orange, wet, loose, medium-grained to fine-grained SAND, mica flakes.	
-36 to -38		30/48	17.5				SP	SAND: 36-38' bgs SAA, some iron staining.	
-38 to -40							SP	SAND: 38-40' bgs Gray, wet, very fine-grained SAND, little Silt layers 1/8" thick.	
-40 to -44		30/48	13.5				SP	SAND: 40-44' bgs Gray brown, wet, fine-grained SAND, some very fine-grained Sand and Silt layers, no odor.	
-44 to -48		20/48	15.5				SP	SAND: 44-48' bgs SAA	
-48 to -51		16/48					SP	SAND: 48-51' bgs SAA	
-51 to -52			6.53				SP	SAND: 51-52' bgs SAA, NAPL observed as two 1" layers within sand matrix (saturated).	
-52 to -56		30/48	21.7 11.5				SP	SAND: 52-56' bgs Gray, wet, fine-grained SAND, from 52-52.8' bgs has a very faint MGP-like odor, no odor observed after 52.8' bgs.	
-56 to -60		24/48	7.8				SP	SAND: 56-60' bgs SAA, layered. Bottom of boring 60' bgs.	

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Boring ID: B-112

Project Name:	Con Edison	**Boring Location:**	South of school building
Location:	St. John's School	**State Permit Number:**	NA
Project Number:	CECN3-16922-202	**Ground Elevation (ft/msl):**	205.32 NAVD88
Date Started:	7/12/04	**Total Depth (ft):**	64 ft/bgs
Date Finished:	7/15/04	**Boring Diameter Outer/Inner (in):**	2-inch
Drilling Company:	Zebra	**Water Level During Drilling (ft/bgs):**	NA
Drilling Method:	Direct-Push	**Weather Conditions:**	
Sampling Method:	4-foot macrocore/piston sampler	**Logged By:**	J. Millard

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
0									
-1			2.2				SM	SILT AND SAND: 0-1' bgs Brown, dry, organic, SILT and SAND, topsoil.	NA = Not Applicable
-2			2.7				SP	SAND: 1-4' bgs Light orange brown, loose, fine-grained to medium-grained SAND, trace Gravel.	
-3			3.5						
-4			3.2				SP	SAND: 4-5' bgs SAA, lighter brown.	
-5	NM	NM	3.4						bgs = below groundsurface
-6									
-7									NM = Not Measured
-8									
-9									SAA = Same As Above
-10									
-11									
-12									
-13									
-14									
-15									
-16									
-17									
-18									
-19									
-20									
-21									
-22									
-23									
-24									
-25									
-26									
-27									
-28									
-29									

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
-30 to -36									
-36 to -40		29/48	17.6				SP	SAND: 36-40' bgs Gray brown, wet, fine-grained, layered SAND.	
-40 to -44		30/48	9.0				SP	SAND: 40-44' bgs SAA	
-44 to -48		27/48	13.6				SP	SAND: 44-48' bgs SAA	
-48 to -52		30/48	14.0				SP	SAND: 48-52' bgs SAA, no odor.	
-52 to -56		25/48	14.3				SP	SAND: 52-56' bgs SAA	
-56 to -60							SP	SAND: 56-60' bgs SAA	
-60 to -64		30/48	14.3				SP	SAND: 60-64' bgs SAA - no odors Bottom of boring 64' bgs.	

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Boring ID: B-113

Project Name:	Con Edison	**Boring Location:**	
Location:	St. John's School	**State Permit Number:**	NA
Project Number:	CECN3-16922-202	**Ground Elevation (ft/msl):**	~ 205.5 NAVD88
Date Started:	7/16/04	**Total Depth (ft):**	60 ft/bgs
Date Finished:	7/16/04	**Boring Diameter Outer/Inner (in):**	2-inch
Drilling Company:	Zebra	**Water Level During Drilling (ft/bgs):**	NA
Drilling Method:	Direct-Push	**Weather Conditions:**	
Sampling Method:	4-foot macrocore/piston sampler	**Logged By:**	J. Millard

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
0								TOPSOIL: 0-3' bgs TOPSOIL over bricks rocks, Sand, and ash-like material, some rebar at 3' bgs.	
-1			2.4						NA = Not Applicable
-2			2.8						
-3								3-36' bgs Geoprobe advanced to 36' bgs.	
-4									
-5	NM	NM	NM						bgs = below ground surface
-6									
-7									NM = Not Measured
-8									
-9									SAA = Same As Above
-10									
-11									
-12									
-13									
-14									
-15									
-16									
-17									
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-21									
-22									
-23									
-24									
-25									
-26									
-27									
-28									
-29									

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Boring ID: B-113

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
-30 to -36									
-36 to -40		28/48	7.4				SP	SAND: 36-40' bgs Gray tan banded, wet, dense, fine-grained, SAND, some iron staining.	
-40 to -44		26/48	5.5				SP	SAND: 40-44' bgs Gray brown, wet, interbedded, fine-grained SAND, little to trace Silt.	
-44 to -48		26/48	9.8				SP	SAND: 44-48' bgs SAA, iron staining from 44-44.3' bgs.	
-48 to -52		23/48	9.0				SP	SAND: 48-52' bgs SAA, no odor.	
-52 to -52.5			25.7				SP	SAND: 52-52.5' bgs SAA	
-52.5 to -53.5			831				SM	SILT AND SAND: 52.5-53.5' bgs Gray brown SILT over fine-grained to medium-grained SAND, 1" band of NAPL saturated Sand at 52.5-52.75' bgs.	
-53.5 to -56		23/48	44.4				SP	SAND: 53.5-56' bgs Gray brown, wet, SAND, trace Silt, no NAPL.	
-56 to -60			17				SP	SAND: 56-60' bgs SAA, slight MGP-like odor. Bottom of boring 60' bgs.	

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Boring ID: B-114

Project Name:	Con Edison
Location:	St. John's School
Project Number:	CECN3-16922-202
Date Started:	7/16/04
Date Finished:	7/17/04
Drilling Company:	Zebra
Drilling Method:	Direct-Push
Sampling Method:	4-foot macrocore/piston sampler

Boring Location:	South of school building
State Permit Number:	NA
Ground Elevation (ft/msl):	205.19 NAVD88
Total Depth (ft):	60 ft/bgs
Boring Diameter Outer/Inner (in):	2-inch
Water Level During Drilling (ft/bgs):	NA
Weather Conditions:	
Logged By:	J. Millard

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
0 to -5			NM					TOPSOIL: 0-5' bgs TOPSOIL composed of Sand and Gravel, some large Cobbles, trace brick as blocks and fragments.	NA = Not Applicable
-5 to -29	NM	NM						5-36' bgs Geoprobe advanced to 36' bgs.	bgs = below ground surface NM = Not Measured SAA = Same As Above

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Boring ID: B-114

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
-30 to -36									
-36 to -40		28/48	13.5				SP	SAND: 36-40' bgs Gray brown, wet, fine-grained, interbedded SAND.	
-40 to -41							SP	SAND: 40-41' bgs Layered, gray brown, wet, very fine-grained SAND, some Silt.	
-41 to -44		30/48	143				SP	SAND: 41-44' bgs Gray brown, wet, dense, fine-grained SAND, little medium-grained Sand.	
-44 to -48		23/48					SP	SAND: 44-48' bgs SAA, interlayered bands 2-3" thick of Sand and Silt.	
-48 to -52		28/48					SP	SAND: 48-52' bgs Gray, wet, fine-grained, layered SAND, slight MGP-like odor.	
-52 to -52.5			53.0	SB			SP	SAND: 52-52.5' bgs Fine-grained SAND (saturated) with NAPL, few unsaturated zones.	
-52.5 to -56		28/48	56.0				SP	SAND: 52.5-56' bgs Gray brown, wet, fine-grained SAND, moderate to strong MGP-like odor.	
-56 to -60		24/48	58.0				SP	SAND: 56-60' bgs SAA, moderate to slight MGP-like odor. Bottom of boring 60' bgs.	

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Boring ID: B-115

Project Name:	Con Edison	**Boring Location:**	South of school building
Location:	St. John's School	**State Permit Number:**	NA
Project Number:	CECN3-16922-202	**Ground Elevation (ft/msl):**	205.51 NAVD88
Date Started:	7/19/04	**Total Depth (ft):**	64 ft/bgs
Date Finished:	7/19/04	**Boring Diameter Outer/Inner (in):**	2-inch
Drilling Company:	Zebra	**Water Level During Drilling (ft/bgs):**	NA
Drilling Method:	Direct-Push	**Weather Conditions:**	
Sampling Method:	4-foot macrocore/piston sampler	**Logged By:**	J. Millard

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
0 to -5								TOPSOIL: 0-5' bgs Brown, dry, TOPSOIL composed of Sand and Gravel, trace brick fragments.	NA = Not Applicable
-5 to -29	NM	NM						5-40' bgs Geoprobe advances to 40' bgs.	bgs = below ground surface NM = Not Measured SAA = Same As Above

Depth scale: 0, -1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29

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Boring ID: B-115

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
-30 to -40									
-40 to -44		20/48	2.2				SP	SAND: 40-44' bgs Gray brown and tan, wet, fine-grained SAND, some iron staining.	
-44 to -48		28/48	4.4				SP	SAND: 44-48' bgs SAA	
-48 to -52		22/48	7.1				SP	SAND: 48-52' bgs SAA, gray, wet, some 3" layers of Silt.	
-52 to -54		24/48	5.8				SP	SAND: 52-54' bgs Gray, wet fine-grained SAND.	
-54 to -56			46.7				SP	SAND: 54-56' bgs Tan brown, wet, fine-grained SAND, moderate to strong MGP-like odor, medium-grained to coarse-grained Sand as 1-inch layers.	
-56 to -60		21/48	43.6				SP	SAND: 56-60' bgs Gray, wet, fine-grained SAND, moderate MGP-like odor.	
-60 to -64		16/48	19.2 15.9				SP	SAND: 60-64' bgs SAA, from 60-62' bgs moderate MGP-like odor and from 62-64' bgs slight to no MGP-like odor. Bottom of boring 64' bgs.	

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Boring ID: B-116

Project Name:	Con Edison	**Boring Location:**	South of school building
Location:	St. John's School	**State Permit Number:**	NA
Project Number:	CECN3-16922-202	**Ground Elevation (ft/msl):**	205.37 NAVD88
Date Started:	7/19/04	**Total Depth (ft):**	60 ft/bgs
Date Finished:	7/19/04	**Boring Diameter Outer/Inner (in):**	2-inch
Drilling Company:	Zebra	**Water Level During Drilling (ft/bgs):**	NA
Drilling Method:	Direct-Push	**Weather Conditions:**	
Sampling Method:	4-foot macrocore/piston sampler	**Logged By:**	J. Millard

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
0								TOPSOIL: 0-0.5' bgs TOPSOIL	
-1		NM	NM				SP	SAND: 0.5-5' bgs Some white, very dense, SAND and brick fragments.	NA = Not Applicable
-5	NA							5-40' bgs Geoprobe advanced to 40' bgs.	bgs = below ground surface NM = Not Measured SAA = Same As Above

Depth scale: 0, -1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29

Boring ID: B-116

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Depth scale (Feet): -30 to -60

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
-40 to -44		29/48					SP	SAND: 40-44' bgs Gray brown, wet, dense, fine-grained SAND, some medium-grained Sand upper 1.5', iron striations at 41-41.5', no odor.	
-44 to -45.5		26/48					SM	SILT AND SAND: 44-45.5' bgs Gray, wet, SILT and SAND, grading to medium-fine sand at 45.5' bgs.	
-45.5 to -48							SP	SAND: 45.5-48' bgs Gray, tan, wet, dense, medium-grained to fine-grained SAND.	
-48 to -52		22/48						SAND: 48-57' bgs Gray black, fine bands of MICA, no odor.	
-52 to -56								No Sample - 52-56' bgs.	
-56 to -57		23/48							
-57 to -58							SP	SAND: 57-58' bgs Gray, wet, fine-grained to medium-grained SAND, some Silt.	
-58 to -60							SP	SAND: 58-60' bgs Gray, wet, fine-grained, banded SAND, some Silt. Bottom of boring 60' bgs.	

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Boring ID: B-117

Project Name:	Con Edison	**Boring Location:**	South of the school building
Location:	St. John's School	**State Permit Number:**	NA
Project Number:	CECN3-16922-202	**Ground Elevation (ft/msl):**	~ 205.5 NAVD88
Date Started:	7/21/04	**Total Depth (ft):**	64 ft/bgs
Date Finished:	7/21/04	**Boring Diameter Outer/Inner (in):**	2-inch
Drilling Company:	Zebra	**Water Level During Drilling (ft/bgs):**	NA
Drilling Method:	Direct-Push	**Weather Conditions:**	
Sampling Method:	4-foot macrocore/piston sampler	**Logged By:**	J. Millard

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
0								TOPSOIL: 0-0.5' bgs TOPSOIL	
-1		NM	NM						NA = Not Applicable
-5	NM							5-40' bgs Geoprobe advanced to 40' bgs.	bgs = below ground surface NM = Not Measured SAA = Same As Above

0, -1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29

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Boring ID: B-117

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
-30 to -40									
-40 to -44		37/48	0.7				SP	SAND: 40-44' bgs Tan brown, wet, fine-grained to medium-grained SAND.	
-44 to -48		33/48	0.3				SM	SILT AND SAND: 44-48' bgs Gray brown, wet, layered SILT and fine-grained SAND, towards 48' bgs sand has mica flakes.	
-48 to -48.5							ML	SILT: 48-48.5' bgs Gray, wet, SILT.	
-48.5 to -52			0.3				SP	SAND: 48.5-52' bgs Gray tan, wet, medium-grained to fine-grained SAND, no odor.	
-52 to -56		8/48	78 0.5		-52 to -53		SP	SAND: 52-56' bgs SAA, one very thin (approximately 1 mm thick) band of NAPL at 52.5' bgs, very slight odor.	
-56 to -60		26/48	0.8		-56 to -60		SP	SAND: 56-60' bgs SAA, no NAPL, no odor.	
-60 to -64		20/48	0.6				SP	SAND: 60-64' bgs SAA Bottom of boring 64' bgs.	

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Boring ID: B-118

Project Name:	Con Edison	**Boring Location:**	South of school building
Location:	St. John's School	**State Permit Number:**	NA
Project Number:	CECN3-16922-202	**Ground Elevation (ft/msl):**	~205.5 NAVD88
Date Started:	7/21/04	**Total Depth (ft):**	60 ft/bgs
Date Finished:	7/21/04	**Boring Diameter Outer/Inner (in):**	2-inch
Drilling Company:	Zebra	**Water Level During Drilling (ft/bgs):**	NA
Drilling Method:	Direct-Push	**Weather Conditions:**	
Sampling Method:	4-foot macrocore/piston sampler	**Logged By:**	J. Millard

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
0								0-40' bgs Geoprobe advanced to 40' bgs before sampling.	
-1									NA = Not Applicable
-2									
-3									NM = Not Measured
-4									
-5	NM								bgs = below ground surface
-6									
-7									
-8									
-9									SAA = Same As Above
-10									
-11									
-12									
-13									
-14									
-15									
-16									
-17									
-18									
-19									
-20									
-21									
-22									
-23									
-24									
-25									
-26									
-27									
-28									
-29									

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Boring ID: B-118

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
-30 to -40									
-40 to -44		33/48	2.6				SM	SAND AND SILT: 40-44' bgs Gray brown, wet, interlayered, fine-grained SAND and SILT, little medium-grained Sand, no odor.	
-44 to -48		20/48	4.4				SM	SILT AND SAND: 44-48' Gray, brown, wet, layered, SILT and medium-grained to fine-grained SAND.	
-48 to -52		25/48	3.0				SM	SILT AND SAND: 48-52' bgs SAA, no odor.	
-52 to -56		33/48	2.3				SM	SILT AND SAND: 52-56' bgs SAA	
-56 to -60		28/48	2.3				SM	SILT AND SAND: 56-60' bgs SAA Bottom of boring 60' bgs.	

RETEC
2550 Eisenhower Avenue
Eagleville, Pennsylvania 19403

Boring ID: B-119

Project Name:	Con Edison	**Boring Location:**	Southwest of school building
Location:	St. John's School	**State Permit Number:**	NA
Project Number:	CECN3-16922-202	**Ground Elevation (ft/msl):**	207.56 NAVD88
Date Started:	7/22/04	**Total Depth (ft):**	64 ft/bgs
Date Finished:	7/22/04	**Boring Diameter Outer/Inner (in):**	2-inch
Drilling Company:	Zebra	**Water Level During Drilling (ft/bgs):**	NA
Drilling Method:	Direct-Push	**Weather Conditions:**	
Sampling Method:	4-foot macrocore/piston sampler	**Logged By:**	J. Millard

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
0								SAND, SILT, AND GRAVEL: 0-2' bgs Brown, dry, SAND, SILT, and GRAVEL, some Cobbles, little brick.	
-1							GM		NA = Not Applicable
-2			2.5					SAND, SILT, AND GRAVEL: 2-3' bgs Light brown, dry, SAND, SILT, and GRAVEL, little brick.	
-3			43				GM		NM = Not Measured
-4								3-40' bgs Geoprobe advances to 40' bgs.	
-5	NM								bgs = below ground surface
-6									
-7									
-8									
-9									SAA = Same As Above
-10									
-11									
-12									
-13									
-14									
-15									
-16									
-17									
-18									
-19									
-20									
-21									
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-23									
-24									
-25									
-26									
-27									
-28									
-29									

RETEC

2550 Eisenhower Avenue
Eagleville, Pennsylvania 19403

Boring ID: B-119

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
-30 to -40									
-40 to -44		29/48	6, 7				SM	SAND AND SILT: 40-44' bgs Gray brown, wet, layered fine-grained SAND and SILT, medium-grained and fine-grained Sand and fine-grained Sand; no odor.	
-44 to -48		28/48	5.3				SM	SAND AND SILT: 44-48' bgs SAA	
-48 to -52		28/48	9.5				SM	SAND AND SILT: 48-52' bgs SAA	
-52 to -56		33/48	4.8				SM	SAND AND SILT: 52-56' bgs SAA, some thin Silt layers, slight MGP-like odor.	
-56 to -60		28/48	65				SP	SAND: 56-60' bgs Gray tan, wet, fine-grained to medium-grained SAND, moderate MGP-like odor.	
-60 to -64		32/48	12				SP	SAND: 60-64' bgs SAA, very slight MGP-like odor. Bottom of boring 64' bgs.	

