INTERIM REMEDIAL MEASURE WORKPLAN

DAYTON SHOPPING PLAZA
86-15 ROCKAWAY BEACH BOULEVARD
QUEENS, NEW YORK
Site No. 2-41-035, Index No. W2-0942-02-10

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1.0 INTRODUCTION

Langan Engineering and Environmental Services, Inc. (Langan) has prepared this Interim Remedial Measure Work Plan (IRMWP) for continued operation of an Air Sparge/Soil Vapor Extraction (AS/SVE) treatment system and to address the issue of sub-slab soil vapor beyond the radius of influence of the active AS/SVE system installed at the Dayton Shopping Plaza site located in Queens, New York. The revised RAWP supplements the February 2003 RAWP, the October 2003 RAWP Addendum, and responds to the New York Department of Environmental Conservation (NYSDEC) letters dated 11 May 2005 and 18 January 2006. The revised RAWP is submitted pursuant to a Voluntary Cleanup Agreement (No. V006202) between the NYSDEC and Rockaway Commons, LLC.

The revised RAWP addresses the operation of the AS/SVE system and details an effectiveness monitoring plan that includes groundwater monitoring and continued indoor air monitoring at previously specified indoor air monitoring points. The revised RAWP also includes recommendations to install an active sub-slab vapor venting system (also known as an active soil depressurization system) at locations where compounds of concern (COC) were detected during the December 2004 sub-slab soil vapor and indoor air sampling event, at levels above the New York State Department of Health (NYSDOH) 75^{th} percentile guidelines. A system Operation, Maintenance and Effectiveness Monitoring Program (OMEMP) is included in Appendix A of this Report. A Quality Assurance Project Plan (QAPP) for the site was previously submitted to the NYSDEC as part of the February 2003 RAWP, and an updated Health and Safety Plan (HASP) was submitted to the NYSDEC as part of the October 2003 RAWP Addendum. These documents are included herein as Appendices C and D, respectively.

2.0 SITE DESCRIPTION

2.1 Physical Setting

The Dayton Shopping Plaza consists of a 4.6 acre site located at 85-15 through 88-07 Rockaway Beach Boulevard in Queens, New York (Figure 1). The site is currently occupied by a one-story shopping center building and adjoining asphalt paved parking areas. Dry cleaning operations are currently conducted near the central portion of the onsite building in retail space occupied by the London French Cleaners (LFC) (86-15 Rockaway Beach Boulevard). The retail space has been occupied by LFC for approximately 19 years. Currently one self-contained dry cleaning unit is located in the LFC facility. The unit was installed in 1997. Prior to 1997, filters and spent tetrachloroethene (PCE) were stored onsite in 15-gallon and 55-gallon drums.

Until recently, (spring 2002) retail space immediately to the east and west of the LFC was vacant. The retail space to the east has recently been occupied by a print shop and then a furniture store. Restaurants and a Laundromat also occupy portions of the onsite building.

As shown on Figure 1, the site is located on a barrier island. The Atlantic Ocean is located approximately 1,000 feet to the south and the Beach Channel is located approximately 1,500 feet to the north. The site topography slopes gently to the north.

2.2 Geology and Hydrogeology

The subject site is underlain by Barrier Island deposits consisting of sand and gravel. Test borings completed during previous environmental investigations conducted by Langan and others, reveal that a fine to medium sand is present to a depth of approximately 20 feet below grade and a fine to medium sand with gravel extends from 20 feet to a minimum of 75 feet below grade (depth of deepest boring/monitoring well).

Water table elevations measured in onsite monitoring wells range from 4 to 6 feet below grade (3 to 4 feet above mean sea level). Ground water flow is toward the southwest. Due to the nearly flat hydraulic gradient, tides and the presence of subsurface utilities influence ground water flow direction. Based on aquifer testing (slug testing) conducted on onsite wells during a 1999 Supplemental Remedial Investigation, measured hydraulic conductivity values ranged from approximately 17 to 43 feet/day.

3.0 SITE BACKGROUND

This section discusses the history of remedial activities at the site including work completed by Langan and by others.

3.1 Previous Investigations

The following is a chronology of the previous remedial investigation and remedial action activities and corresponding reports for the subject property:

- Phase I Environmental Site Assessment - RECON Environmental Corp. (RECON) (2/17/1995);
- Phase II Environmental Site Assessment - RECON Environmental Corp. (4/13/1996);
- Remedial Investigation - RECON Environmental Corp. (4/1/1996);
- Supplemental Remedial Investigation - Langan (1/5/1999);
- Phase II Remedial Investigation Report – Langan (2/29/2000);
- Start-up Report Soil Vapor Extraction/Air Sparging Remedial System – Langan (2/5/01);
- Air Sparging/Soil Vapor Extraction Remedial System Semi-Annual Status Report (October 2000 to June 2001)- Langan (8/20/01);
- Supplemental Remedial Investigation Workplan – Langan (January 2004);
- Supplemental Remedial Investigation Report – Langan (April 2004); and
- Supplemental Remedial Investigation (Phase II) Report – Langan (March 2005).