2550 Eisenhower Avenue
Eagleville, Pennsylvania 19403

Boring ID: B-120

Project Name:	Con Edison	**Boring Location:**	Southwest of school building
Location:	St. John's School	**State Permit Number:**	NA
Project Number:	CECN3-16922-202	**Ground Elevation (ft/msl):**	207.82 NAVD88
Date Started:	7/22/04	**Total Depth (ft):**	64 ft/bgs
Date Finished:	7/22/04	**Boring Diameter Outer/Inner (in):**	2-inch
Drilling Company:	Zebra	**Water Level During Drilling (ft/bgs):**	NA
Drilling Method:	Direct-Push	**Weather Conditions:**	
Sampling Method:	4-foot macrocore/piston sampler	**Logged By:**	J. Millard

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
0								0-40' bgs Geoprobe advances to 40' bgs, asphalt is found from 0-0.3' bgs.	
-1			0.1						NA = Not Applicable
-2									
-3									NM = Not Measured
-4									
-5	NM								bgs = below ground surface
-6									
-7									
-8									
-9									SAA = Same As Above
-10									
-11									
-12									
-13									
-14									
-15									
-16									
-17									
-18									
-19									
-20									
-21									
-22									
-23									
-24									
-25									
-26									
-27									
-28									
-29									

RETEC
2550 Eisenhower Avenue
Eagleville, Pennsylvania 19403

Boring ID: B-120

Depth (Feet)	Blow Counts	Recovery (Inches)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Geologic Description	Remarks
-30 to -40									
-40 to -42		28/48	3.8				SP	SAND: 40-42' bgs Red brown, wet, medium-grained SAND.	
-42 to -44			0.0				SP	SAND: 42-44' bgs Gray brown, wet, fine-grained SAND.	
-44 to -48		31/48	6.0				SP	SAND: 44-48' bgs Gray, wet, fine-grained SAND.	
-48 to -52		28/48	5.3				SP	SAND: 48-52' bgs SAA	
-52 to -56		26/48	3.5				SM	SILT AND SAND: 52-56' bgs Interlayered SILT and SAND, slight MGP-like odor at 56' bgs.	
-56 to -60		33/48	16.3				SP	SAND: 56-60' bgs Gray, wet, fine-grained SAND, moderate MGP-like odor.	
-60 to -64		26/48	9.0				SP	SAND: 60-64' bgs SAA, very slight MGP-like odor. Bottom of boring 64' bgs.	

The RETEC Group, Inc.
300 Baker Ave., Suite 302
Concord, MA 01742-2851
(978) 371-1422 Phone
(978) 371-1448 Fax
www.retec.com

WELL INSTALLATION

ID: MW-9

RETEC

Project Number: CECN3-16922-206	Drilling Co.: Aquifer Drilling and Testing	Surface Elevation: 207.69 NAVD88
Client: Con Edison	Driller: Shaun	Water Level During Drilling: NA
Site Location: St. John's School	Casing ID: 4 1/4 - inch	Stickup: NA
Start Date: September 1, 2004	Method: Hollow Stem Auger	MP Elevation: 207.34 NAVD88
Completion Date: September 2, 2004	Logged By: Joshua Millard	Total Depth: 64 feet bgs
Location: Parking Lot Adj. to Gym		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description	Well Construction
1					See adjacent soil boring log SB-119 for lithologic descriptions. Well set to evaluate groundwater quality at the downgradient edge of the suspected impact zone.	
2						
3						
4						
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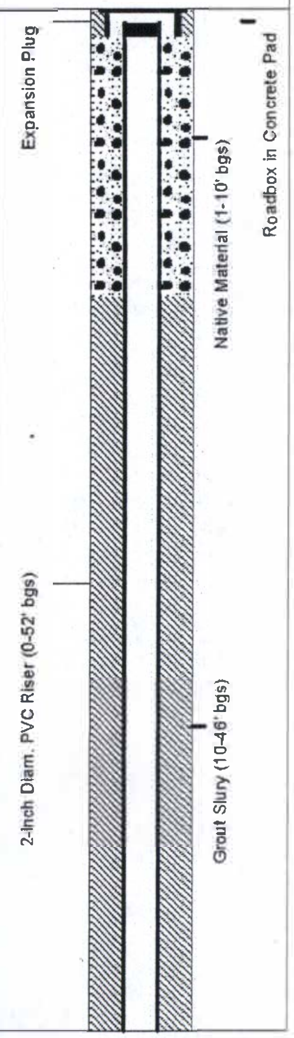
30						
31						
32						
33						
34						
35						



Remarks:

1. Augers advanced w/ wood plug directly to tennination depth.
2. Water added to augers to prevent running sands.
3. bgs = below ground surface

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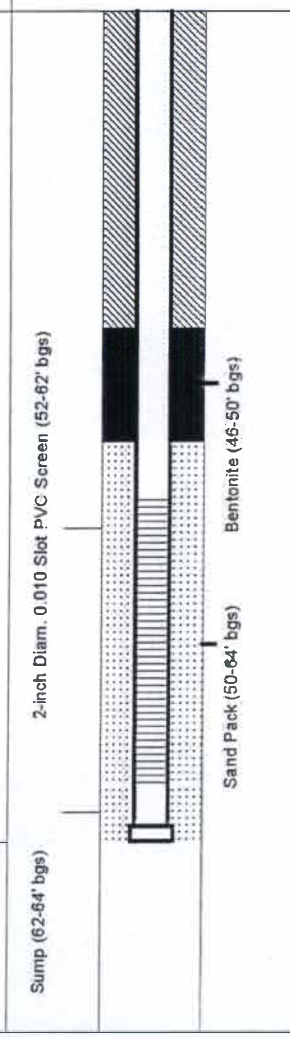
WELL INSTALLATION

ID: MW-9

RETEC

Project Number: CECN3-16922-206	Drilling Co.: Aquifer Drilling and Testing	Surface Elevation: 207.69 NAVD88
Client: Con Edison	Driller: Shaun	Water Level During Drilling: NA
Site Location: St. John's School	Casing ID: 4 1/4 - inch	Stickup: NA
Start Date: September 1, 2004	Method: Hollow Stem Auger	MP Elevation: 207.34 NAVD88
Completion Date: September 2, 2004	Logged By: Joshua Millard	Total Depth: 64 feet bgs
Location: Parking Lot Adj. to Gym		

Depth (ft)	Recovery (%)	PID Headspace (ppm)	Blow Counts /6"	Lithology	Description	Well Construction
36–64						
64					Bottom of Borehole	
65–70						



Remarks:
1. Augers advanced w/ wood plug directly to termination depth.
2. Water added to augers to prevent running sands.
3. bgs = below ground surface

Appendix C

Photographic Record of Representative Sampling Activities

1. Cafeteria Post Field Work B-103.

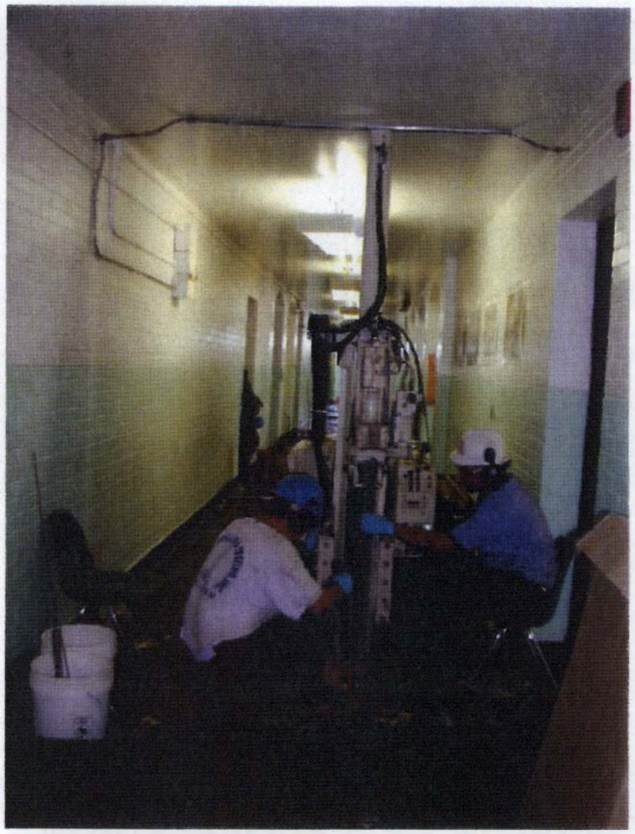
2. Hallway Post Work.

3. Kitchen B-102 Post Work.

4. Rig Ascending Stairs.

5. Rotary Hammer Installation of B-104.

6. Typical Drill Setup with Exhaust Venting.



7. Typical Installation of Soil Boring using Limited Access Direct Push Rig.

8. Typical Surface Completion - B-102.

9. July 2004 soil boring area view.

10. Example of distinct nature of subsurface NAPL impacts at depth (B-110).

11. Example of distinct nature of subsurface NAPL impacts at depth (B-111).

Appendix D

Groundwater Sampling Forms

GROUNDWATER SAMPLING FORM

RETEC

300 Baker Ave., Suite 302
Con cordMA 01742

Site (Location): St. John's, White Plains, NY
Well ID: B-101
Page 1 of 1
Date: april 13, 2004
Field Personnel: Josh Millard / Jesse Lloyd
Project No.: CECNJ-16922-200

Measuring Point: NA
Well Diameter: 3/4-inch
Well Screen
Depth to Bottom (ft): NA/EM - 24' bgs
Well Volume (gal): —
Top: NA
Weather: Steady Rain
Depth to Water (ft): NA/EM - 22' bgs
Purge Volume (gal):
Bottom: NA
Well Condition: NA
Water Column (ft): NA ~2'
Purging Device: Peristaltic Pump
Pump Intake: NA
L/D NAPL Thickness: NA

Time (24 hour)	Depth to Water ft	Pump Dial Setting	Purge Rate (ml/min)	Cumulative Volume Purged Gallons	Temp. °C	Specific Conductance mS/cm ~~uS/cm~~	pH	ORP/Eh[3] mv	DO mg/L	Turbidity NTU	
Stabilization Target	(< 0.30 ft)		(200-400)		(3%)	(3%)	(+ - 0.1unit)	(+ - 10 mv)	(10%)	(10%)*	Comments:
8:33	—	—	200	0.5	15.72	5.06	7.14	232	5.17	12.5	
8:38	—	—	200	0.75	15.94	5.11	7.15	231	5.19	1.76	
8:41	—	—	200	1.0	16.02	5.12	7.15	230	5.16	1.29	
8:47	—	—	250	1.5	16.20	5.12	7.15	239	5.25	1.06	STBL

Samples Collected at: 9:15
Sample ID: B101-041304
COC #:
Laboratory Receiving Samples: STL-Pittsburgh
Shipped By: FedEx
Decon Method: WA
Analysis(es) to be Performed: VOCs, SVOCs, TAL Metals, Total + Available Cyanide
QA/QC Samples Collected:
*Turbidity must be with in 10% if above 1 NTU

RETEC

GROUNDWATER SAMPLING FORM

300 Baker Ave., Suite 302
Concord, MA 01742

Site (Location): St. John's, White Plains, WY
Date: April 16, 2004
Well ID: B-102
Field Personnel: Josh Millard, Jesse Lloyd
Page 1 of 1
Project No.: CECW3-16932-200

Measuring Point: NA
Depth to Bottom (ft): ~24'
Depth to Water (ft): ~21'
Water Column (ft): ~3'
Well Diameter: 3/4 inch
Well Volume (gal): —
Purge Volume (gal): —
Purging Device: Peristaltic Pump
Well Screen
Top: —
Bottom: —
Pump Intake: —
Weather: Indoors
Well Condition: NA
L/D NAPL Thickness: NA

Time (24 hour)	Depth to Water ft	Pump Dial Setting	Purge Rate (ml/min)	Cumulative Volume Purged Gallons	Temp. °C	Specific Conductance mS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turbidity NTU	Comments:
Stabilization Target	(< 0.30 ft)		(200-400)		(3%)	(3%)	(+ - 0.1unit)	(+ - 10 mv)	(10%)	(10%)*	
12:03	—	—	—	—	18.23	4.13	7.11	179	5.35	33.5	
12:08	—	—	—	—	18.17	4.15	7.06	183	5.66	7.18	
12:13	—	—	—	—	18.13	4.16	7.06	191	5.77	4.32	
12:20	—	—	—	—	18.09	4.14	7.06	198	5.85	2.81	
12:24	—	—	—	—	18.03	4.15	7.06	201	5.86	2.75	

Samples Collected at: 1215
Laboratory Receiving Samples: STL - Pittsburgh
Analysis(es) to be Performed: VOCs, SVOCs, TAL Metals, Total and Available Cyanide
QA/QC Samples Collected: NA
Sample ID: B102-041604
Shipped By: FedEx
COC #:
Decon Method:

*Turbidity must be with in 10% if above 1 NTU

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GROUNDWATER SAMPLING FORM

RETEC

300 Baker Ave., Suite 302
Concord, MA 01742

Site (Location): St. Johns, White Plains, NY
Date: April 14, 2004

Well ID: B-103
Field Personnel: Josh Millard & Jesse Lloyd

Page 1 of 1
Project No.: CECW3-16722-200

Measuring Point: NA
Depth to Bottom (ft): ~24' bgs
Depth to Water (ft): ~21' bgs
Water Column (ft): ~3

Well Diameter: 3/4 - inch
Well Volume (gal): —
Purge Volume (gal):
Purging Device: Peristaltic Pump

Well Screen
Top: —
Bottom: —
Pump intake: —

Weather: Indoors
Well Condition: NA
L/D NAPL Thickness: NA

Time (24 hour)	Depth to Water ft	Pump Dial Setting	Purge Rate (ml/min)	Cumulative Volume Purged Gallons	Temp. °C	Specific Conductance uS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turbidity NTU	Comments:
Stabilization Target	(< 0.30 ft)		(200-400)		(3%)	(3%)	(+ - 0.1unit)	(+ - 10 mv)	(10%)	(10%)*	
12:28	—	—	300	0.4	17.80	4.38	7.40	179	4.48	11.5	
12:34	—	—	300	0.5	17.57	4.70	7.33	179	4.72	2.85	
12:40	—	—	300	1.0	17.52	4.79	7.32	169	4.91	43.7	
12:46	—	—	200	1.5	17.79	4.50	7.29	163	5.00	7.75	
12:49	—	—	200	2.0	17.44	4.40	7.29	162	5.02	2.14	
12:52	—	—	200	2.4	17.77	4.52	7.30	161	5.06	1.57	stable

Samples Collected at: 1255
Laboratory Receiving Samples: STL - Pittsburgh
Analysis(es) to be Performed: VOCs, SVOCs, TAL metals, total and amenable Cyanide
QA/QC Samples Collected: Duplicate sample B103D-041404

Sample ID: B103F-041404
Shipped By: FedEX

COC #:
Decon Method:

*Turbidity must be with in 10% if above 1 NTU

GROUNDWATER SAMPLING FORM

RETEC

300 Baker Ave., Suite 302
Concord, MA 01742

Site (Location): ST. Johns, White Plains, NY
Well ID: B-104
Page 1 of 1
Date: April 15, 2004
Field Personnel: Josh Millard, Jesse Lloyd
Project No.: CECW3-16922-200

Measuring Point: NA
Well Diameter: 3/4 inch
Well Screen
Depth to Bottom (ft): ~20.5' bgs
Well Volume (gal): —
Top: —
Weather: Indoors
Depth to Water (ft): ~19' bgs
Purge Volume (gal): —
Bottom: —
Well Condition: NA
Water Column (ft): ~3-5 ft
Purging Device: Peristaltic Pump
Pump Intake: —
L/D NAPL Thickness: NA

Time (24 hour)	Depth to Water ft	Pump Dial Setting	Purge Rate (ml/min)	Cumulative Volume Purged Gallons	Temp. °C	Specific Conductance ms/cm	pH	ORP/ Eh³ mv	DO mg/L	Turbidity NTU	Comments:
Stabilization Target	(< 0.30 ft)		(200-400)		(3%)	(3%)	(+ - 0.1unit)	(+ - 10 mv)	(10%)	(10%)*	
10:28	—	—	—	—	17.76	1.83	7.35	440	5.36	202	
10:33	—	—	—	—	17.71	1.75	7.35	411	6.27	79.7	
10:38	—	—	—	—	17.73	1.67	7.34	387	6.59		
10:43	—	—	—	—	17.70	1.70	7.34	373	6.60	27.6	
10:48	—	—	—	—	17.71	1.66	7.33	366	6.69	20.2	
10:53	—	—	—	—	17.75	1.66	7.32	364	6.42	10.67	