All historic soil, groundwater and indoor air sampling locations are shown on Figure 2. Summary tables of soil, groundwater, sub-slab soil vapor and indoor air sampling results from previous sampling events are provided in Tables 1 through 4, respectively. The findings of previous reports/activities have been summarized in previous Remedial Investigation Reports and, as such, are only briefly discussed below.

3.1.1 Phase I Environmental Site Assessment

A Phase I Environmental Site Assessment (ESA) was completed by RECON in 1995. The Phase I ESA identified the London French Cleaners site as a Resource Conservation and Recovery Act (RCRA) Large Quantity Generator of tetrachloroethene (PCE). The Phase I ESA recommended completion of a Phase II Remedial Investigation to determine if the observed site operations had impacted subsurface conditions.

3.1.2 Remedial Investigation

During the initial remedial investigation completed by RECON in 1995, soil and ground water samples were collected from four test boring/monitoring well locations (MW-1 through MW-4) to the north and south of the LFC building. The results revealed that no exceedances of NYSDEC Soil Cleanup Objectives were detected in soil samples collected from the 0. to 0.5 feet interval above the water table at any of the four test boring locations. Ground water analytical results revealed the presence of volatile organic compound above the NYSDEC GA Ground Water Quality Standards.

3.1.3 Phase II Remedial Investigation

During the Phase II Remedial Investigation completed by RECON in 1996, five additional shallow monitoring wells (MW-5 through MW-9) and one deep monitoring well (DW-1) were installed downgradient (south) of the LFC facility. Soil samples were collected from the 0 to 0.5-foot interval above the water table at all shallow monitoring well locations. The results revealed that detected soil volatile organic compounds concentrations did not exceed the NYSDEC Soil Cleanup Objectives. Ground water sample results revealed the presence of volatile organic compounds at concentrations above the NYSDEC GA Ground Water Standards at all monitoring well locations.

3.1.4 Supplemental Remedial Investigation

The Supplemental Remedial Investigation completed by Langan in March and April of 1998 included the collection of sub-slab soil vapor samples within the onsite building and to the south of the LFC facility, installation of two additional monitoring wells to delineate the extent of impacted ground water, collection of ground water samples from temporary well points located within the onsite building, collection of ground water samples from nine of twelve onsite monitoring wells, and completion of aquifer testing (slug testing) and long-term ground water level monitoring. The purpose of the Supplemental Remedial Investigation was to complete delineation of ground water contaminants and to provide an initial assessment of the potential for adverse environmental impact resulting from contaminant migration to offsite receptors, and from migration of volatile organic compounds into the onsite building. The results of soil and ground water sampling and aquifer testing conducted during the Supplemental RI revealed elevated concentrations of PCE were present in ground water in the area of the trench drain located to the south of the LFC facility. Volatile organic compounds exceeding the NYSDEC Ground Water Quality Standards were delineated onsite, with relatively low concentrations of PCE, trichloroethene (TCE) and dichloroethene (DCE) detected at MW-9 (the furthest downgradient well).

3.1.5 Phase II Remedial Investigation

The Phase II RI completed by Langan in September 1999 included the completion of a dye tracer test to determine the destination of the onsite trench drain and storm sewer systems and collection of soil samples in the area of the trench drain. The Phase II findings documented a connection between the trench drain and the storm sewer system and the presence of chlorinated volatile organic compounds in soil above NYSDEC Soil Cleanup Objectives in the area of the trench drain. The results indicated that PCE, TCE and/or DCE were detected above the NYSDEC Soil Cleanup Objectives in test borings LB-7 and LB-8, located adjacent to the trench drain. The results revealed that vertical and horizontal delineation of the soil contamination was completed, as adjacent soil samples collected from monitoring well borings MW-3, MW-4, MW-8, MW-9 and DW-1 revealed no exceedences of Soil Cleanup Objectives. The vertical extent of the contamination in unsaturated soil was limited due to presence of groundwater at depths of 4 to 5 feet below grade.

3.1.6 Supplemental Remedial Investigation Workplan

Langan’s January 2004 SRI Workplan proposed additional investigation in order to assess current soil, groundwater, sub-slab soil vapor and indoor air conditions and to completely characterize and delineate the extent of contamination in the site soil and groundwater resulting from past discharges from onsite dry cleaning operations.

3.1.7 Supplemental Remedial Investigation Report

Langan’s April 2004 SRI Report summarized the findings of the soil, groundwater, sub-slab soil vapor and indoor air sampling originally proposed in the January 2004 SRI Workplan. Results of the soil sampling revealed that impacted soil in the area of the onsite trench was limited to shallow contamination (0.5 to 1 foot below ground surface) and that vertical and horizontal delineation of impacted soil in this area was completed. Results of groundwater sampling revealed continued exceedances of NYSDEC Groundwater Standards for chlorinated Volatile Organic Compounds, including PCE, TCE, cis-DCE and vinyl chloride, with the highest detected concentrations in the vicinity of the trench drain. The sub-slab soil vapor and indoor air sampling completed during the SRI revealed that elevated concentrations of chlorinated VOCs were detected in both sub slab soil vapor and indoor air samples collected from within the London French Cleaner and adjoining tenant spaces.

3.1.8 Supplemental Remedial Investigation (Phase II) Report

Langan's March 2005 SRI (Phase II) Report summarized the results of sub-slab soil vapor and indoor air sampling and analysis. The sub-slab soil vapor and indoor air sampling results revealed exceedances of applicable volatile organic compounds, primarily PCE and TCE. Other exceedances of NYSDOH and USEPA criteria were detected but are not attributable to compounds of concern at the site. Sub-slab soil vapor sampling results revealed that concentrations of chlorinated VOCs were detected below the floor slab of the entire Shopping Plaza (with the exception of C-Town Supermarket in the western corner) and decreased in concentration with distance from the London French Dry Cleaners. Indoor air sampling results revealed similar trends, with no exceedances of applicable NYSDOH or USEPA criteria detected at locations in the west (C-Town Supermarket) as well as the eastern (Popeye's) portions of the Plaza. The NYSDEC responded with comments on the SRI Phase (II) in a letter dated 11 May 2005. Langan addressed the NYSDEC comments in a correspondence dated 26 September 2005, incorporated the requested changes and resubmitted the SRI Phase (II) to the NYSDEC.

3.2 Regulatory History and Remedial Action

Remedial Investigation activities discussed in Section 3.1 were conducted on behalf of the former site owner, FGH Realty Corporation. FGH submitted reports documenting these investigations to NYSDEC under the Voluntary Cleanup Program and was in the process of executing a Volunteer Cleanup Agreement with the NYSDEC. However, in the interim, the property was subsequently transferred to the current site owner. The Volunteer Cleanup Program process was later assumed by Rockaway Commons, LLC and the Agreement was executed on 20 December 2002. Prior to execution of the Voluntary Cleanup Agreement, the NYSDEC provided notification that the subject site was to be included on the Registry of Inactive Hazardous Waste Disposal Sites. Langan, on behalf of Malachite Real Estate and Rockaway Commons, filed a reclassification petition on 15 April 2002. Rockaway Commons, LLC, received a response from NYSDEC to the reclassification petition on 9 September 2002.

During ownership of the site by FGH, a remediation plan was implemented to address the groundwater contamination at the site. An AS/SVE system was installed in August 2000 and operation of the system was initiated in October 2000. The system operated until June 2002, when it was taken off-line because of the property transfer and unresolved Volunteer Cleanup Agreement status. The operation of the AS/SVE system was resumed on 16 June 2005.

As discussed in Section 3.1, two reports regarding installation and operation of the AS/SVE system (February 2001 Startup Report and August 2001 Semi-Annual Status Report) have been produced and were submitted to the NYSDEC with the reclassification petition in April 2002. The reports were also submitted to the NYSDEC's Division of Environmental Remediation on 29 January 2003.

This revised RAWP is being issued in accordance with the provisions of the executed Voluntary Cleanup Agreement to allow for continued operation of the AS/SVE system and includes recommendations to install an active venting system at select locations at the shopping plaza that are beyond the radius of influence of the SVE system. The as-built system details of the AS/SVE were provided in the 2001 Start-Up Report previously submitted to the NYSDEC. The AS/SVE system design were submitted to the NYSDEC in the February 2003 RAWP. The following sections detail an effectiveness-monitoring plan that includes groundwater monitoring and indoor air monitoring, as well as the design of the active sub-slab vapor venting system (active soil depressurization system).

4.0 INTERM REMEDIAL MEASURE WORKPLAN

Ground water and soil contamination above the applicable NYSDEC standards was delineated through various remedial investigations, as discussed in Section 3.1. The elevated concentrations of chlorinated volatile organic compounds in groundwater are limited to the area of MW-3, MW-4, MW-5, MW-6, MW-7, MW-8 and MW-9, located to the south of the LFC in the vicinity of a trench drain. Groundwater contaminants include PCE, TCE, DCE (cis and trans), and vinyl chloride. Impacted soil with concentrations of PCE, TCE and DCE above NYSDEC Soil Cleanup Objectives, have been historically encountered in an area adjacent to the trench drain.