Samples Collected at: 10:40
Sample ID: B104-041504
COC #:
Laboratory Receiving Samples: STL-Pittsburgh
Shipped By: FedEx
Decon Method: NA
Analysis(es) to be Performed: VOCs, SVOCs, TAL Metals, Total and Available Cyanide
QA/QC Samples Collected: MS/MSD

*Turbidity must be with in 10% if above 1 NTU

GROUNDWATER SAMPLING FORM

RETEC

300 Baker Ave., Suite 302
Concord, MA 01742

Site (Location): White Plains
Date: 9-14-07

Well ID: MW-7
Field Personnel: Josh Millard

Page ____ of ____

Project No.: ____

Measuring Point: ____
Depth to Bottom (ft): 15.75
Depth to Water (ft): 7.80
Water Column (ft): ____

Well Diameter: 2-inch
Well Volume (gal): ____
Purge Volume (gal): ____
Purging Device: ____

Well Screen
Top: ____
Bottom: ____
Pump Intake: ____

Weather: ____
Well Condition: ____
L/D NAPL Thickness: ____

Time (24 hour)	Depth to Water ft	Pump Dial Setting	Purge Rate (ml/min)	Cumulative Volume Purged Gallons	Temp. °C	Specific Conductance mS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turbidity NTU	Comments:
Stabilization Target	(< 0.30 ft)		(200-400)		(3%)	(3%)	(+ - 0.1unit)	(+ - 10 mv)	(10%)	(10%)*	
1255											Start Purging
1300	7.32		200	0.2	19.77	3.36	6.80	3	0.60	48	
1303	7.6		150	0.4	1745	3.15	6.77	0	0.32	36.2	
1306	7.4		150	0.5	1956	3.21	6.78	-8	0.27	32.1	
1309	7.55		150	0.6	1956	3.28	6.79	-11	0.24	28.9	
1312	7.60		190	0.69	1943	3.32	6.79	-15	0.21	24.2	
1318	7.7		150	0.75	1918	3.38	6.79	-1.5	0.16	17.4	
1321	7.75		150	0.9	19.17	3.37	6.80	-15	0.17	16.1	
1324	7.80		150	1.0	19.16	3.43	6.80	-16	0.16	15.8	Sample

Samples Collected at: 13:30
Laboratory Receiving Samples: STL Pitts
Analysis(es) to be Performed: MNA
QA/QC Samples Collected: ____

Sample ID: MW7-091407
Shipped By: FedEx

COC #: ____
Decon Method: ____

*Turbidity must be wilh in 10% if above 1 NTU

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GROUNDWATER SAMPLING FORM

RETEC

300 Baker Ave., Suite 302
Concord, MA 01742

Site (Location): St. John's White Plains
Date: 9-14-04
WellID: MW-9
Field Personnel: J. Milford
Page 1 of ____
Project No.: CECN3-16932-

Measuring Point: Top of PVC
Depth to Bottom (ft): 62.12
Depth to Water (ft): 29.63
Water Column (ft):
Well Diameter: 2-inch
Well Volume (gal):
Purge Volume (gal):
Purging Device: Grundfos Pump
Well Screen
Top: 52
Bottom: 62
Pump Intake: 57'
Weather: Overcast, Mild
Well Condition: good
L/D NAPL Thickness: NA

Time (24 hour)	Depth to Water ft	Pump Dial Setting	Purge Rate (ml/min)	Cumulative Volume Purged Gallons	Temp. °C	Specific Conductance mS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turbidity NTU	Comments:
Stabilization Target	(< 0.30 ft)		(200-400)		(3%)	(3%)	(+ - 0.1unit)	(+ - 10 mv)	(10%)	(10%)*	
9:40											Start Purging
9:48	29.75	125	300	0.4	18.31	4.08	6.64	115	0.46	176	
9:52	29.80	123	300	0.6	20.14	4.10	6.65	102	0.27	114	
9:55	29.75	124	300	1.0	20.92	4.11	6.65	101	0.24	83.3	
10:00	29.75	124	300	1.5	21.02	4.07	6.66	100	0.20	59.1	
10:04	29.75	124	300	2.0	21.23	4.05	6.66	102	0.18	53.3	
10:08	29.75	124	300	2.5	21.34	4.04	6.66	104	0.16	47.9	
10:12	29.75	124	300	3.2	21.40	4.03	6.66	104	0.16	40.3	
10:15	29.75	124	300	3.6	21.60	4.02	6.67	104	0.16	36.2	
10:18	29.75	124	300	4.2	21.67	4.01	6.68	104	0.16	27.4	
10:21	29.75	124	300	4.6	21.74	4.02	6.67	104	0.15	24.1	
10:24	29.75	124	300	4.7	21.72	4.02	6.66	103	0.14	23.6	
10:27	29.75	124	300	5.0	21.70	4.00	6.67	104	0.14	19.1	
10:30	29.75	124	300	5.2	22.02	4.00	6.67	104	0.15	18.1	
10:33	29.75	124	300	5.5	22.57	4.00	6.66	99	0.14	22.3	
10:36	29.75	124	300	6.0	22.24	3.98	6.67	101	0.14	17.1	
10:39	29.75	124	300	6.4	21.98	3.97	6.66	102	0.13	16.7	
10:42	29.75	124	300	6.8	21.93	3.97	6.66	102	0.12	16.6	
10:45	29.75	124	300	7.2	21.89	3.94	6.66	100	0.11	15.3	Stable

Samples Collected at: 10:50
Sample ID: MW9-091404
COC #:
Laboratory Receiving Samples: STL - Pitts
Shipped By: FedEx
Decon Method:
Analysis(es) to be Performed: VOCs, SVOCs, Metals, CN, MNA
QA/QC Samples Collected:

*Turbidity must be with in 10% if above 1 NTU

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GROUNDWATER SAMPLING FORM

RETEC

300 Baker Ave., Suite 302
Concord, MA 01742

Site (Location): White Plains
Date: 9-17-09
WellID: MW-5
Field Personnel: J. McWard
Page ___ of ___
Project No.: CECN3-16822

Measuring Point: Top of PVC
Depth to Bottom (ft): 10.11
Depth to Water (ft): 5.72
Water Column (ft):
Well Diameter: 2-inch
Well Volume (gal):
Purge Volume (gal):
Purging Device: Peristaltic
Well Screen
Top:
Bottom:
Pump Intake: 7' bgs
Weather: Clear, Mild
Well Condition: Good
L/D NAPL Thickness:

Time (24 hour)	Depth to Water ft	Pump Dial Setting	Purge Rate (ml/min)	Cumulative Volume Purged Gallons	Temp. °C	Specific Conductance mS/cm	pH	ORP/ Eh³ mv	DO mg/L	Turbidity NTU	
Stabilization Target	(< 0.30 ft)		(200-400)		(3%)	(3%)	(+ - 0.1unit)	(+ - 10 mv)	(10%)	(10%)*	Comments:
1146											Start Purging
1148	6.18										
1149	6.18		120	0.2	2620	0.305	6.80	105	1.75	24.3	
1154	6.44		100	0.3	2627	0.304	6.74	55	1.10	13.6	
1159	6.53		100	0.4	2620	0.304	6.64	44	0.87	8.61	
1203	6.63		100	0.45	2616	0.306	6.70	47	0.76	7.914	
1205	6.71		100	0.5	26.35	0.307	6.59	49	0.60	6.76	
1208	6.81		100	0.55	26.32	0.309	6.55	58	0.51	5.67	
1211	6.91		100	0.58	26.38	0.312	6.55	64	0.48	5.54	
1214	6.98		100	0.6	26.35	0.312	6.57	68	0.44	5.72	stable

Samples Collected at: 1215
Laboratory Receiving Samples: STL. Pitts
Analysis(es) to be Performed: MNA
QA/QC Samples Collected:
Sample ID: MW5.09.1404
Shipped By: FedEx
COC #:
Decon Method:

*Turbidity must be with in 10% if above 1 NTU

F:\TABLES\A_Generic_Tables\GWFormRETEC-LowFlow.xls

Appendix E

Monitoring Well Development Record (MW-9)

MONITORING WELL DEVELOPMENT LOG

RETEC

Site: St. John's School, White Plains, NY	Client: Con Edison
Project No.: CECN3-16922 / Sample ID: NA	Well No.: MW-9
Development Start Date/Time: 9/3/04 7:36	Development End Date/Time: 9/3/04 9:30
Developed By: Josh Millard and Drillers of ADT	

Depth Measurement Ref. Point* Top of PVC

Well Casing ID: (2") 4" 6" Other ____

Well Headspace/Odor NO

LNAPL Check (Yes/(No)) DNAPL Check (Yes/(No))

Equipment used to measure thickness and sample free product (Make, Model, etc.) ____

Depth to top and bottom of screened interval 52-62

Depth to LNAPL NA

Original DTW 29.90

Final DTW 34.80

Depth to DNAPL NA

LNAPL/DNAPL Thickness NA

LNAPL/DNAPL Sample and Volume NA

Measured Well TD: 62.32 (-) Original DTW: 29.90 (=) Ht. Wtr Col.: 33.42

DEVELOPMENT METHOD:

- [x] Submersible Pump
- [ ] Dedicated Bladder Pump
- [ ] Bladder Pump
- [ ] SS
- [ ] Centrifugal Pump
- [ ] Peristaltic Pump
- [ ] Hand Pump
- [ ] Bailer
- [ ] Tef
- [ ] Gas Lift/Displacement Pump
- [ ] Inertial Lift Pump
- [ ] Other ____
- [ ] PVC

Development Equip. (Make, Model, etc.) Grundfos Redi-flow, custom Surge Block

Development Water Containerized? ((Yes)/No)

Development Equip. Decontaminated? [x] Yes [ ] No

Average Development Rate: 9 gpm

Weather Clear, Mild

Actual Time (min.)	Vols. Purged (gals.)	Depth to Pump Intake (ft.)	Depth to Water (ft.)	Temp (°C)	pH	Cond. (mS/cm)	Turbidity (NTA)	D.O. (mg/L)	Salinity (%)	Comments
9:15	2	60	31	17.3	7.08	3.02	NA	NA	NA	Cloudy - Surged
9:20	25	58	32	17.8	7.08	3.28	NA	NA	NA	Slightly Cloudy - Surged
9:30	50	60	33	17.1	7.08	3.63	NA	NA	NA	Slightly Cloudy - Surged
9:35	70	55	34	17.1	7.10	3.70	NA	NA	NA	Cloudy very slightly
9:40	80	60	35	17.6	7.09	3.72	NA	NA	NA	Clear

* All depths in feet below reference point on wellhead, generally Top of Casing; DTW = Depth to Water; LNAPL/DNAPL = Light/Dense Non-Aqueous Phase Liquid

Appendix F

PID, Cyanide, and Meteorological Observations and Measurements During Indoor Air and Soil Gas Sampling

Table F-1
Summary of Volatile Organic Compounds in Air Measured Using a Photoionization Detector during Collection of Air Samples
April 8, 2004
St. John's School,
White Plains, New York

Location	VOC[a] Concentration (ppm)[b]	VOC Concentration (ppb)[c]
St. John's School		
Kitchen	--	33
Cafeteria	--	57-75
Boiler Room & Coal Storage	--	35-60
Play Room	--	55-63
Classroom 1 - First Floor.	--	52
Classroom 2 - First Floor.	--	77
Classroom 3 - First Floor.	--	72
Boy's Bathroom - First Floor.	--	70
Rectory		
Boiler Room	--	45
Basement Hallway	--	50-79
Hallway - First Floor	--	55
Pantry - First Floor	--	120
Kitchen - First Floor	--	250
Gymnasium	--	40

Notes
[a] volatile organic compound
[b] parts of VOCs per million parts of air
[c] parts of VOCs per billion parts of air

Table F-2
Summary of Cyanide Measured in Air using Colorimetric Indicator Tubes
April 8, 2004
St. John's School,
White Plains, New York

Location	HCN Concentration (mg/m^3)+B20
St. John's School	
Kitchen	ND
Cafeteria	ND
Boiler Room & Coal Storage	ND
Play Room	ND
Classroom 1 - First Floor.	ND
Classroom 2 - First Floor.	ND
Classroom 3 - First Floor.	ND
Boy's Bathroom - First Floor.	ND
Rectory	
Boiler Room	ND
Basement Hallway	ND
Hallway - First Floor	ND
Pantry - First Floor	ND
Kitchen - First Floor	ND
Gymnasium	ND

Table F-3
Summary of Meteorological Measurements Made during the Collection of Air Samples
April 12, 2004
St. John's School
White Plains, New York

Time	Temperature (°F)	Humidity (%)	Pressure (in. Hg)	Wind Speed (mph)	Wind Direction (from)
5:56	41.0	60	30.17	5.8	East Northeast
6:56	42.1	55	30.22	6.9	Northeast
7:56	43.0	56	30.23	4.6	East
8:56	45.0	58	30.24	6.9	East
9:56	48.0	58	30.24	6.9	East Southeast
10:56	50.0	59	30.23	8.1	East
11:56	48.9	66	30.22	11.5	South Southeast
12:56	48.9	52	30.19	11.5	East Southeast
13:56	50.0	59	30.21	9.2	Southeast
14:56	48.9	64	30.21	9.2	South Southeast
15:56	46.9	66	30.21	5.8	Southeast
16:56	46.9	71	30.20	6.9	East
17:56	46.0	73	30.20	9.2	East Southeast

Table G-1
Summary Table of Ambient, Indoor Air, and Soil Gas Results
St. John's School and Rectory
Resampling Event - April 12, 2004