4.1 Air Sparging / Soil Vapor Extraction Remedial System

An AS/SVE system is currently operating at the site to address the elevated concentrations of PCE and its attenuation products in soil and ground water. The AS/SVE system consists of two air sparging and two vapor extraction wells, two skid-mounted blowers, associated piping, fittings, and instrumentation. The AS/SVE system was installed in October 2000 and operated until June 2002. The operation of the AS/SVE system was resumed on 16 June 2005.

The system design, installation and operation details were previously provided to the NYSDEC in the 2001 Start-up Report and initial Semi-Annual Status Report. The system remedial objectives, remedial design deliverables, and system effectiveness were submitted to the NYDEC in the February 2003 RAWP, and are also included within this report.

4.1.1 Remedial Objectives

The remedial system designed for this site was developed to meet the following objectives:

- Reduce ground water concentrations of volatile organic compounds to meet the NYSDEC Ground Water Quality Standards;
- Reduce soil concentration of volatile organic compounds within the suspected source area (trench drain) to meet NYSDEC Soil Cleanup Objectives;
- Prevent offsite migration of site-related VOC's to sensitive receptors;
- Create no adverse impacts to other environmental media (air); and,
- Protect human health during construction and operation.

Specific performance objectives and measurements are detailed in the Operation, Maintenance and Effectiveness Monitoring Plan (OMEMP) presented in Appendix A.

4.1.2 Remedial Design Deliverables

The purpose of the Remedial Design submittal is to describe actions required for the implementation of the selected remedy. The Remedial Design submittal includes the following:

- Design basis for site ground water remediation,
- Design Elements,
- Permitting requirements,
- Identification of wastes and disposal options,

- An Operation, Maintenance and Effectiveness Monitoring Plan,
- A plan of the Site showing locations of remedial/mitigation systems (existing and proposed);
- A Health and Safety Plan, and
- A Quality Assurance Project Plan.

Each of these items is provided within this report and discussed below.

4.1.3 Remedial Design

The AS/SVE technology has been demonstrated to be a cost effective and viable remedial option to address VOC contamination in hydrogeologic environments documented at the site (Fields et. al., 2002). A description of the extraction well network and the major elements of each technology are presented in the following sections. A site plan showing the location and components of the AS/SVE system is provided on Figure 3.

4.1.3.1 Soil Vapor Extraction System

Soil vapor extraction is a viable and effective remedial alternative to address adsorbed-phase volatile compounds both in terms of the radial area of influence produced by each extraction well and the volatile organic concentrations removed in vapor effluent. The SVE technology is typically used to remediate soil impacted with volatile organic compounds and to collect vapors generated by the air sparging system. The SVE will function primarily to capture VOC generated by the AS system, in addition to addressing a limited area of elevated soil VOC concentrations in the area of the trench drain.

The SVE well points are located adjacent to the existing dry cleaners facility in partially occupied retail space to the east (SVE-2) and the asphalt paved access road to the south (SVE-1). The SVE wells are interconnected through a piping network manifolded to treatment equipment located inside the tenant space to the east of the dry cleaners. The main header pipe is 20-foot long, and 2-inch in diameter Polyvinyl Chloride (PVC) pipe. The lateral pipes are also 2-inch in diameter PVC. All elbows, tees, unions and other required fittings consist of Schedule 40 PVC.

The two vapor extraction wells were installed by Aquifer Drilling and Testing (ADT) using a Geoprobe® Rig. The PVC well screen was installed approximately one foot above the mean high water table and extends from a depth of 2.5 to 3 feet below grade to the bottom of the wells at 5 to 6 feet below grade. The wells were constructed with 2.5-foot long, 2-inch diameter PVC well screen. The top of the SVE-2 vapor extraction well was finished as a two-foot stick-up. Vapor extraction well SVE-1 was installed as a flush mount well within a 6-inch diameter road box.

Each vapor extraction well is controlled by a ball valve to enable adjustment of the airflow and vacuum at each individual well, and a sampling port for drawing air samples and measuring airflow. The individual wells were connected to a 2-inch main header hose via 2-inch PVC piping. The 2-inch PVC header hose is connected to a regenerative vacuum blower designed to extract 50-scfm airflow from the soil vapor wells at 20 inches of water column vacuum. Piping materials made out of PVC were selected as the material to be used to convey soil vapors due to the relatively low concentrations of chlorinated solvent vapors in the soil (<10 parts per million by volume (ppmv)).

Vapors from the soil vapor extraction system are extracted with the use of a skid-mounted vacuum blower system. A one horsepower (Hp) regenerative vacuum blower manufactured by T (model R4310A-2) and a moisture separator (30-gallon capacity) are used to develop the required vacuum at each well head. Soil vapors from the vapor wells are pulled to the moisture tank via the piping network and the vacuum blower. Moisture associated with the soil is collected in the moisture separator.

No short-circuiting of air from the surface to the vapor wells was anticipated during design or has been observed during operation of the system, as the SVE wells are placed below the building floor or asphalt pavement. The floor and the asphalt pavement act as a surface seal to prevent short-circuiting.

Construction details including boring logs and design details of the SVE system well point, Process and Instrumentation Diagram (P&ID) for the SVE system, and construction diagrams were provided in the 2001 Start-Up Report submittal.

4.1.3.2 Air Sparging Remedial System

The air sparge points are located adjacent to the dry cleaners facility in the asphalt paved access road to the south (AS-1) and the tenant space to the east (AS-2). The AS wells are interconnected through a piping network manifolded to the blower equipment located inside the building. The main header pipe is constructed of approximately 20-feet of 2-inch diameter

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rubber hose. The lateral hoses are also constructed of 2-inch diameter rubber hose. All elbows, tees, unions and other required fittings are made of Schedule 80 PVC.

The sparge wells were installed by ADT between 21 and 28 of August, 2000 with the use of a Geoprobe® to a depth of 17 feet below floor surface. The sparge wells consist of 1-inch diameter PVC with a bottom plug and a two-foot length of the screen from 15 to 17 feet below grade. The remainder of the sparge well AS-2 was finished with 1-inch diameter schedule 80 PVC casing to three feet above the concrete floor of the former dry-cleaner retail space. Air sparge well AS-1 was finished flush with the asphalt pavement and placed inside a 6-inch diameter protective road box.

Air for the sparge points is generated by a 3-Horsepower, three-phase, TEFC, oil-less rotary vane low-pressure air compressor manufactured by Becker, Inc. The air compressor model number is Becker DTLF 250. Each sparge point is individually valved with a shut-off valve and a pressure regulator valve. The sparge points are connected via 2-inch diameter rubber hose.

The maximum quantity of the air injected by the air sparging system is limited to one-half the volume of soil extracted by the soil vapor extraction system. This limitation is designed to maintain overall vacuum in the subsurface soils and prevent the migration of fugitive volatile compounds to surrounding areas and buildings. Each air sparge well is operated from 5 to 6 pounds per square inch gauge (psig) air injection pressure at the location of the well head. This injection pressure variation depends on the ground water table elevation above the well screen. At an injection pressure of 5 psi, each air sparge well is designed to deliver to the subsurface 9 standard cubic feet per minute (scfm). An allowance for 1 psi in airflow piping losses has been incorporated into the design. Thus, at the blower side, the design injection pressure is set at approximately 6 psig.

The air sparging system layout, boring logs, P&ID for the system and construction details of the sparge wells were previously provided in the 2001 Start-up Report.

4.1.4 System Effectiveness

The system effectiveness during operation was documented in the 20 August 2001 Semi-Annual Status Report. The semi-annual status report discussed the system effectiveness based on contaminant removal, observed subsurface response regarding the system area of influence, and groundwater analytical data. Based on the soil and groundwater investigations, Langan estimated that approximately 4 lbs of dissolved VOCs and 50 lbs of adsorbed VOCs were present in the SVE/AS area of influence. Based on the monitoring data from October 2000 to June 2001, the system has removed approximately 45 pounds of volatile organic compounds from the subsurface (approximately 0.01 pounds of VOCs per hour, on average). This calculation is based on the initial weekly startup monitoring and subsequent monthly system emissions monitoring using a photo-ionization detector and Tedlar bag samples collected in October 2000, March 2001 and June 2001.

The vacuum response measured during the startup and continued monitoring documents that a vacuum was measured in MW-3, MW-4, MW5, MW-6 and MW-7, indicating that the SVE system radius of influence was within design parameters. Influence from the AS system is also measured by increased ground water elevations in the site monitoring wells. An average water level change of 1.4 feet was observed during initial system operation in monitoring wells MW-3, MW-4, MW-6 and MW-9. Also, small water level changes ranging from 0.06 to 0.19 feet were observed at wells located at greater distance from AS wells (MW-1, MW-2, MW-10 and MW-11).

As shown on Table 2, based on groundwater monitoring results obtained both prior to and during operation of the AS/SVE system at MW-3, MW-5, MW-7, and MW-9, decreasing trends of PCE, TCE, DCE, and vinyl chloride concentrations are evident.

As indicated previously, AS/SVE system operation was resumed in June 2005. Vacuum measurements were recorded at SVE-1 and SVE-2, at 5 inches of water column and 4 inches of water column, respectively. Vacuum at the influent to the SVE blower was measured at 5 inches of water column. The blower was operating at a pressure of 6 pounds per square inch (psi). In addition, vacuum measurements were observed within both monitoring points MP-2 and MP-3 located in the London French Dry Cleaners.