Compound	CAS number	Sample Number, Location, and Results in ug/m^3																								Background Indoor Air Values[3]	
Type of Sample		Ambient Air	Ambient Air	Ambient Air	Ambient Air	Soil Gas	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Soil Gas	Indoor Air	Soil Gas	Indoor Air	Soil Gas	Indoor Air	Indoor Air-FD	Soil Gas	Indoor Air	DOH 75th ug/m^3	DOH 90th ug/m^3
Sample Location		Outdoor Southwest	Outdoor Northeast	Outdoor Southwest	Outdoor Northeast	Gym Floor, at foot of Stairs	Center of Gymnasium	Rectory 1st Floor	Rectory 1st Floor	Rectory Basement	Rectory Basement	1st Floor of School, Men's Restroom	1st Floor of School, Classroom No. 3	1st Floor of School, Classroom No. 2	1st Floor of School, Classroom No. 1	Basement of School, Entry	Grassy Area	Basement of School, Kitchen	Basement of School, Kitchen	Basement of School, Cafeteria	Basement of School, Cafeteria	Basement of School, Boiler Room	Field Duplicate Basement of School, Boiler Room	Basement of School, Boiler Room	Basement of School, Play Room		
Sampling Date		4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004		
SampleID		AMB-101	AMB-102	AMB-103	AMB-104	SG-106	IA-G106	IA-R1-101	IA-R1-102	IA-RB-101	IA-RB-102	IA-S1-101	IA-S1-102	IA-S1-103	IA-S1-104	IA-SB-101	SG-101	IA-SB-102	SG-102	IA-SB-103	SG-103	IA-SB-104	IA-SB-104FD	SG-104	IA-SB-105		
Possibly MGP Related or Other Sources [1]																											
1,2,4-Trimethylbenzene	95-63-6	0.76 U	0.79 U	0.88	2.8	16	0.85	0.79 U	0.76 U	3.9 U	0.80 U	0.76 U	0.76 U	0.79 U	1.1 U	1.9	5.0	0.86	15	4.3	18	0.97	0.74	13	0.77	4.4	11
1,3,5-Trimethylbenzene	108-67-8	0.76 U	0.79 U	0.72 U	0.86	11 U	0.72 U	0.79 U	0.76 U	3.9 U	0.80 U	0.76 U	0.76 U	0.79 U	1.1 U	0.73 U	5.0 U	0.74 U	10 U	1.2	10 U	0.74 U	0.74 U	10 U	0.69 U	1.7	3.8
2,3-Dimethylpentane	565-59-3	3.2 U	3.3 U	3.0 U	3.2 U	46 U	3.0 U	3.3 U	3.2 U	16 U	3.4 U	3.2 U	3.2 U	3.3 U	4.5 U	3.0 U	21 U	3.1 U	43 U	3.3 U	42 U	3.1 U	3.1 U	43 U	2.9 U	2.1	7.9
2-Hexanone	591-78-6	3.2 U	3.3 U	3.0 U	3.2 U	46 U	3.0 U	3.3 U	3.2 U	16 U	3.4 U	3.2 U	3.2 U	3.3 U	4.5 U	3.0 U	21 U	3.1 U	43 U	3.3 U	42 U	3.1 U	3.1 U	43 U	2.9 U	NA	NA
2-Methylpentane	107-83-5	2.7 U	2.8 U	2.6 U	6.3	39 U	2.6 U	2.8 U	2.7 U	14 U	4.7	2.7 U	2.7 U	2.8 U	3.8 U	2.6 U	18 U	2.7 U	37 U	2.8 U	36 U	2.7 U	2.7 U	37 U	2.5 U	NA	NA
4-Ethyltoluene	622-96-8	3.8 U	3.9 U	3.6 U	3.8 U	55 U	3.6 U	3.9 U	3.8 U	19 U	4.0 U	3.8 U	3.8 U	3.9 U	5.4 U	3.6 U	25 U	3.7 U	52 U	3.9 U	51 U	3.7 U	3.7 U	52 U	3.5 U	NA	NA
4-Methyl-2-pentanone	108-10-1	3.2 U	3.3 U	3.0 U	3.2 U	46 U	3.0 U	3.3 U	3.2 U	16 U	3.4 U	3.2 U	3.2 U	3.3 U	4.5 U	3.0 U	21 U	3.1 U	43 U	3.4	42 U	3.1 U	3.1 U	43 U	2.9 U	0.98	3
Benzene	71-43-2	1.5	1.0	2.2	2.8	7.1 U	1.3	1.8	1.6	2.5 U	2.8	1.6	1.3	2.9	1.7	1.5	3.2 U	1.5	6.7 U	1.6	6.6 U	1.5	1.6	6.7 U	1.5	5.7	15
Carbon Disulfide	75-15-0	2.4 U	2.5 U	2.3 U	2.4 U	35 U	4.3	2.5 U	2.4 U	12 U	2.5 U	2.4 U	2.4 U	2.5 U	3.4 U	2.3 U	16 U	2.4 U	33 U	3.0	32 U	2.4 U	5.5	33 U	2.2 U	NA	NA
Cyclohexane	110-82-7	2.6 U	2.8 U	2.5 U	2.6 U	38 U	2.5 U	2.8 U	2.6 U	14 U	2.8 U	2.6 U	2.6 U	2.8 U	3.8 U	2.6 U	17 U	2.6 U	36 U	2.8 U	36 U	2.6 U	2.6 U	36 U	2.4 U	2.9	9.1
Ethylbenzene	100-41-4	0.67 U	0.70 U	0.71	1.7	9.7 U	0.64 U	0.70 U	0.67 U	3.4 U	0.71 U	0.67 U	0.67 U	0.70 U	0.95 U	0.64 U	12	0.66 U	12	3.4	9.6	0.66 U	0.66 U	9.1 U	0.61 U	2.8	7.3
Heptane	142-82-5	3.2 U	3.3 U	3.0 U	3.2 U	46 U	3.0 U	3.3 U	3.2 U	16 U	3.4 U	3.2 U	3.2 U	3.3 U	4.5 U	3.0 U	21 U	3.1 U	43 U	3.3 U	42 U	3.1 U	3.1 U	43 U	2.9 U	7.7	19
Hexane	110-54-3	2.7 U	2.8 U	2.6 U	3.5	39 U	2.6 U	2.8 U	2.7 U	14 U	3.6	2.7 U	2.7 U	2.8 U	3.8 U	2.6 U	18 U	2.7 U	37 U	2.8 U	36 U	2.7 U	2.7 U	37 U	2.5 U	6.5	19
2,2,4-Trimethylpentane	540-84-1	3.6 U	3.8 U	3.4 U	3.6 U	1100	3.4 U	3.8 U	3.6 U	18 U	3.8 U	3.6 U	3.6 U	3.8 U	5.1 U	3.5 U	580	3.5 U	1700	3.8 U	1700	3.5 U	3.5 U	1200	3.3 U	2.6	7.3
Indan	496-11-7	3.7 U	3.9 U	3.5 U	3.7 U	54 U	3.5 U	3.9 U	3.7 U	19 U	4.0 U	3.7 U	3.7 U	3.9 U	5.3 U	3.6 U	24 U	3.7 U	51 U	3.9 U	50 U	3.7 U	3.7 U	51 U	3.4 U	NA	NA
Indene	95-13-6	3.7 U	3.8 U	3.5 U	3.7 U	53 U	3.5 U	3.8 U	3.7 U	19 U	3.9 U	3.7 U	3.7 U	3.8 U	5.2 U	3.5 U	24 U	3.6 U	50 U	3.8 U	49 U	3.6 U	3.6 U	50 U	3.4 U	NA	NA
Isopentane	78-784	2.3 U	2.4 U	2.6	7.6	33 U	2.2 U	9.9	3.6	12 U	11	3.9	2.3 U	2.4 U	3.2 U	3.5	15 U	3.1	31 U	3.5	30 U	7.9	7.7	31 U	11	NA	NA
Naphthalene	91-20-3	4.0 U	4.2 U	3.8 UJ	4.0 UJ	58 UJ	3.8 UJ	4.2 UJ	4.0 UJ	21 UJ	4.3 UJ	4.0 UJ	4.0 UJ	4.2 U	6.2 J	3.9 UJ	26 UJ	4.0 UJ	55 UJ	4.2 J	54 UJ	4.0 UJ	4.0 UJ	55 UJ	3.7 UJ	NA	NA
Styrene	100-42-5	0.66 U	0.68 U	0.62 U	0.66 U	9.5 U	0.62 U	0.68 U	0.66 U	3.4 U	0.70 U	0.66 U	0.66 U	0.68 U	0.93 U	0.63 U	4.3 U	0.64 U	9.0 U	0.68 U	8.8 U	0.64 U	0.64 U	9.0 U	0.60 U	0.68	1.3
Thiophene	110-02-1	2.6 U	2.8 U	2.5 U	2.6 U	38 U	2.5 U	2.8 U	2.6 U	14 U	2.8 U	2.6 U	2.6 U	2.8 U	3.8 U	2.6 U	17 U	2.6 U	36 U	2.8 U	36 U	2.6 U	2.6 U	36 U	2.4 U	NA	NA
Toluene	108-88-3	3.1	3.1	3.9	9.3	59	1.8	3.5	2.5	3.0 U	3.1	2.4	1.6	2.0	1.9	4.6	40	2.6	79	6.9	80	2.6	2.6	64	3.7	25	59
m/p-Xylenes	136777-61-2	1.1	2.6	2.0	6.0	21	1.4	1.1 J	1.1 J	6.8 U	1.2 J	1.2 J	0.90 J	0.70 U	1.0 J	1.9	38	1.2 J	38	8.4	31	1.4	1.4	28	1.2	4.7	12
o-Xylene	95-47-6	0.67 U	0.94	0.75	2.3	9.7 U	0.61 J	0.70 U	0.67 U	3.4 U	0.71 U	0.67 U	0.67 U	0.70 U	0.95 U	0.73	10	0.66 U	12	3.1	8.8 J	0.66 U	0.66 U	9.1 U	0.61 U	3.1	7.9
Not MGP Related [2]																											
1,1,1-Trichloroethane	71-55-6	0.84 U	0.88 U	0.80 U	0.64 U	12 U	0.80 U	0.88 U	0.84 U	4.3 U	0.89 U	0.84 U	0.84 U	0.88 U	1.2 U	17	5.5 U	0.83 U	11 U	0.88 U	11 U	0.83 U	0.83 U	11 U	0.77 U	1.4	3.5
1,1,2,2-Tetrachloroethane	79-34-5	1.1 U	1.1 U	1.0 U	1.1 U	15 U	1.0 U	1.1 U	1.1 U	5.4 U	1.1 U	1.1 U	1.1 U	1.1 U	1.5 U	1.0 U	6.9 U	1.0 U	14 U	1.1 U	14 U	1.0 U	1.0 U	14 U	0.97 U	0.2	0.23
1,1,2-Trichloroethane	79-00-5	0.84 U	0.88 U	0.80 U	0.84 U	12 U	0.80 U	0.88 U	0.84 U	4.3 U	0.89 U	0.84 U	0.84 U	0.88 U	1.2 U	0.81 U	5.5 U	0.83 U	11 U	0.88 U	11 U	0.83 U	0.83 U	11 U	0.77 U	0.2	0.24
1,1-Dichloroethane	75-34-3	0.62 U	0.65 U	0.59 U	0.62 U	9.0 U	0.59 U	0.65 U	0.62 U	3.2 U	0.66 U	0.62 U	0.62 U	0.65 U	0.88 U	0.67	4.1 U	0.61 U	8.5 U	0.65 U	8.4 U	0.61 U	0.61 U	8.5 U	0.57 U	0.19	0.23
1,1-Dichloroethene	75-35-4	0.61 U	0.64 U	0.58 U	0.61 U	8.8 U	0.58 U	0.64 U	0.61 U	3.1 U	0.65 U	0.61 U	0.61 U	0.64 U	0.87 U	1.1	4.0 U	0.60 U	8.3 U	0.64 U	8.2 U	0.60 U	0.60 U	8.3 U	0.56 U	0.19	0.23
1,2,4-Trichlorobenzene	120-82-1	5.7 UJ	6.0 UJ	5.4 UJ	5.7 UJ	83 UJ	5.4 UJ	6.0 UJ	5.7 UJ	29 UJ	6.1 UJ	5.7 UJ	5.7 UJ	6.0 UJ	8.1 UJ	5.5 UJ	37 UJ	5.6 UJ	78 UJ	6.0 UJ	76 UJ	5.6 UJ	5.6 UJ	78 UJ	5.2 UJ	0.24	3
1,2-Dibromoethane (EDB)	106-93-4	1.2 U	1.2 U	1.1 U	1.2 U	17 U	1.1 U	1.2 U	1.2 U	6.0 U	1.2 U	1.2 U	1.2 U	1.2 U	1.7 U	1.1 U	7.8 U	1.2 U	16 U	1.2 U	16 U	1.2 U	1.2 U	16 U	1.1 U	0.19	0.23
1,2-Dichlorobenzene	95-50-1	0.93 U	2.0	0.88 U	0.93 U	13 U	0.88 U	0.96 U	0.93 U	4.7 U	0.98 U	0.93 U	0.93 U	0.96 U	1.3 U	0.89 U	6.1 U	0.91 U	13 U	0.96 U	12 U	0.91 U	0.91 U	13 U	0.85 U	0.24	0.78
1,2-Dichloroethane	107-06-2	0.62 U	0.65 U	0.59 U	0.62 U	9.0 U	0.59 U	0.65 U	0.62 U	3.2 U	0.66 U	0.62 U	0.62 U	0.65 U	0.88 U	7.2	4.1 U	0.61 U	8.5 U	0.65 U	8.4 U	0.61 U	0.61 U	8.5 U	0.57 U	0.19	0.22
1,2-Dichloropropane	78-87-5	0.71 U	0.74 U	0.68 U	0.71 U	10 U	0.68 U	0.74 U	0.71 U	3.6 U	0.76 U	0.71 U	0.71 U	0.74 U	1.0 U	0.68 U	4.7 U	0.70 U	9.7 U	0.74 U	9.5 U	0.70 U	0.70 U	9.7 U	0.65 U	0.2	0.24
1,3-Butadiene	106-99-0	1.7 U	1.8 U	1.6 U	1.7 U	25 U	1.6 U	1.8 U	1.7 U	8.7 U	1.8 U	1.7 U	1.7 U	1.8 U	2.4 U	1.6 U	11 U	1.7 U	23 U	1.8 U	23 U	1.7 U	1.7 U	23 U	1.6 U	NA	NA
1,3-Dichlorobenzene	541-73-1	0.93 U	0.96 U	0.88 U	0.93 U	13 U	0.88 U	0.96 U	0.93 U	4.7 U	0.98 U	0.93 U	0.93 U	0.96 U	1.3 U	0.89 U	6.1 U	0.91 U	13 U	0.96 U	12 U	0.91 U	0.91 U	13 U	0.85 U	0.24	0.66
1,4-Dichlorobenzene	106-46-7	0.93 U	0.96 U	0.88 U	0.93 U	13 U	0.88 U	0.96 U	0.93 U	4.7 U	0.98 U	0.93 U	0.93 U	0.96 U	1.3 U	0.89 U	6.1 U	0.91 U	13 U	1.9	12 U	0.91 U	0.91 U	13 U	0.85 U	0.54	1.3
1,4-Dioxane	123-91-1	2.8 U	2.9 U	2.6 U	2.8 U	40 U	2.6 U	2.9 U	2.8 U	14 U	2.9 U	2.8 U	2.8 U	2.9 U	3.9 U	2.7 U	18 U	2.7 U	38 U	2.9 U	37 U	2.7 U	2.7 U	38 U	2.5 U	NA	NA
2-Butanone (MEK)	78-93-3	2.3 U	2.4 U	2.2	2.3 U	33 U	2.2 U	2.4 U	2.3 U	12 U	2.4 U	2.3 U	2.3 U	2.4 U	3.2 U	2.2 U	21	2.2 U	31 U	12	30 U	2.2 U	3.2	31 U	2.1 U	7.5	14
Acetone	67-64-1	7.3	6.0	15	11	28	6.9	6.7	12	14	6.0	11	6.8	13	17	8.0	84	6.2	44	14	37	14	17	49	7.8	46	110
Benzyl Chloride	100-44-7	0.80 U	0.83 U	0.76 U	0.80 U	12 U	0.76 U	0.83 U	0.80 U	4.1 U	0.85 U	0.80 U	0.80 U	0.83 U	1.1 U	0.77 U	5.2 U	0.78 U	11 U	0.83 U	11 U	0.78 U	0.78 U	11 U	0.73 U	NA	NA
Bromodichloromethane	75-27-4	5.2 U	5.4 U	4.9 U	5.2 U	74 U	4.9 U	5.4 U	5.2 U	26 U	5.5 U	5.2 U	5.2 U	5.4 U	7.3 U	5.0 U	34 U	5.1 U	70 U	5.4 U	69 U	5.1 U	5.1 U	70 U	4.7 U	NA	NA
Bromoform	75-25-2	8.0 U	8.3 U	7.6 U	8.0 U	120 U	7.6 U	8.3 U	8.0 U	41 U	8.4 U	8.0 U	8.0 U	8.3 U	11 U	7.7 U	52 U	7.8 U	110 U	8.3 U	110 U	7.8 U	7.8 U	110 U	7.3 U	NA	NA
Bromomethane	74-83-9	0.60 U	0.62 U	0.57 U	0.60 U	8.6 U	0.57 U	0.62 U	0.60 U	3.0 U	0.64 U	0.60 U	0.59 J	0.62 U	0.85 U	0.58 U	3.9 U	0.59 U	8.2 U	0.62 U	8.0 U	0.59 U	0.59 U	8.2 U	0.55 U	0.24	0.58
Carbon Tetrachloride	56-23-5	0.97 U	1.0 U	0.92 U	0.97 U	14 U	0.92 U	1.0 U	0.97 U	5.0 U	1.0 U	0.97 U	0.97 U	1.0 U	1.4 U	0.93 U	6.4 U	0.95 U	13 U	1.0 U	13 U	0.95 U	0.95 U	13 U	0.89 U	0.68	0.87
Chlorobenzene	108-90-7	0.71 U	0.74 U	0.67 U	0.71 U	10 U	0.67 U	0.74 U	0.71 U	3.6 U	0.75 U	0.71 U	0.71 U	0.74 U	1.0 U	0.68 U	4.6 U	0.70 U	9.7 U	0.74 U	9.5 U	0.70 U	0.70 U	9.7 U	0.65 U	0.19	0.23
Chloroethane	75-00-3	0.41 U	0.42 U	0.39 U	0.41 U	5.9 U	0.39 U	0.42 U	0.41 U	2.1 U	0.43 U	0.41 U	0.41 U	0.42 U	0.58 U	0.39 U	2.7 U	0.40 U	5.6 U	0.42 U	5.4 U	0.40 U	0.40 U	5.6 U	0.37 U	0.2	0.25
Chloroform	67-66-3	0.75 U	0.78 U	0.71 U	0.75 U	11 U	0.71 U	0.78 U	0.75 U	3.8 U	1.1	0.75	0.75 U	0.78 U	1.1 U	0.72 U	4.9 U	0.74 U	80	0.78 U	10 U	0.87	0.76	10 U	0.69 U	0.54	1.4
Chloromethane	74-87-3	1.2	1.2	1.0	0.95	4.6 U	0.88	1.1	1.1	1.6 U	0.92	0.88	0.99	1.3	0.94	1.0	2.1 U	0.88	4.3 U	1.1	4.3 U	0.85	0.92	4.3 U	0.91	2	3.3
cis-1,2-Dichloroethene	156-59-2	0.61 U	0.64 U	0.58 U	0.61 U	8.8 U	0.58 U	0.64 U	0.61 U	3.1 U	0.65 U	0.61 U	0.61 U	0.64 U	0.87 U	0.59 U	4.0 U	0.60 U	8.3 U	0.64 U	8.2 U	0.60 U	0.60 U	8.3 U	0.56 U	0.2	0.24
cis-1,3-Dichloropropene	10061-01-5	0.70 U	0.73 U	0.66 U	0.70 U	10 U	0.66 U	0.73 U	0.70 U	3.6 U	0.74 U	0.70 U	0.70 U	0.73 U	0.99 U	0.67 U	4.6 U	0.69 U	9.5 U	0.73 U	9.4 U	0.69 U	0.69 U	9.5 U	0.64 U	0.2	0.24
Dibromochloromethane	124-48-1	6.6 U	6.8 U	6.2 U	6.6 U	95 U	6.2 U	6.8 U	6.6 U	34 U	7.0 U	6.6 U	6.6 U	6.8 U	9.3 U	6.3 U	43 U	6.4 U	90 U	6.8 U	88 U	6.4 U	6.4 U	90 U	6.0 U	NA	NA
Ethanol	64-17-5	14	4.7	7.0	14	26	5.1	81 J	93 J	3800 J	15	12	8.0	16	32	24	73	15	26	76 J	19 U	3.8	6.9	22	49 J	610	1600
Trichlorofluoromethane (Freon 11)	75-69-4	2.0	2.0	1.6	1.6	12 U	1.5	2.5	1.8	4.4 U	1.5	1.5	1.6	2.0	1.6	1.5	5.7 U	1.4	12 U	1.5	12 U	1.5	1.5	12 U	1.4	5.5	17
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	1.2 U	1.2 U	1.1 U	1.2 U	17 U	1.1 U	1.2 U	1.2 U	6.0 U	1.2 U	1.2 U	1.2 U	1.2 U	1.7 U	1.1 U	7.7 U	1.2 U	16 U	1.2 U	16 U	1.2 U	1.2 U	16 U	1.1 U	1.1	1.8
1,2-Dichlorotetrafluoroethane	76-14-2	1.1 U	1.1 U	1.0 U	1.1 U	16 U	1.0 U	1.1 U	1.1 U	5.5 U	1.1 U	1.1 U	1.1 U	1.1 U	1.5 U	1.0 U	7.0 U	1.0 U	15 U	1.1 U	14 U	1.0 U	1.0 U	15 U	0.99 U	0.21	0.63
Dichlorodifluoromethane (Freon 12)	75-71-8	3.6	3.8	2.6	2.6	11 U	2.7	2.8	2.8	3.9 U	2.6	2.4	2.8	3.8	2.8	2.8	5.0 U	2.7	28	2.5	12	2.7	2.8	10 U	2.6	5.6	15
Hexachlorobutadiene (C-46)	87-68-3	8.2 UJ	8.6 UJ	7.8 UJ	8.2 UJ	120 UJ	7.8 UJ	8.6 UJ	8.2 UJ	42 UJ	8.7 UJ	8.2 UJ	8.2 UJ	8.6 UJ	12 UJ	7.9 UJ	54 UJ	8.1 UJ	110 UJ	8.6 UJ	110 UJ	8.1 UJ	8.1 UJ	110 UJ	7.5 UJ	0.25	4.8
Methyl tert-Butyl Ether	1634-04-4	2.8 U	2.9 U	2.6 U	2.8 U	40 U	2.6 U	2.9 U	2.8 U	14 U	2.9 U	2.8 U	2.8 U	2.9 U	3.9 U	2.7 U	18 U	2.7 U	38 U	2.9 U	37 U	2.7 U	2.7 U	38 U	2.5 U	6.7	27
Methylene Chloride (Dichloromethane)	75-09-2	0.54 U	0.56 U	0.98	3.3	7.7 U	0.51 U	0.75	1.0	2.7 U	0.64	0.54 U	0.54 U	0.56 U	0.76 U	1.8	5.6	0.53 U	7.3 U	0.56 U	7.2 U	0.71	0.73	7.3 U	0.50	6.3	22
2-Propanol	67-63-0	1.9 U	2.0 U	1.8 U	1.9 U	27 U	1.8 U	2.8	13	9.7 U	2.0 U	2.2	1.9	2.0 U	2.7 U	4.2	31	1.8 J	26 U	8.8	25 U	32	1.9 U	26 U	1.7 U	NA	NA
Propene	115-07-1	1.3 U	1.4 U	1.2 U	1.3 U	19 U	1.2 U	1.4 U	1.3 U	6.8 U	1.4 U	1.3 U	1.3 U	1.4 U	1.9 U	1.3 U	8.7 U	1.3 U	18 U	1.4 U	18 U	1.3 U	1.3 U	18 U	1.2 U	NA	NA
Tetrachloroethene	127-18-4	1.2	1.1 U	0.99 U	1.0 U	98	9.2	1.1 U	1.0 U	5.3 U	1.1 U	1.0 U	1.0 U	1.1 U	1.5 U	2.5	6.8 U	1.0 U	14 U	1.1 U	24	1.0 U	1.0 U	22	0.96 U	1.2	2.9
Tetrahydrofuran	109-99-9	2.3 U	2.4 U	2.2 U	2.3 U	33 U	2.2 U	2.4 U	2.3 U	12 U	2.4 U	2.3 U	2.3 U	2.4 U	3.2 U	2.2 U	15 U	2.2 U	31 U	3.3	30 U	2.2 U	2.2 U	31 U	2.1 U	0.32	3.3
trans-1,2-Dichloroethene	156-60-5	3.1 U	3.2 U	2.9 U	3.1 U	44 U	2.9 U	3.2 U	3.1 U	16 U	3.2 U	3.1 U	3.1 U	3.2 U	4.3 U	2.9 U	20 U	3.0 U	42 U	3.2 U	41 U	3.0 U	3.0 U	42 U	2.8 U	NA	NA
trans-1,3-Dichloropropene	10061-02-6	0.70 U	0.73 U	0.66 U	0.70 U	10 U	0.66 U	0.73 U	0.70 U	3.6 U	0.74 U	0.70 U	0.70 U	0.73 U	0.99 U	0.67 U	4.6 U	0.69 U	9.5 U	0.73 U	9.4 U	0.69 U	0.69 U	9.5 U	0.64 U	0.18	0.22
Trichloroethene	79-01-6	0.83 U	0.86 U	0.79 U	0.83 U	12 U	0.79 U	0.86 U	0.83 U	4.2 U	0.88 U	0.83 U	0.83 U	0.86 U	1.2 U	17	5.4 U	0.81 U	11 U	0.86 U	11 U	0.81 U	0.81 U	11 U	0.76 U	0.23	0.48
Vinyl Acetate	108-05-4	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	NA	NA
Vinyl Chloride	75-01-4	0.39 U	0.41 U	0.37 U	0.39 U	5.7 U	0.37 U	0.41 U	0.39 U	2.0 U	0.42 U	0.39 U	0.39 U	0.41 U	0.56 U	0.38 U	2.6 U	0.39 U	5.4 U	0.41 U	5.3 U	0.39 U	0.39 U	5.4 U	0.36 U	0.2	0.23

Notes:

[1] These compounds may be related to either MGP sources or non-MGP sources, or both. MGP sources include MGP tars and petroleum feedstocks used in MGP processes, such as the carburetted water gas process. Non-MGP sources include cleaning products, floor wax and polish, vehicle exhaust, construction materials, and cigarette smoke.

[2] These compounds are not related to MGP sources and are present due to non-MGP sources, such as vehicle exhaust, heating and air conditioning systems, cleaning agents, art supplies, paints, etc.

[3] Background Indoor/Outdoor Air Levels of Volatile Organic Compounds in Homes Heated with Fuel Oil, Sampled by the New York State Department of Health, 1997-2003, New York State Department of Health, Bureau of Toxic Substance Assessment, Nov. 16, 2004 [NYSDOH, 2004].

NA - Not Available. No data available for background concentrations of these compounds.

* - Vinyl Acetate was analyzed as a TIC and was found Not Detected in all samples. Since there is no Reporting Limit applicable to TICs, there was none entered for Vinyl Acetate.

U - Not detected at the detection limit indicated.

J - Estimated Concentration.

Table G-2
Summary Table of Volatilization Study Headspace Analysis
St. John's School and Rectory
Resampling Event - April 13-17, 2004

Compound	CAS number	Sample Number, Location, and Results in ug/m³										
Type of Sample		Groundwater	Groundwater	Groundwater	Groundwater	Soil	Soil	Soil	Soil	Soil	Soil	Groundwater
Sample Location		Outside, Northeast Corner of School	Basement of School, Kitchen	Basement of School, Cafeteria	Basement of School, Boiler Room	Basement of School, Kitchen	Basement of School, Cafeteria	Basement of School, Kitchen	Basement of School, Cafeteria	Basement of School, Cafeteria	Lab	Lab
Sampling Depth		20-23	20-23	20-23	20-23	39.5-40	39-40.5	40-42	38-40	36-40	NA	NA
Sampling Date		4/13/2004	4/16/2004	4/14/2004	4/15/2004	4/16/2004	4/14/2004	4/15/2004	4/17/2004	4/17/2004		
Sample ID		B-101	B-102	B-103	B-104	B-102 (39.5-40)	B-103 (39-40.5)	B-107 (40-42)	B-108 (36-40) High	B-108 (36-40) Low[7]	Soil Blank	Water Blank
Possibly MGP Related or Other Sources [1]												
1,2,4-Trimethylbenzene	95-63-6	0.50 U	0.50 U	0.50 U	0.50 U	260 J[4]	260 J[4]	270 J[4]	310 J[4]	22 J[6]	0.50 U	0.50 U
1,3,5-Trimethylbenzene	108-67-8	0.50 U	0.50 U	0.50 U	0.50 U	220 J[4]	220 J[4]	240 J[4]	260 J[4]	6.5 J[6]	0.50 U	0.50 U
2,3-Dimethylpentane	565-59-3	2.1 U	2.1 U	2.1 U	2.1 U	300 J[5]	61 J[6]	400 J[5]	140 J[6]	2.1 U	2.1 U	2.1 U
2-Hexanone	591-78-6	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-Methylpentane	107-83-5	1.8 U	1.8 U	1.8 U	1.8 U	150 J[5]	31 J[6]	170 J[6]	82 J[6]	1.8 U	1.8 U	1.8 U
4-Ethyltoluene	622-96-8	2.5 U	2.5 U	2.5 U	2.5 U	300 J[4]	310 J[4]	320 J[4]	360 J[4]	10 J[6]	2.5 U	2.5 U
4-Methyl-2-pentanone	108-10-1	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
Benzene	71-43-2	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
Carbon Disulfide	75-15-0	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
Cyclohexane	110-82-7	1.7 U	1.7 U	1.7 U	1.7 U	140 J[6]	25 J[6]	190 J[6]	68 J[6]	1.7 U	1.7 U	1.7 U
Ethylbenzene	100-41-4	0.44 U	0.44 U	0.44 U	0.44 U	480 J[4]	230 J[6]	450 J[4]	520 J[4]	2.5 J[6]	0.44 U	0.44 U
Heptane	142-82-5	2.1 U	2.1 U	2.1 U	2.1 U	520 J[4]	280 J[6]	580 J[4]	520 J[6]	2.1 U	2.1 U	2.1 U
Hexane	110-54-3	1.8 U	1.8 U	1.8 U	1.8 U	390 J[5]	87 J[6]	460 J[6]	160 J[6]	1.8 U	1.8 U	1.8 U
2,2,4-Trimethylpentane	540-84-1	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U
Indan	496-11-7	2.4 U	2.4 U	2.4 U	2.4 U	230 J[6]	190 J[6]	200 J[6]	270 J[6]	5.0 J[6]	2.4 U	2.4 U
Indene	95-13-6	2.4 U	2.4 U	2.4 U	2.4 U	600 J[4]	620 J[4]	610 J[4]	720 J[4]	120 J[6]	2.4 U	2.6
Isopentane	78-784	1.5 U	1.5 U	1.5 U	1.5 U	1.5 J[6]	1.5 U	2.1 J[6]	1.9 J[6]	1.5 U	1.5 U	1.5 U
Naphthalene	91-20-3	2.7 UJ	2.7 UJ	2.7 UJ	2.7 UJ	2700 J[4]	2400 J[4]	2700 J[4]	3100 J[4]	110 J[6]	2.7 U	9.2 J
Styrene	100-42-5	0.43 U	0.43 U	0.43 U	0.43 U	350 J[4]	300 J[4]	370 J[4]	450 J[4]	20 J[6]	0.43 U	0.53
Thiophene	110-02-1	1.7 UJ	1.7 UJ	1.7 UJ	1.7 UJ	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 UJ
Toluene	108-88-3	0.38 U	0.38 U	0.38 U	0.38 U	38 J[6]	64 J[6]	280 J[4]	400 J[4]	2.8 J[6]	0.38 U	0.38 U
m/p-Xylenes	136777-61-2	0.88 U	0.88 U	0.88 U	0.88 U	690 J[4]	540 J[4]	700 J[4]	740 J[4]	21 J[6]	0.88 U	0.62 J
o-Xylene	95-47-6	0.44 U	0.44 U	0.44 U	0.44 U	570 J[4]	480 J[4]	560 J[4]	650 J[4]	10 J[6]	0.44 U	0.44 U
Not MGP Related [2]												
1,1,1-Trichloroethane	71-55-6	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U
1,1,2,2-Tetrachloroethane	79-34-5	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	130 J[6]	0.70 U	0.70 U	0.70 U
1,1,2-Trichloroethane	79-00-5	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U
1,1-Dichloroethane	75-34-3	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
1,1-Dichloroethene	75-35-4	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
1,2,4-Trichlorobenzene	120-82-1	3.8 UJ	3.8 UJ	3.8 UJ	3.8 UJ	3.8 U	3.8 U	3.8 U	3.8 U	3.8 UJ	3.8 U	3.8 U
1,2-Dibromoethane (EDB)	106-93-4	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U
1,2-Dichlorobenzene	95-50-1	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U
1,2-Dichloroethane	107-06-2	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
1,2-Dichloropropane	78-87-5	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
1,3-Butadiene	106-99-0	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
1,3-Dichlorobenzene	541-73-1	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U
1,4-Dichlorobenzene	106-46-7	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U
1,4-Dioxane	123-91-1	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
2-Butanone (MEK)	78-93-3	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Acetone	67-64-1	1.2 U	1.2 U	1.2 U	1.2 U	2.3 J[6]	2.4 J[6]	3.0 J[6]	2.1 J[6]	1.2 U	1.2 U	1.2 U
Benzyl Chloride	100-44-7	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U
Bromodichloromethane	75-27-4	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U
Bromoform	75-25-2	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U
Bromomethane	74-83-9	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
Carbon Tetrachloride	56-23-5	0.64 U	0.64 U	0.64 U	0.64 U	0.64 UJ	0.64 UJ	0.64 UJ	0.64 UJ	0.64 U	0.64 UJ	0.64 U
Chlorobenzene	108-90-7	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	75-00-3	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
Chloroform	67-66-3	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane	74-87-3	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
cis-1,2-Dichloroethene	156-59-2	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
cis-1,3-Dichloropropene	10061-01-5	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
Dibromochloromethane	124-48-1	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U
Ethanol	64-17-5	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U	1.4 J[6]	0.96 U	0.96 U	0.96 U
Trichlorofluoromethane (Freon11)	75-69-4	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U
1,2-Dichlorotetrafluoroethane	76-14-2	0.71 U	0.71 U	0.71 U	0.71 U	0.71 U	0.71 U	0.71 U	0.71 U	0.71 U	0.71 U	0.71 U
Dichlorodifluoromethane (Freon 12)	75-71-8	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Hexachlorobutadiene (C-46)	87-68-3	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U
Methyl tert-Butyl Ether	1634-04-4	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Methylene Chloride (Dichloromethane)	75-09-2	1.1 U[3]	1.0 U[3]	1.0 U[3]	1.4 U[3]	3.5 U[3]	2.8 U[3]	0.82 U[3]	2.5 U[3]	0.35 U	1.3	1.7
2-Propanol	67-63-0	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	1.2 U
Propene	115-07-1	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U
Tetrachloroethene	127-18-4	0.69 U	0.69 U	0.69 U	0.69 U	35 J[6]	24 J[6]	53 J[6]	3.1 J[6]	0.69 U	0.69 U	0.69 U
Tetrahydrofuran	109-99-9	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
trans-1,2-Dichloroethene	156-60-5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
trans-1,3-Dichloropropene	10061-02-6	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
Trichloroethene	79-01-6	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U
Vinyl Acetate	108-05-4	*U	*U	*U	*U	*U	*U	*U	*U	*U	*U	*U
Vinyl Chloride	75-01-4	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

Notes:
[1] These compounds may be related to either MGP sources or non-MGP sources, or both. MGP sources include MGP tars and petroleum feedstocks used in MGP processes, such as the carburetted water gas process. Non-MGP sources include cleaning products, floor wax and polish, vehicle exhaust, construction materials, and cigarette smoke.
[2] These compounds are not related to MGP sources and are present due to non-MGP sources, such as vehicle exhaust, heating and air conditioning systems, cleaning agents, art supplies, paints, etc.
[3] The positive methylene chloride results were qualified "U," as undetected because of laboratory contamination.
[4] The analyte concentration in the headspace saturated the detector. The result was qualified "J," as an estimate.
[5] One or more surrogate recoveries exceeded the upper QC limits. The result was qualified "J," as an estimate and may be biased high.
[6] The analyte concentration exceeded the calibration range. The result was qualified "J," as an estimate.
[7] Sample B-108 (36-40) was analyzed at a reduced aliquot because of the high number of compounds that saturated the detector in the full volume aliquot "high" analysis.
NA - Not Available. No data available for background concentrations of these compounds.
* - Vinyl Acetate was analyzed as a TIC and was found Not Detected in all samples. Since there is no Reporting Limit applicable to TICs, there was none entered for Vinyl Acetate.
J - Estimated Concentration.