4.2 Active Sub-slab Venting System

An active sub-slab vapor venting system has been designed to prevent sub-slab soil vapor intrusion into buildings by creating a negative-pressure zone underneath the slab. The negative pressure allows air to flow from the building into the soil, effectively sealing slab foundation cracks and holes, and thus preventing the intrusion of volatile organic compounds. The system is similar to the one used for radon soil venting. Based on sub-slab soil vapor and indoor air sampling analytical results conducted in December 2004, the sub-slab vapor venting system will be installed at Beauty & More, Dano's Pizza and Med Port of Rockaway Beach to the west of London French

Cleaners, and at Sunny Gift and The Visiting Services of New York to the east of London French Cleaners.

The following sections discuss the remedial system design.

4.2.1 Remedial Objectives

The active sub-slab venting system designed for this site was developed to meet the following objectives:

- Reduce soil concentration of volatile organic compounds within areas that are outside the radius of influence of the AS/SVE remedial system;
- Prevent intrusion of volatile organic compounds into buildings;
- Create no adverse impacts to other environmental media (air); and,
- Protect the human health.

Specific performance objectives and measures are detailed in the Operation, Maintenance and Effectiveness Monitoring Plan (Appendix A).

4.2.2 Remedial Design Deliverables

The purpose of the Remedial Design submittal is to describe actions required for the implementation of the selected remedy. The Remedial Design submittal includes the following:

- Design basis;
- Design elements;
- Permitting requirements;
- Identification of wastes and disposal options;
- An Operation, Maintenance and Effectiveness Monitoring Plan; and,

- A plan of the Site showing locations of and installation details for the active venting system.

Each of these submittals is provided within this report and discussed below. A Health and Safety Plan and a Quality Assurance Project Plan were submitted to the NYDEC in the February 2003 RAWP Report and are included in this report as Appendices C and D, respectively.

4.2.3 Remedial Design

The active sub-slab venting system has been demonstrated to be a cost-effective remedial option to address soil- intrusion into buildings. A site plan showing the locations and components of the active sub-slab venting system is provided on Figure 3.

The system will consist of a suction pit measuring approximately 18 inches in diameter. Two 4-inch diameter solid HDPE pipes will be used as the vent pipes. One pipe will be placed at the front of the retail space under consideration, and the second pipe will be placed at the rear. The two pipes will be connected to a 6-inch diameter solid HDPE header. The header pipe will extend vertically above the roof. An in-line fan (Fantech FR150) will be installed at the tip of the solid HDPE pipe with a weather-heard. The Fantech FR150 is specified to create an air flowrate of 230 cubic feet per minute (cfm) with a vaccum of 0.2-inches of water (per Fantech www.fantech.net). A description of the suction pit and the major elements of the active sub-slab venting system are presented in the following sections. Figure 4 shows a typical venting system cross-section.

4.2.3.1 The Suction Pit

A typical suction pit is shown on Figure 4. As mentioned previously, the suction pit will measure approximately 18 inches in diameter. The lower tip of the 4-inch diameter HDPE vent pipe will be placed inside the pit, and will extend vertically to meet the header, which will extend above the roof. Figure 3 shows the proposed locations of the suction pits. Prior to installation, Langan will attempt to obtain the "as-built" plans of the Shopping Center to ensure that the pits are located in areas with no nearby sub-slab barriers such as footings or adjacent to unsealed openings (such as sumps).

The existing concrete slab will be cut to dig-out the pit and install the suction pipe. Once the suction pipe is installed, the slab will be restored. A sealant will be used to seal the openings around the suction pipes as well as any openings in the slab.

4.2.3.2 The HDPE Vent Pipe

Each HPDP vent will consist of solid 4-inch diameter pipe and will be connected to a 6-inch diameter header. The lower tip of the vent pipe will be placed inside the suction pit. The vent pipe will extend vertically above the roof. Any openings between the pipe and the floor slab will be sealed with a high adhesive sealant such as polyurethane. All piping joints will be also sealed. The slab will be visually inspected for any cracks and openings. All openings will be sealed. In case the design requires a horizontal piping run, piping will be pitched a minimum of 1/8 inch per linear foot to allow any condensation to drain back into the pit.

4.2.3.3 The In-Line Fan

The in-line fan is 11.75-inches in diameter and will be attached to the 6-inch diameter header pipe and is capable of providing an air flowrate of 230 cfm at a vacuum of 0.2-inches of water. According to the January 1993 USEPA document entitled *Radon Prevention in the Design and Construction of Schools and Other Large Buildings*, a suction fan flowrate of 500 cfm would provide a sufficient radius of influence to cover 100,000 square feet of slab area. Thus, a 230 cfm would cover approximately 46,000 square feet of slab area. Therefore the five tenant spaces with a subslab depressurization system should receive adequate vacuum to be protective of the tenant space from the proposed in-line fans.

4.2.4 System Effectiveness

The system effectiveness will be monitored through initial sub-slab vacuum measurements and indoor air sampling (using a 6-liter Summa canister) within the retail spaces under consideration. The exhaust air (at the upper tip of the vent pipe) will be also monitored once using a hand-held photo-ionization detector (PID) shortly after system installation. The monitoring and sampling schedule is included in the Operation, Maintenance and Effectiveness Monitoring Program (Appendix A) and summarized below.