Table G-3
Summary Table of Ambient and Indoor Air Results
St. John's School
Post-Investigation Sampling Event - April 24, 2004

RETEC

Compound	CAS number	Sample Number, Location, and Results in ug/m^3															Background Indoor Air Values[3]	
Type of Sample		Ambient Air	Ambient Air	Ambient Air	Ambient Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air-FD	Indoor Air	Indoor Air	DOH 75th ug/m^3	DOH 90th ug/m^3
Sample Location		Outdoor Southwest	Outdoor Northeast	Outdoor Southwest	Outdoor Northeast	Center of Gymnasium	1st Floor of School, Men's Restroom	1st Floor of School, Classroom No. 3	1st Floor of School, Classroom No. 2	1st Floor of School, Classroom No. 1	Basement of School, Entry	Basement of School, Kitchen	Basement of School, Cafeteria	Field Duplicate Basement of School, Cafeteria	Basement of School, Boiler Room	Basement of School, Play Room		
Sampling Date		4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004	4/24/2004		
Sample ID		STJ2-Amb-101	STJ2-Amb-102	STJ2-Amb-103	STJ2-Amb-104	STJ2-IA-GI-106	STJ2-IA-S1-101	STJ2-IA-SI-102	STJ2-IA-SI-103	STJ2-IA-SI-104	STJ2-IA-SB-101	STJ2-IA-SB-102	STJ2-IA-SB-103	STJ2-IA-SB-103 Dup	STJ2-IA-SB-104	STJ2-IA-SB-105		
Possibly MGP Related or Other Sources[1]																		
1,2,4-Trimethylbenzene	95-63-6	0.82 U	1.0	0.74 U	0.77 U	0.79	1.5	0.73 U	0.79 U	0.74 U	4.1	0.77 U	0.77 U	0.72 U	0.69 U	2.3 U	4.4	11
1,3,5-Trimethylbenzene	108-67-8	0.82 U	0.87 U	0.74 U	0.77 U	0.72 U	0.73 U	0.73 U	0.79 U	0.74 U	1.1	0.77 U	0.77 U	0.72 U	0.69 U	2.3 U	1.7	3.8
2,3-Dimethylpentane	565-59-3	3.4 U	3.6 U	3.1 U	3.2 U	3.0 U	3.0 U	3.0 U	3.3 U	3.1 U	2.7 U	3.2 U	3.2 U	3.0 U	2.9 U	9.8 U	2.1	7.9
2-Hexanone	591-78-6	3.4 U	3.6 U	3.1 U	3.2 U	3.0 U	3.0 U	3.0 U	3.3 U	3.1 U	2.7 U	3.2 U	3.2 U	3.0 U	2.9 U	9.8 U	NA	NA
2-Methylpentane	107-83-5	2.9 U	3.1 U	2.7 U	2.8 U	2.6 U	2.6 U	2.6 U	2.8 U	2.7 U	2.3 U	2.8 U	2.8 U	2.6 U	2.5 U	8.4 U	NA	NA
4-Ethyltoluene	622-96-8	4.1 U	4.4 U	3.7 U	3.9 U	3.6 U	3.6 U	3.6 U	3.9 U	3.7 U	3.2 U	3.9 U	3.9 U	3.8 U	3.5 U	12 U	NA	NA
4-Methyl-2-pentanone	106-10-1	3.4 U	3.6 U	3.1 U	3.2 U	3.0 U	3.0 U	3.0 U	3.3 U	3.1 U	2.7 U	3.2 U	3.2 U	3.0 U	2.9 U	9.8 U	0.98	3
Benzene	71-43-2	1.1	0.76	0.83	0.50 U	0.76	0.91	1.0	2.2	0.95	0.78	1.1	0.85	0.77	0.63	1.5 U	5.7	15
Carbon Disulfide	75-15-0	2.6 U	2.8 U	2.4 U	2.4 U	2.3 U	2.3 U	2.3 U	2.5 U	2.4 U	2.0 U	2.4 U	2.4 U	2.3 U	2.2 U	7.4 U	NA	NA
Cyclohexane	110-82-7	2.9 U	3.1 U	2.6 U	2.7 U	2.5 U	2.6 U	2.6 U	2.8 U	2.6 U	3.3	2.7 U	2.7 U	2.5 U	2.4 U	13	2.9	9.1
Ethylbenzene	100-41-4	0.72 U	0.77 U	0.66 U	0.68 U	0.64 U	0.64 U	0.64 U	0.70 U	0.66 U	1.1	0.66 U	0.68 U	0.64 U	0.61 U	2.1	2.8	7.3
Heptane	142-82-5	3.4 U	3.6 U	3.1 U	3.2 U	3.0 U	3.0 U	3.0 U	3.3 U	3.1 U	2.7 U	3.2 U	3.2 U	3.0 U	2.9 U	9.8 U	7.7	19
Hexane	110-54-3	2.9 U	3.1 U	2.7 U	2.8 U	2.6 U	2.6 U	2.6 U	2.8 U	2.7 U	2.3 U	2.8 U	2.8 U	2.6 U	2.5 U	8.4 U	6.5	19
2,2,4-Trimethylpentane	540-84-1	3.9 U	4.2 U	3.5 U	3.7 U	3.4 U	3.5 U	3.5 U	3.8 U	3.5 U	3.5	3.7 U	3.7 U	3.4 U	3.3 U	11 U	2.6	7.3
Indan	496-11-7	4.0 U	4.3 U	3.7 U	3.8 U	3.5 U	3.6 U	3.6 U	3.9 U	3.7 U	3.2 U	3.8 U	3.8 U	3.5 U	3.4 U	12 U	NA	NA
Indene	95-13-6	4.0 U	4.2 U	3.6 U	3.7 U	3.5 U	3.5 U	3.5 U	3.8 U	3.6 U	3.1 U	3.7 U	3.7 U	3.5 U	3.4 U	11 U	NA	NA
Isopentane	78-784	2.4 U	2.6 U	2.2 U	2.3 U	2.2 U	4.2	2.2 U	2.4 U	4.2	44	10	11	9.7	2.4	170	NA	NA
Naphthalene	91-20-3	4.4 UJ	4.7 UJ	4.0 UJ	4.1 UJ	3.8 U	3.9 U	3.9 U	4.2 U	4.0 U	4.6 J	4.1 UJ	4.1 UJ	3.8 UJ	3.7 U	12 U	NA	NA
Styrene	100-42-5	0.71 U	0.76 U	0.64 U	0.67 U	0.62 U	0.63 U	0.63 U	0.83	0.78	0.99	0.67 U	0.67 U	0.62 U	0.60 U	3.9	0.68	1.3
Thiophene	110-02-1	2.9 U	3.1 U	2.6 U	2.7 U	2.5 U	2.6 U	2.6 U	2.8 U	2.8 U	2.3 U	2.7 U	2.7 U	2.5 U	2.4 U	8.2 U	NA	NA
Toluene	108-88-3	2.6	2.2	1.4	0.64	2.7	3.9	1.8	3.0	2.3	13	2.1	2.2	2.0	1.3	18	25	59
m/p-Xylenes	136777-61-2	1.2	1.7	0.74	0.68 U	1.6	1.8	0.67	0.98	0.98	3.4	1.1	0.85	0.86	0.63	3.5	4.7	12
o-Xylene	95-47-6	0.72 U	0.77 U	0.66 U	0.68 U	0.64	0.67	0.64 U	0.70 U	0.66 U	1.4	0.68 U	0.66 U	0.64 U	0.61 U	2.1 U	3.1	7.9
Not MGP Related[2]																		
1,1,1-Trichloroethane	71-55-6	0.91 U	0.97 U	0.83 U	0.86 U	0.80 U	0.81 U	0.81 U	0.88 U	0.83 U	0.72 U	0.86 U	0.86 U	0.80 U	0.77 U	2.6 U	1.4	3.5
1,1,2,2-Tetrachloroethane	79-34-5	1.1 U	1.2 U	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U	0.91 U	1.1 U	1.1 U	1.0 U	0.97 U	3.3 U	0.2	0.23
1,1,2-Trichloroethane	79-00-5	0.91 U	0.97 U	0.83 U	0.86 U	0.80 U	0.81 U	0.81 U	0.88 U	0.83 U	0.72 U	0.86 U	0.86 U	0.80 U	0.77 U	2.6 U	0.2	0.24
1,1-Dichloroethane	75-34-3	0.67 U	0.72 U	0.61 U	0.64 U	0.59 U	0.60 U	0.60 U	0.65 U	0.61 U	0.53 U	0.64 U	0.64 U	0.59 U	0.57 U	1.9 U	0.19	0.23
1,1-Dichloroethene	75-35-4	0.66 U	0.70 U	0.60 U	0.62 U	0.58 U	0.59 U	0.59 U	0.64 U	0.60 U	0.52 U	0.62 U	0.62 U	0.58 U	0.56 U	1.9 U	0.19	0.23
1,2,4-Trichlorobenzene	120-82-1	6.2 UJ	6.6 UJ	5.6 UJ	5.8 UJ	5.4 UJ	5.5 UJ	5.5 UJ	6.0 UJ	5.6 UJ	4.9 UJ	5.8 UJ	5.8 UJ	5.4 UJ	5.2 UJ	18 UJ	0.24	3
1,2-Dibromoethane (EDB)	106-93-4	1.3 U	1.4 U	1.2 U	1.2 U	1.1 U	1.1 U	1.1 U	1.2 U	1.2 U	1.0 U	1.2 U	1.2 U	1.1 U	1.1 U	3.7 U	0.19	0.23
1,2-Dichlorobenzene	95-50-1	1.0 U	1.1 U	0.91 U	0.95 U	0.88 U	0.89 U	0.89 U	0.96 U	0.91 U	0.79 U	0.95 U	0.95 U	0.88 U	0.85 U	2.9 U	0.24	0.78
1,2-Dichloroethane	107-06-2	0.67 U	0.72 U	0.61 U	0.84 U	0.59 U	0.60 U	0.60 U	0.65 U	0.61 U	0.53 U	0.64 U	0.64 U	0.59 U	0.57 U	1.9 U	0.19	0.22
1,2-Dichloropropane	78-87-5	0.77 U	0.82 U	0.70 U	0.73 U	0.68 U	0.68 U	0.68 U	0.74 U	0.70 U	0.61 U	0.73 U	0.73 U	0.68 U	0.65 U	2.2 U	0.2	0.24
1,3-Butadiene	106-99-0	1.8 U	2.0 U	1.7 U	1.7 U	1.6 U	1.6 U	1.6 U	1.8 U	1.7 U	1.5 U	1.7 U	1.7 U	1.6 U	1.6 U	5.3 U	NA	NA
1,3-Dichlorobenzene	541-73-1	1.0 U	1.1 U	0.91 U	0.95 U	0.88 U	0.89 U	0.89 U	0.96 U	0.91 U	0.79 U	0.95 U	0.95 U	0.88 U	0.85 U	2.9 U	0.24	0.66
1,4-Dichlorobenzene	106-46-7	1.0 U	1.1 U	0.91 U	0.95 U	0.88 U	0.89 U	0.89 U	0.96 U	0.91 U	0.79 U	0.95 U	0.95 U	0.88 U	0.85 U	2.9 U	0.54	1.3
1,4-Dioxane	123-91-1	3.0 U	3.2 U	2.7 U	2.8 U	2.6 U	2.7 U	2.7 U	2.9 U	2.7 U	2.4 U	2.8 U	2.8 U	2.6 U	2.5 U	8.6 U	NA	NA
2-Butanone (MEK)	78-93-3	2.4 U	2.6 U	2.2 U	2.3 U	2.2 U	2.2 U	2.2 U	2.4 U	2.2 U	2.1	2.3 U	2.3 U	2.2 U	2.1 U	7.0 U	7.5	14
Acetone	67-64-1	5.4	11	4.3	4.4	6.4	16	8.9	18	12	15	8.4	7.0	12	5.5	40	46	110
Benzyl Chloride	100-44-7	0.86 U	0.92 U	0.78 U	0.82 U	0.76 U	0.77 U	0.77 U	0.83 U	0.78 U	0.68 U	0.82 U	0.82 U	0.76 U	0.73 U	2.5 U	NA	NA
Bromodichloromethane	75-27-4	5.6 U	6.0 U	5.1 U	5.3 U	4.9 U	5.0 U	5.0 U	5.4 U	5.1 U	4.4 U	5.3 U	5.3 U	4.9 U	4.7 U	16 U	NA	NA
Bromoform	75-25-2	8.6 U	9.2 U	7.8 U	8.1 U	7.6 U	7.7 U	7.7 U	8.3 U	7.8 U	6.8 U	8.1 U	8.1 U	7.6 U	7.3 U	25 U	NA	NA
Bromomethane	74-83-9	0.65 U	0.69 U	0.59 U	0.61 U	0.57 U	0.58 U	0.58 U	0.62 U	0.59 U	0.56	0.61 U	0.61 U	11	0.55 U	1.8 U	0.24	0.58
Carbon Tetrachloride	56-23-5	1.0 U	1.1 U	0.95 U	0.99 U	0.92 U	0.93 U	0.93 U	1.0 U	0.95 U	0.83 U	0.99 U	0.99 U	0.92 U	0.89 U	3.0 U	0.68	0.87
Chlorobenzene	108-90-7	0.77 U	0.82 U	0.70 U	0.72 U	0.67 U	0.68 U	0.68 U	0.74 U	0.70 U	0.61 U	0.72 U	0.72 U	0.67 U	0.65 U	2.2 U	0.19	0.23
Chloroethane	75-00-3	0.44 U	0.47 U	0.40 U	0.42 U	0.39 U	0.39 U	0.39 U	0.42 U	0.40 U	0.35 U	0.42 U	0.42 U	0.39 U	0.37 U	1.3 U	0.2	0.25
Chloroform	67-66-3	0.81 U	0.67 U	0.74 U	0.77 U	0.71 U	2.2	0.72 U	0.78 U	0.74 U	3.8	0.79	0.77 U	3.0	0.69 U	2.3 U	0.54	1.4
Chloromethane	74-87-3	0.94	0.92	0.91	0.89	0.87	0.94	1.1	1.3	0.91	1.2	0.94	0.86	7.9	0.99	1.1	2	3.3
cis-1,2-Dichloroethene	156-59-2	0.66 U	0.70 U	0.60 U	0.62 U	0.58 U	0.59 U	0.59 U	0.64 U	0.60 U	0.52 U	0.62 U	0.62 U	0.58 U	0.56 U	1.9 U	0.2	0.24
cis-1,3-Dichloropropene	10061-01-5	0.76 U	0.81 U	0.69 U	0.72 U	0.66 U	0.67 U	0.67 U	0.73 U	0.69 U	0.60 U	0.72 U	0.72 U	0.66 U	0.64 U	2.2 U	0.2	0.24
Dibromochloromethane	124-48-1	7.1 U	7.6 U	6.4 U	6.7 U	6.2 U	6.3 U	6.3 U	6.8 U	6.4 U	5.6 U	6.7 U	6.7 U	6.2 U	6.0 U	20 U	NA	NA
Ethanol	64-17-5	3.0	3.3	1.9	1.5 U	4.2	19	10	21	38	27	18	25	17	3.6	270 J	610	1600
Trichlorofluoromethane (Freon 11)	75-69-4	1.5	1.6	1.6	1.6	1.6	1.6	1.8	1.7	1.7	1.6	1.7	1.6	1.3	1.6	2.7 U	5.5	17
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	1.3 U	1.4 U	1.2 U	1.2 U	1.1 U	1.1 U	1.1 U	1.2 U	1.2 U	1.0 U	1.2 U	1.2 U	1.1 U	1.1 U	3.7 U	1.1	1.8
1,2-Dichlorotetrafluoroethane	76-14-2	1.2 U	1.2 U	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U	0.92 U	1.1 U	1.1 U	1.0 U	0.99 U	3.3 U	0.21	0.63
Dichlorodifluoromethane (Freon 12)	75-71-8	2.8	3.1	2.9	2.7	2.9	3.0	3.3	3.1	2.9	3.0	2.9	2.9	2.4	2.8	3.2	5.6	15
Hexachlorobutadiene (C-46)	87-68-3	8.9 U	9.5 U	8.1 U	8.4 U	7.8 UJ	7.9 UJ	7.9 UJ	8.6 UJ	8.1 UJ	7.0 U	8.4 U	8.4 U	7.8 U	7.5 UJ	25 UJ	0.25	4.8
Methyl tert-Butyl Ether	1634-04-4	3.0 U	3.2 U	2.7 U	2.8 U	2.6 U	2.7 U	2.7 U	2.9 U	2.7 U	2.4 U	2.8 U	2.8 U	2.6 U	2.5 U	8.6 U	6.7	27
Methylene Chloride (Dichloromethane)	75-09-2	0.58 U	0.62 U	0.53 U	0.55 U	0.51 U	0.54	0.52 U	1.6	0.52	2.2	0.55 U	0.55 U	0.87	0.49 U	1.6 U	6.3	22
2-Propanol	67-63-0	2.0 U	2.2 U	1.9 U	1.9 U	1.8 U	3.5	3.3	3.6	2.6	2.1	2.1	1.9 U	8.3	1.7 U	8.9	NA	NA
Propene	115-07-1	1.4 U	1.5 U	1.3 U	1.4 U	1.2 U	1.3 U	1.3 U	1.4 U	1.3 U	1.1 U	1.4 U	1.4 U	1.2 U	1.2 U	4.1 U	NA	NA
Tetrachloroethene	127-18-4	1.1 U	1.2 U	1.0 U	1.1 U	0.99 U	1.0 U	1.0 U	1.1 U	1.0 U	0.90 U	1.1 U	1.1 U	0.99 U	0.96 U	3.2 U	1.2	2.9
Tetrahydrofuran	109-99-9	2.4 U	2.6 U	2.2 U	2.3 U	2.2 U	2.2 U	2.2 U	2.4 U	2.2 U	1.9 U	2.3 U	2.3 U	2.2 U	2.1 U	7.0 U	0.32	3.3
trans-1,2-Dichloroethene	156-60-5	3.3 U	3.5 U	3.0 U	3.1 U	2.9 U	2.9 U	2.9 U	3.2 U	3.0 U	2.6 U	3.1 U	3.1 U	2.9 U	2.8 U	9.5 U	NA	NA
trans-1,3-Dichloropropene	10061-02-6	0.76 U	0.81 U	0.69 U	0.72 U	0.66 U	0.67 U	0.67 U	0.73 U	0.69 U	0.60 U	0.72 U	0.72 U	0.66 U	0.64 U	2.2 U	0.18	0.22
Trichloroethene	79-01-6	0.90 U	0.96 U	0.81 U	0.85 U	0.79 U	0.80 U	0.80 U	0.86 U	0.81 U	0.71 U	0.85 U	0.85 U	0.79 U	0.76 U	2.6 U	0.23	0.48
Vinyl Acetate	108-05-4	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	* U	NA	NA
Vinyl Chloride	75-01-4	0.43 U	0.45 U	0.39 U	0.40 U	0.37 U	0.38 U	0.38 U	041 U	0.39 U	0.34 U	0.40 U	0.40 U	0.37 U	0.36 U	1.2 U	0.2	0.23

Notes:

[1] These compounds may be releted to either MGP sources or non-MGP sources, or both. MGP sources include MGP tars and petroleum feedstocks used in MGP processes, such as the carburetted water gas process. Non-MGP sources include cleaning products, floor wax and polish, vehicle exhaust, construction materials, and cigarette smoke.