- Exhaust air monitoring (at the upper tip of the vent pipe) – once, upon system startup using a PID.
- Sub-slab vacuum measurements – monthly during the first six months of operation using magnehelic gauges.
- Indoor air sampling – collected 6 months after initial operation of the IRM. Six-liter Summa canisters will be used to collect the air samples.

4.3 Permitting

During start-up and operation of the AS/SVE system, the modeled SVE emissions (using NYSDEC's DAR-1 guidance document) have not exceeded the Annual Guideline Concentrations (AEC) or the Short-term Guideline Concentrations (SGC) in accordance with NYSDEC, Division of Air Quality (DAQ) requirements. This is based on the NYSDEC-DAQ Air Guide 1 equations, which indicate that when emissions from the system are 0.01 pounds per hour ambient concentration of the constituents of concern are below their respective AGC and SGC. Applicable calculations, assumptions and NYSDEC guidelines are provided in Appendix B. This calculation was based on the time period between October 2000 and June 2001. Also, the calculations were based on a screening-level modeling, which does not account for thermal momentum rise, advection of emissions, and uses very conservative meteorological conditions. Based on system operation measurements obtained to date, emission control equipment is not necessary and therefore, a Process, Exhaust, and Ventilation System (PE&VS) permit is not required (NYSDEC, DAR-1, Section IV.B.1.a, 1991 Edition). The total amount of PCE estimated to have been emitted is less than the reportable quantity of 100 lbs of PCE. Furthermore, the PCE concentrations are less than the 50 ppmv PCE concentrations referred in NYCRR Part 232—Perchlorethylene Dry Cleaning Facilities. Continued air emissions monitoring will be conducted as discussed in Sections 4.5 and 4.6. If results indicate that emissions control equipment is necessary the system will be shutdown, emission control equipment will be installed and a PE&VS permit will be obtained as well as a certificate to operate (CO).

Based on the above calculations with regard to recovery of VOCs, the active venting system will also be in compliance with the AEC and the SGC and no permits will be required.

4.4 Waste Disposal

Based on results of previous sampling and the proposed shallow installation depth of the active venting system, concrete cuttings and soil from the installation of the suction pits will not require offsite disposal as contaminated material.

4.5 Facility Air-Monitoring Program

The periodic AS/SVE emissions sampling was submitted to the NYSDEC in the February 2003 RAWP and is included in Section 4.5.1 for reference. The active venting system air monitoring is included in Section 4.5.2.

4.5.1 Air Sparging / Soil Vapor Extraction Remedial System

In accordance with NYSDEC requirements, an AS/SVE emissions sampling program had been proposed for the site in February 2003. The sampling program was used, and will be used, to monitor the AS/SVE system emissions to evaluate the system performance and potential permitting requirements.

The AS/SVE emissions sampling will be a periodic occurrence as discussed in Section 4.6 and specified in the Operation, Maintenance and Effectiveness Monitoring Program (Appendix A). Air monitoring at the SVE/AS wells will be conducted monthly using a hand-held PID. Air samples will be collected using 6-liter Summa canisters on quarterly basis.

4.5.2 Active Sub-slab Venting System

A one-time air emission monitoring (at the tip of the vent pipe, using a hand-held PID) will be conducted once after system installation. A periodic indoor air sampling program is proposed and had been discussed in Section 4.2.4 above.

4.6 Operation, Maintenance and Effectiveness Monitoring Program

An Operation, Maintenance and Effectiveness Monitoring Program has been developed for the AS/SVE system and the sub-slab vapor venting system, at the site and is provided in Appendix A. The Operation, Maintenance and Effectiveness Monitoring Program will address the following items:

- System Mass Removal Monitoring;
- Remediation System Effectiveness Monitoring Procedures;
- Remediation System Maintenance; and
- Remediation System Monitoring and Maintenance Schedule.

As discussed previously, the AS/SVE system has operated from October 2000 to June 2001 and the initial Start-Up Report and the first Semi-Annual Status Report documenting system installation and performance were submitted to the NYSDEC. AS/SVE system operation was resumed in June 2005. Operation and maintenance of the system in accordance with the provisions of the Operation, Maintenance and Effectiveness Monitoring Program will continue upon approval of this revised RAWP by NYSDEC.

4.6.1 Air Sparging / Soil Vapor Extraction System

The AS/SVE extraction system effectiveness-monitoring program will be as follows:

- The following activities will be conducted on a monthly basis:
  - Monitoring AS/SVE emissions;
  - Measuring vacuum at the SVE wells and the blowers;
  - Measuring blowers temperature;
  - Checking the vapor/water separator reservoir and emptying it when necessary; and
  - Checking the system hoses.