[2] These compounds are not related to MGP sources and are present due to non-MGP sources, such as vehicle exhaust, heating and air conditioning systems, cleaning agents, art supplies, paints, etc.

[3] Background Indoor/Outdoor Air Levels of Volatile Organic Compounds in Homes Heated with Fuel Oil, Sampled by the New York State Department of Health, 1997-2003, New York State Department of Health, Bureau of Toxic Substance Assessment, Nov. 16, 2004 (NYSDOH, 2004).

NA - Not Available. No data available for background concentrations of these compounds.

* - Vinyl Acetate was analyzed as a TIC and was found Not Detected in all samples. Since there is no Reporting Limit applicable to TICs, there was none entered for Vinyl Acetate.

U - Not detected et the detection limit indicated.

J - Estimeted Concentration.

Lab Rev 1

Appendix H

Evaluation of Chromatographic and Mass Spectral Data

Evaluation of GC/MS Chromatographic and Mass Spectral Data, and EPA TO-15 Data from Air, Soil Gas, and Soil Headspace Samples

St. John's School and Rectory

Prepared by: Dr. Steven B. Hawthorne, SOTA Analytical, Inc.
Prepared for: The RETEC Group, Inc.

May 21, 2004

Summary

The evaluation of the raw GC/MS data and the compound identities and concentrations for sub-slab soil gas, ambient air, indoor air, and the headspace from MGP tar contaminated soils (collected approximately 40 feet below grade) support the following observations.

1. No evidence exists that the MGP materials collected below the site contribute to benzene (or other hydrocarbon) levels in the indoor air. This observation is supported by the fact that benzene was not detected in the headspace above the soils contaminated with MGP tar. Duplicate headspace analyses on four contaminated soils from the site were performed at independent laboratories, with the same results.

2. It is unlikely that soil gas has any significant contribution to indoor air benzene concentrations since benzene was not detected in the soil gas samples. In addition, all of the soil gas samples have high (580 to 1700 $\mu g/m^3$) concentrations of 2,2,4-trimethylpentane, which was not detected in any of the indoor air samples. This chemical should be present in the indoor air samples if soil gas contributed significantly to indoor air hydrocarbons.

3. Although both the sub-slab soil gas and the headspace above the MGP-impacted soils contain toluene and other alkyl benzenes, the composition of other chemicals in these samples indicates that MGP materials are not responsible for the soil gas hydrocarbons. This observation is further supported by the fact that the MGP-impacted headspace contained very high concentrations of naphthalene, indene, indane, and styrene as well as C6 to C11 alkanes that were not detected in the sub-slab soil gas samples.

4. Outdoor air is the most likely contributor to indoor air benzene and other hydrocarbons. This is supported by the fact that outdoor and indoor air benzene concentrations are similar. In addition, the distribution of different chemical compound classes (using an approach analogous to the New York State Department of Health's (NYSDOH) proposed method to use GC/MS compound class data for source determinations) are very similar between outdoor and indoor air, while they

are very different from both the sub-slab soil gas and the headspace above the MGP-contaminated soils.

5. Benzene concentrations in outdoor ambient air and indoor air are fairly low at this site, and range from 1.0 to 2.8 μg/m$^{3.}$ All benzene concentrations in outdoor and indoor air are below the NYSDOH's background indoor air values (5 and 14 μg/m^3 for the 75th and 95th percentile, respectively).

Approach

The data were evaluated in terms of the following questions:

1. Are there any unique indicator compounds (or groups of compounds) that can be used to trace the contribution of MGP materials, ambient air, and soil gas to benzene and other hydrocarbons to indoor air?

2. Do the GC/MS data indicate a contribution of benzene and other hydrocarbons from the MGP contaminated soils to the sub-slab soil gas?

3. Do the GC/MS data indicate any contribution from the MGP contaminated soils to indoor air benzene and other hydrocarbons?

4. Do the GC/MS data indicate any contribution from the soil gas to indoor air benzene and other hydrocarbons?

5. Do the GC/MS data indicate any contribution from outdoor ambient air to indoor air benzene and other hydrocarbons?

The comments in this report are based on concentration data reported by Air Toxics, Ltd. (ATL) and a general review of the raw GC/MS data from the air samples collected on April 12, 2004, and specific ion plots for important characteristic MGP and petroleum-related organics (benzene and alkyl benzenes, alkanes and unsaturated hydrocarbons). Individual mass spectra were also evaluated for compounds not previously identified in the ATL analyses. Initial attempts to apply the NYSDOH selected ion plots to obtain compound class information for source apportionment were made according to the NYSDOH Volatilization Study of MGP Waste and Petroleum Fuels, Public Comment Draft, August 6, 2003.

Finally, four samples of MGP-contaminated soils from approximately 40 feet deep were obtained from the site and the headspace vapor organics analyzed by two independent laboratories, ATL, and by Dr. Hawthorne.

Data Discussion

The quantitative data reported by ATL is given in the Appendix Table 1 for all of the species detected in two or more of the St. John's samples. The various organics were also sorted into different compound classes as discussed later in this report. The discussions below are based on the data presented in Table 1.

Evaluation of MGP-Contaminated Soil Volatile Hydrocarbons in Relation to Indoor Air and Soil Gas Hydrocarbons

Headspace analyses of four soil samples (collected approximately 40 feet below grade) by ATL, and by Dr. Hawthorne independently confirmed the results discussed below. Several important observations came from these analyses. They include:

1. Although several alkyl benzenes were identified, neither lab detected benzene in the headspace of the four MGP-contaminated samples.

2. The headspace samples had high concentrations of several organics that were not detected in either the soil gas or the indoor air samples (Table 1). First, several alkanes (e.g., hexane and heptane in Table 1) were present in the headspace samples that were not detected in the soil gas, indoor air, or ambient air samples. Several additional alkanes (predominantly n-octane to n-undecane) were identified in the headspace samples. Although these compounds were not quantitated, the chromatographic data shows that they are present in concentrations even higher than those shown in Table 1 for n-hexane and n-heptane. These alkanes are not useful as tracers of MGP materials, since they are present in most petroleum products. However, their presence and distribution in the headspace samples is consistent with the fact that petroleum was used as the hydrocarbon source for the MGP plant at this site.

   More importantly, the headspace samples had very high concentrations of indane, indene, and styrene (Table 1) as well as high concentrations of their alkyl derivatives. None of these compounds were detected in any of the soil gas, indoor air, or ambient air samples. Also, indane is common in many petroleum products, while indene is generally present in much lower concentrations. However, the headspace samples from the MGP-contaminated soil were substantially higher in indene than indane. These results indicate that indene (or possibly the indene/indane ratio) could be a useful tracer of MGP contamination at this site.

   In summary, the headspace samples show that the MGP-contaminated soil is highly unlikely to contribute to benzene in the indoor air samples because (1) no benzene was detected in the headspace samples, and (2) because predominant organics (several alkanes, indane, styrene, and indene) were present in the headspace that were not detected in the indoor air samples.

   In addition, the lack of the n-alkanes and the lack of indane, indene, and styrene in the soil gas sample indicates that the MGP-contaminated soil was not the source of hydrocarbons in the shallow soil gas.

Evaluation of Soil Gas Hydrocarbons to Indoor Air Hydrocarbons

Two sets of the results summarized in Table 1, when considered together, indicate that soil gas is not a likely source of benzene in indoor urban air.

1. Even though several alkyl benzenes were detected at fairly high concentrations in the soil gas, benzene was not detected. (Although it should be noted that the detection limit for benzene in the soil gas samples was ca. 7 $\mu g/m^3$, so concentrations similar to the 1.3 to 2.9 $\mu g/m^3$ found in the indoor air are theoretically possible.)

2. All five soil gas samples had very high concentrations of 2,2,4-trimethylpentane. Since this compound is relatively volatile, it would be expected to be found in indoor air if soil gas was a significant source of hydrocarbons to indoor air. Since 2,2,4-trimethylpentane is not found in any of the indoor air samples, it is unlikely that soil gas is the source of benzene or other significant hydrocarbons in the indoor air samples.

Evaluation of Outdoor Ambient Air Hydrocarbons to Indoor Air Hydrocarbons

As shown in Table 1, there is a great degree of similarity in the organic compounds found in outdoor ambient air and in indoor air. These similarities include:

1. The benzene concentrations in outdoor and indoor air are very similar.

2. Other aromatic hydrocarbons (e.g., toluene) have similar concentrations in outdoor and indoor air.

3. Although alkanes were generally not detected, the one alkane that was frequently detected (isopentane) showed similar concentrations in outdoor and indoor air.

4. Several halogenated organics (e.g., chloromethane, Freon 11, and Freon 12) that are not associated with either MGP or petroleum materials are found in similar concentrations in outdoor and indoor air.

These observations, combined with the discussions regarding the lack of relationship between shallow soil gas and indoor air, and between the MGP-contaminated soil headspace and indoor air, demonstrate that outdoor ambient air is the only source likely to be a significant contributor of benzene to indoor air.

Additional data presentation on the use of different compound classes to demonstrate that outdoor air is the source of benzene in indoor air are provided in the Appendix.

Evaluation of the NYSDOH Compound Class Approach to Source Apportionment

Initial evaluation of the NYSDOH's selected ion approach (based on GC/MS data) to relative concentrations of groups of organic compounds was evaluated on the samples from the St. John's site. The NYSDOH suggests mass ions (m/z) that are indicative of six compound classes, i.e., alkanes, alkenes, benzene/alkylbenzenes, indane/tetralins, and naphthalene/alkylnaphthalenes. Their recommendations were based on a survey of volatile organics from common petroleum products and MGP-contaminated soils. The shortcomings of this approach (especially the potential to mis-identify alkenes and cycloalkanes) were the subject of an earlier report to RETEC.

The evaluation of the NYSDOH's approach to the St. John's air samples demonstrate additional shortcomings of the proposed selected ion method when applied to air samples. In summary, these shortcomings are:

1. Many compounds (especially alkanes) are frequently below the detection limit. Thus, a single value that is only slightly above the detection limit will greatly skew the apparent compound class distributions, and could lead to erroneous interpretations of different source contributions.

2. The mass ions used for various compound classes are not specific to those compound classes, especially when the air samples are complicated by non-petroleum and non-MGP sources (which is the case for all indoor and outdoor air samples). For example, the use of the ion m/z 43 for alkanes will mistakenly include acetone. For the St. John's indoor and outdoor air samples, the erroneous contribution of acetone to the alkane fraction is larger than all of the alkanes combined that are reported for those samples. Many other similar cases of "false positives" become apparent when mass spectra of non-target organics commonly found in indoor and outdoor air samples are evaluated in the St. John's samples.

3. Even when the mass ions suggested by the method are reasonably unique to the target compound classes (e.g., the benzene/alkylbenzene group), chromatographic retention time (or indices) must be included in the data evaluation to avoid including non-target organics in the wrong compound classes.

   Therefore, based on the St. John's air samples, the proposed NYSDOH method will not give a reasonable estimate of the concentrations of different compound classes, and it should not be applied in such cases. Some more detailed comments on potential ways to correct its shortcomings are given in the Appendix.

Recommendations for Future Studies

1. The concept of investigating the relative proportions of different compound classes (as suggested by the NYSDOH) should be further developed. However, the present approach in their draft document will lead to substantial errors and should not be used

with outdoor and ambient air samples. Some initial recommendations for altering their approach are included in the Appendix.

2. Several halogenated organics (e.g., chlorinated solvents and Freons) are present in outdoor ambient air that are not present in other sources of benzene, such as petroleum products and MGP materials. These species are excellent candidates to help determine the contribution of outdoor air to indoor air benzene (and other hydrocarbons) and their use should be evaluated along with other compound classes.

3. Future studies on the St. John's samples should be performed to develop and evaluate the selected mass ion approach to eliminate the "false positives" and other errors associated with the present NYSDOH approach when applied to outdoor and indoor air samples. Ions should also be included for major halogenated organics typically found in outdoor air. Initial recommendations for the development of a more accurate approach are given in the Appendix.

Appendix

Initial Evaluation of the Use of TO-15 Data for the Compound Class Approach to Source Apportionment

Although the use of the proposed selected ion method cannot be accurately applied to the St. John's samples, the concept of investigating different compound classes to understand the source of benzene in indoor air is sound. Therefore, the TO-15 data for the detected organics in the indoor air, outdoor air, soil gas, and the MGP contaminated soil headspace were sorted into different compound classes similar to those proposed by the New York as shown in the Appendix Table 1. In addition, a class was added for halogenated organics, and for the common oxygenated organics.

As shown in Table 1, the major compound classes showing multiple detections were alkanes, benzene/alkyl benzenes, indane/indene/styrene, naphthalene, halogenated organics, and the oxygenated organics. The total concentrations and percent contribution of each of these compound classes is shown in Table 2. Note that the percent distribution of each compound class is similar in outdoor and indoor air. The only exception is the very high concentration of ethanol in the Rectory samples, which skews the percentage comparison for those samples. In addition for the indoor and outdoor air samples, alkanes are not particularly useful for source apportionment because the majority of samples had non-detect for nearly all alkanes in the indoor air. Thus any values slightly above the detection limit would greatly (and erroneously) affect the apparent percentage of alkanes in a sample. However, as shown in Table 2, comparing both the compound class concentrations and percentage contributions shows a very clear relationship between outdoor air and indoor air.

Although all of the St. John's samples show a substantial percentage contribution from the alkylbenzene group (Table 2), the other compound classes show very clear distinctions between these samples. The contaminated soil headspace samples have indane/tetralins and naphthalene groups as major contributors, while the same groups have essentially no contribution to the indoor and outdoor air, or to the soil gas. Conversely, the halogenated organics and oxygenated organics are significant in the indoor and outdoor air samples and in the soil gas samples, but make no contribution to the contaminated soil headspace.

The soil gas samples all have a high contribution from alkanes, because of the very high 2,2,4-trimethylpentane found in the soil gas samples (Table 1), but if the alkane group is removed from the data analysis, the distributions of the remaining compound classes are similar between the outdoor air and soil gas, thus indicating that outdoor air is the source of most of the soil gas organics, with the exception of 2,2,4-trimethylpentane (Table B).

Thorough analysis of the use of compound class data for source apportionment is beyond the scope of these comments. However, the results in Table B show the potential for using compound class groups to determine benzene sources. In addition, it is likely that ratios of benzene to those of the compound classes in Table B among the different samples would provide information for source apportionment.

Initial Suggestions for Improving the NYSDOH Selected Ion Approach

The ions suggested to measure different compound classes were developed using fuels and soils contaminated with coal tar. Unfortunately, the potential overlaps (and therefore overestimation) from other common air organics was not adequately addressed. For example, the method suggests using the ions m/z 43, 57, 71, and 85 to determine the relative concentration of alkanes. However, acetone (present in most indoor and outdoor samples) has an intense ion at m/z 43. At the St. John's site the contribution of acetone to the alkanes estimated using m/z 43 is more than the total alkanes present in the sample (based on the ATL data). Similarly, methylene chloride (another common air organic) shows an intense ion at m/z 85, and will often falsely contribute a major fraction of the "alkane" concentrations.

Similar arguments exist for many of the ions suggested by the New York DEP. An initial survey of the GC/MS data from the St. John's site lead to the following suggestions for reducing the errors the New York DEP approach for source apportionment when it is applied to ambient air, indoor air, and soil gas GC/MS data:

1. Integrations must be performed by an analyst that is familiar with the chromatographic patterns of various compound classes. Generally speaking, retention time information for individual and some groups of compounds should be included in the method, and would help eliminate overestimation from false positive identifications. However, some compound classes (especially alkanes and alkenes) can have species throughout the whole retention time range that show the same ions. For these compound classes, the experience of the analyst and confirmation of individual mass spectra are important.

2. For alkanes, the ions at m/z 57 and 71 appear to have less interferences than the other suggested ions at m/z 43 and 85, and should be used for total alkane estimations. However, it will likely be necessary to confirm the identity of the alkanes by looking at individual mass spectra. Retention time information for n-alkanes and major branched alkanes should also be applied.

3. Ions for alkenes are not sufficiently unique to give useful data. Either a few specific alkenes should be specified to represent this group based on a survey of ambient and indoor air data, and volatiles from common sources (fuels, coal tars, etc.), or alkenes should not be included as a compound class.

4. Ions for cyclic alkanes are also not sufficiently unique. However, cyclopentane, methylcyclopentanes, cyclohexane, and methyl cyclohexane are likely to represent the major compounds in this class. These can be estimated by using ions at m/z 84, 98, and 112 along with retention time information for the individual compounds (especially cyclopentane and cyclohexane).

5. Benzenes and alkylbenzenes are very usefiil, and the ions suggested are appropriate. However, the molecular ions (m/z 78, 92, 106, 120, 134, and 148) and a knowledge of retention time patterns would be simpler and help to avoid including non-target species.

6. Comments on Indane/Tetralins are similar to those for cyclic alkanes (above). Major species include styrene (m/z 104), indene (m/z 116), indane (m/z 118), methyl styrenes (m/z 118) methyl indenes (m/z 130), and methyl indanes (m/z 132). Like alkylbenzenes, the chromatographic patterns of these compounds are quite distinctive, and can be recognized by an experienced analyst. Also note that indene (and to a lesser extent, styrene) is a very important compound since it is present in higher amounts in some coal tars (like the St John's samples) than indane, which is the reverse case from common petroleum products.

These initial suggestions are based on the GC/MS data from the St. John's samples discussed above, and are only meant to provide a basis for additional investigations needed to improve the proposed NYSDOH approach. It should also be noted that much of same information can be obtained from the species reported by ATL for TO-15 analyses, and the addition of a few specific compounds to the compound list could cover the majority of significant species of each compound class. Given the complexity and potential for large errors using the proposed NYSDOH selected ion method, the use of TO-15 data (possibly with an expanded list) may give better quality compound class results with better comparability among labs (and at a lower cost) than the use of the proposed selected ion approach.

Appendix Table 1: Summary Table of Ambient, Indoor Air, and Soil Gas Results Sorted by Compound Class
St. John's School and Rectory
Resampling Event - April 12, 2004

Compound	CAS number	Sample Number, Location, and Results in ug/m³															
Type of Sample		Ambient Air	Ambient Air	Ambient Air	Ambient Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air
Sample Location		Outdoor Southwest	Outdoor Northeast	Outdoor Southwest	Outdoor Northeast	Center of Gymnasium	Rectory 1st Floor	Rectory 1st Floor	Rectory Basement	Rectory Basement	1st Floor of School, Men's Restroom	1st Floor of School, Classroom No. 3	1st Floor of School, Classroom No. 2	1st Floor of School, Classroom No. 1	Basement of School, Entry	Basement of School, Kitchen	Basement of School, Cafeteria
Sampling Date		4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004
Sample ID		AMB-101	AMB-102	AMB-103	AMB-104	IA-G106	IA-R1-101	IA-R1-102	IA-RB-101	IA-RB-102	IA-S1-101	IA-S1-102	IA-S1-103	IA-S1-104	IA-SB-101	IA-SB-102	IA-SB-103
alkanes																	
Isopentane	78-784			2.6	7.6		9.9	3.6		11	3.9				3.5	3.1	3.5
2-Methylpentane	107-83-5				6.3					4.7							
2,3-Dimethylpentane	565-59-3																
hexane	110-54-3				3.5					3.6							
heptane	142-82-5																
2,2,4-trimethylpentane	540-84-1																
Cyclohexane	110-82-7																
benzene	**71-43-2**	**1.5**	**1.0**	**2.2**	**2.8**	**1.3**	**1.8**	**1.6**		**2.8**	**1.6**	**1.3**	**2.9**	**1.7**	**1.5**	**1.5**	**1.6**
toluene	108-88-3	3.1	3.1	3.9	9.3	1.8	3.5	2.5		3.1	2.4	1.6	2	1.9	4.6	2.6	6.9
m/p-xylenes	136777-61-2	1.1	2.6	2.0	6	1.4	1.1	1.1		1.2	1.2	0.9		1	1.9	1.2	8.4
ethylbenzene	100-41-4			0.7	1.7												3.4
o-xylene	95-47-6		0.9	0.8	2.3	0.61									0.73		3.1
4-Ethyltoluene	622-96-8																
1,2,4-trimethylbenzene	95-63-6			0.9	2.8	0.85									1.9	0.86	4.3
1,3,5-trimethylbenzene	108-67-8				0.86												1.2
Indan	496-11-7																
Indene	95-13-6																
styrene	100-42-5																
naphthalene	91-20-3													6.2			4.2
chloroform	67-66-3									1.1	0.75						
chloromethane	74-87-3	1.2	1.2	1.0	0.95	0.88	1.1	1.1		0.92	0.88	0.99	1.3	0.94	1	0.88	1.1
trichlorofluoromethane (Freon 11)	75-69-4	2.0	2.0	1.6	1.6	1.5	2.5	1.8		1.5	1.5	1.6	2	1.6	1.5	1.4	1.5
dichlorodifluoromethane (Freon 12)	75-71-8	3.6	3.8	2.6	2.6	2.7	2.8	2.8		2.6	2.4	2.8	3.8	2.8	2.8	2.7	2.5
methylene chloride (dichloromethane)	75-09-2			1.0	3.3		0.75	1		0.64					1.8		
tetrachloroethene	127-18-4	1.2				9.2									2.5		
Ethanol	64-17-5	14.0	4.7	7.0	14	5.1	81E	93E	3800E	15	12	8	16	32	24	15	76E
2-Propanol	67-63-0						2.8	13			2.2	1.9			4.2	1.8	8.8
acetone	67-64-1	7.3	6.0	15.0	11	6.9	6.7	12	14	6	11				8	6.2	14
2-butanone (MEK)	78-93-3			2.2													12

Values with "E" exceed calibration
Values with "S" indicates saturated peaks.

Appendix Table 1 (Cont'd.): Summary Table of Ambient, Indoor Air, and Soil Gas Results Sorted by Compound Class
St. John's School and Rectory
Resampling Event - April 12, 2004

Compound	CAS number	Sample Number, Location, and Results in ug/m³															
Type of Sample		Ambient Air	Ambient Air	Ambient Air	Ambient Air	Indoor Air	Indoor Air-FD	Indoor Air	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Headspace			
Sample Location		Outdoor Southwest	Outdoor Northeast	Outdoor Southwest	Outdoor Northeast	Basement of School, Boiler Room	Field Duplicate Basement of School, Boiler Room	Basement of School, Play Room	Gym Floor, at foot of Stairs	Grassy Area	Basement of School, Kitchen	Basement of School, Cafeteria	Basement of School, Boiler Room				
Sampling Date		4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	38093	38091	38092	38094
Sample ID		AMB-101	AMB-102	AMB-103	AMB-104	IA-SB-104	IA-SB-104FD	IA-SB-105	SG-106	SG-101	SG-102	SG-103	SG-104	B-102 (39.5-40)	B-103 (39-40.5)	B-107 (40-42)	B-108 (36-40)
alkanes																	
Isopentane	78-784			2.6	7.6	7.9	7.7	11						1.5		2.1	1.9
2-Methylpentane	107-83-5				6.3									150E	31	170E	62
2,3-Dimethylpentane	565-59-3													300E	61	400E	140E
hexane	110-54-3				3.5									390E	87E	460E	180E
heptane	142-82-5													520S	280E	580S	520E
2,2,4-trimethylpentane	540-84-1								1100	580	1700	1700	1200				
Cyclohexane	110-82-7													140E	25	190E	68
benzene	71-43-2	1.5	1.0	2.2	2.8	1.5	1.6	1.5									
toluene	108-88-3	3.1	3.1	3.9	9.3	2.6	2.6	3.7	59	40	79	80	64	38	64	280S	400S
m/p-xylenes	136777-61-2	1.1	2.6	2.0	6	1.4	1.4	1.2	21	38	38	31	28	690S	540S	700S	740S
ethylbenzene	100-41-4			0.7	1.7					12	12	9.6	8.7 J	480S	230E	450S	520S
o-xylene	95-47-6		0.9	0.8	2.3					10	12	8.8		570S	480S	560S	650S
4-Ethyltoluene	622-96-8													300S	310S	320S	360S
1,2,4-trimethylbenzene	95-63-6			0.9	2.8	0.97	0.74	0.77	16	5	15	18	13	260S	260S	270S	310S
1,3,5-trimethylbenzene	108-67-8				0.86									220S	220S	240S	260S
Indan	496-11-7													230E	190E	200E	270E
Indene	95-13-6													600S	620S	610S	720S
styrene	100-42-5													350S	300S	370S	450S
naphthalene	91-20-3													2700	2400	2700	3100
chloroform	67-66-3					0.87	0.76				80						
chloromethane	74-87-3	1.2	1.2	1.0	0.95	0.85	0.92	0.91									
trichlorofluoromethane (Freon 11)	75-69-4	2.0	2.0	1.6	1.6	1.5	1.5	1.4									
dichlorodifluoromethane (Freon 12)	75-71-8	3.6	3.8	2.6	2.6	2.7	2.8	2.6			28	12					
methylene chloride (dichloromethane)	75-09-2			1.0	3.3	0.71	0.73	0.5		5.6				3.5	2.8	0.82	2.5
tetrachloroethene	127-18-4	1.2							98			24	22	35	24	53	3.1
Ethanol	64-17-5	14.0	4.7	7.0	14	3.8	6.9	49E	26	73	26		22				1.4
2-Propanol	67-63-0					32				31							
acetone	67-64-1	7.3	6.0	15.0	11	14	17	7.8	28	84	44	37	49	2.3	2.4	3.0	2.1
2-butanone (MEK)	78-93-3			2.2			3.2			21							

Values with "E" exceed calibration
Values with "S" indicates saturated peaks.

Appendix Table 2: Summary of Compound Class Distributions in St. John's Air Samples
St. John's School and Rectory
Resampling Event - April 12, 2004

Type of Sample	Ambient Air	Ambient Air	Ambient Air	Ambient Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air
Sample Location	Outdoor Southwest	Outdoor Northeast	Outdoor Southwest	Outdoor Northeast	Center of Gymnasium	Rectory 1st Floor	Rectory 1st Floor	Rectory Basement	Rectory Basement	1st Floor of School, Men's Restroom	1st Floor of School, Classroom No. 3	1st Floor of School, Classroom No. 2	1st Floor of School, Classroom No. 1	Basement of School, Entry	Basement of School, Kitchen
Sampling Date	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004
Sample ID	AMB-101	AMB-102	AMB-103	AMB-104	IA-G106	IA-R1-101	IA-R1-102	IA-RB-101	IA-RB-102	IA-S1-101	IA-S1-102	IA-S1-103	IA-S1-104	IA-SB-101	IA-SB-102

Compound Class Concentrations (ug/m^3)

Sum alkanes (6 species)	0.0	0.0	2.6	17.4	0.0	9.9	3.6	0.0	19.3	3.9	0.0	0.0	0.0	3.5	3.1
Sum benzene, alkyl benzenes (8 species)	5.7	7.6	10.4	25.8	6.0	6.4	5.2	0.0	7.1	5.2	3.8	4.9	4.6	10.6	6.2
Indan/Tetralins (indan, indene, styrene)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Naphthalene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	0.0	0.0
Sum halogenated organics (6 species)	8.0	7.0	6.2	8.5	14.3	7.2	6.7	0.0	6.8	5.5	5.4	7.1	5.3	9.6	5.0
Sum oxygenated organics (4 species)	21.3	10.7	24.2	25.0	12.0	90.5	118.0	3814.0	21.0	25.2	9.9	16.0	32.0	36.2	23.0

Compound Class Percentage

Sum alkanes (6 species)	0%	0%	6%	23%	0%	9%	3%	0%	36%	10%	0%	0%	0%	6%	8%
Sum benzene, alkyl benzenes (8 species)	16%	30%	24%	34%	18%	6%	4%	0%	13%	13%	20%	18%	10%	18%	17%
Indan/Tetralins (indan, indene, styrene)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Naphthalene	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	13%	0%	0%
Sum halogenated organics (6 species)	23%	28%	14%	11%	44%	6%	5%	0%	12%	14%	28%	25%	11%	18%	13%
Sum oxygenated organics (4 species)	61%	42%	56%	33%	37%	79%	88%	100%	39%	63%	52%	57%	66%	60%	62%

Compound Class Percentage, No Alkanes

Sum benzene, alkyl benzenes (8 species)	16%	30%	26%	44%	18%	6%	4%	0%	20%	14%	20%	18%	10%	19%	18%
Indan/Tetralins (indan, indene, styrene)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Naphthalene	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	13%	0%	0%
Sum halogenated organics (6 species)	23%	28%	15%	14%	44%	7%	5%	0%	19%	15%	28%	25%	11%	17%	15%
Sum oxygenated organics (4 species)	61%	42%	59%	42%	37%	87%	91%	100%	60%	70%	52%	57%	66%	64%	67%

Zero values indicate no detected concetrations were reported by AirToxics Ltd. for any members of these compound classes.

Appendix Table 2 (Cont'd.): Summary of Compound Class Distributions in St. John's Air Samples
St. John's School and Rectory
Resampling Event - April 12, 2004

Type of Sample	Ambient Air	Ambient Air	Ambient Air	Ambient Air	Indoor Air	Indoor Air	Indoor Air-FD	Indoor Air	SoilGas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Headspace			
Sample Location	Outdoor Southwest	Outdoor Northeast	Outdoor Southwest	Outdoor Northeast	Basement of School, Cafeteria	Basement of School, Boiler Room	Field Duplicate Basement of School, Boiler Room	Basement of School, Play Room	Gym Floor, at foot of Stairs	Grassy Area	Basement of School, Kitchen	Basement of School, Cafeteria	Basement of School, Boiler Room				
Sampling Date	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	38093	38091	38092	38094
Sample ID	AMB-101	AMB-102	AMB-103	AMB-104	IA-SB-103	IA-SB-104	IA-SB-104FD	IA-SB-105	SG-106	SG-101	SG-102	SG-103	SG-104	B-102 (39.5-40)	B-103 (39-40.5)	B-107 (40-42)	B-108 (36-40)

Compound Class Concentrations (ug/m³)

Sum alkanes (6 species)	7.9	7.7	11.0	1100.0	3.5	7.9	7.7	11.0	1100.0	580.0	1700.0	1700.0	1200.0	1360.0	367.0	1610.0	0.0
Sum benzene, alkyl benzenes (8 species)	6.5	6.3	7.2	96.0	28.9	6.5	6.3	7.2	96.0	105.0	156.0	147.4	105.0	2520.0	2040.0	2620.0	0.0
Indan/Tetralins (indan, indene, styrene)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1180.0	1110.0	1180.0	120.0
Naphthalene	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2700.0	2400.0	2700.0	110.0
Sum halogenated organics (6 species)	6.6	6.7	5.4	98.0	5.1	6.6	6.7	5.4	98.0	5.6	108.0	36.0	22.0	0.0	0.0	0.0	0.0
Sum oxygenated organics (4 species)	49.8	23.9	56.8	54.0	110.8	49.8	23.9	56.8	54.0	209.0	70.0	37.0	71.0	0.0	0.0	0.0	0.0

Compound Class Percentage

Sum alkanes (6 species)	11%	17%	14%	82%	2%	11%	17%	14%	82%	64%	84%	89%	86%	18%	6%	19%	0%
Sum benzene, alkyl benzenes (6 species)	9%	14%	9%	7%	19%	9%	14%	9%	7%	12%	8%	8%	8%	32%	34%	34%	0%
Indan/Tetralins (indan, indene, styrene)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	19%	14%	52%
Naphthalene	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	35%	41%	32%	48%
Sum halogenated organics (6 species)	9%	15%	7%	7%	3%	9%	15%	7%	7%	1%	5%	2%	2%	0%	0%	0%	0%
Sum oxygenated organics (4 species)	70%	54%	71%	4%	73%	70%	54%	71%	4%	23%	3%	2%	5%	0%	0%	0%	0%

Compound Class Percentage, No Alkanes

Sum benzene, alkyl benzenes (6 species)	10%	17%	10%	39%	19%	10%	17%	10%	39%	33%	47%	67%	53%	39%	37%	42%	0%
Indan/Tetralins (indan, indene, styrene)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	18%	20%	18%	52%
Naphthalene	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	42%	43%	40%	48%
Sum halogenated organics (6 species)	11%	18%	8%	40%	3%	11%	18%	8%	40%	2%	32%	16%	11%	0%	0%	0%	0%
Sum oxygenated organics (4 species)	79%	65%	82%	22%	74%	79%	65%	82%	22%	65%	21%	17%	36%	0%	0%	0%	0%

Zero values indicate no detected concetrations were reported by AirToxics Ltd. for any members of these compound classes.