- The following activity will be conducted on a quarterly basis:
  - Sampling the exhaust air emissions using Summa canisters.

- The following activity will be conducted on a semi-annual basis
  - Sampling monitoring wells MW-3, MW-5, MW-7 and MW-9.

- The following activity will be conducted on an annual basis:

- Sampling all onsite shallow monitoring wells (except MW-1) and deep monitoring well DW-1.

4.6.2 Sub-slab Vapor Venting System

The sub-slab vapor venting system effectiveness-monitoring program will be as follows:

- The following activity will be conducted upon system start-up:
  - Measuring VOC concentrations at the tip of the vent pipe.

- The following activities will be conducted on a monthly basis:
  - Inspecting the pipes for leaks; and
  - Measuring sub-slab vacuum during the first six months of operation.

- The following activities will be conduced on a quarterly basis:
  - Inspecting the slab for cracks and sealing them; and

4.7 Quality Assurance Project Plan

A Quality Assurance Project Plan (QAPP) has been prepared and submitted to the NYSDEC as part of the February 2003 RAWP. The QAPP is included in Appendix C. The QAPP covers system-monitoring procedures including emissions sampling, ground water monitoring, the one-time sub-slab emissions monitoring (exhaust air), and the indoor air sampling program discussed in Section 4.5. The QAPP also covers analytical requirements for the various media.

4.8 Health and Safety Plan

An established Health and Safety program designed to protect personnel on-site and the public from site hazards and exposures was implemented during the previous remedial investigations conducted by Langan and during the system installation. A revised site-specific Health and Safety Plan (HASP) has been prepared for the project in accordance with OSHA statute 29 CFR 1910.120, detailing procedures required to safely perform work specified in the OMEMP. The HASP is provided as Appendix D.

4.9 Schedule

Installation of the sub-slab vapor venting system will be initiated within 21 days of the NYSDEC approval of the IRM Workplan. The AS/SVE system was restarted in June 2005. A Status Report will be submitted within 90 days of the IRM WP approval and will include all of the OMEM results from June 2001 to present. The Status Report will detail the March 2002 sampling event, for which a summary of the results was submitted with the 14 April 2002 ECL reclassification petition. The system status reporting will continue as specified in the OMEMP (Appendix A). The proposed schedule is provided in Table 5.

5.0 COST ESTIMATE

The estimated cost for completion of the proposed IRM Workplan is listed below.

$20,000	Installation of subslab depressurization system
$15,000	System Effectiveness Monitoring (one year)
$15,000	Groundwater Monitoring (one year)
$20,000	Reporting (one year)
$205,000	Long-Term operation of AS/SVE system and subslab depressurization system - Electricity(30-years) (1)
$145,000	Long-Term operation of AS/SVE system and subslab depressurization system – Maintenance (30-years) (2)
$420,000	**Total Estimated IRM Costs**

Notes

(1) Long-term electrical cost assumes inflation of 3% with a currently monthly electrical cost of $350 per month. Assumes cost will be paid directly by on owner

(2) Long-term maintenance cost assumes inflation of 3% with a currently monthly maintenance cost of $250 per month. Long-term maintenance will be completed by onsite personnel

6.0 REFERENCES

Fields, K, J Gibbs, W Condit, A. Leeson and G Wickramanayake, 2002. *Air Sparging: A Project Manager's Guide*. Battelle Press, Columbus, OH. 160 pp.

EPA Technical Guidance. *Radon Reduction Techniques for Existing Detached Houses*.

EPA Technical Guidance. 1993. *Radon Prevention in the Design and Construction of Schools and Other Large Buildings*

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TABLES

Table 1
Summary of Historical Soil Sampling Analytical Results
Remedial Action Workplan (Revision)
Dayton Shopping Plaza
Queens, New York

Sample Location		**MW-1**	**MW-2**	**MW-3**	**MW-4**	**MW-5**	**MW-6**	**MW-7**	**MW-8**	**MW-9**
Consultant	NYSDEC	**RECON**	**RECON**	**RECON**	**RECON**	**RECON**	**RECON**	**RECON**	**RECON**	**RECON**
Sample Number	TAGM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Laboratory Sample No.	Recommended	9511-195.6	9511-195.7	9511-195.8	9511-195.8	9602-4.26	9602-4.28	9602-4.30	9602-4.32	9602-4.34
Sample Depth (ft)	Soil Cleanup	4.5-5	4.5 - 5	4.5 - 5	4.2 - 4.7	3.5 - 4	3.5 - 4	3.5 - 4	3.5 - 4	5.5 - 6
Sample Date	Criteria	11/20/1995	11/20/1995	11/20/1995	11/20/1995	1/30/1996	1/30/1996	1/30/1996	1/30/1996	1/30/1996
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VOLATILE ORGANIC COMPOUNDS										
Benzene	0.06	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.3	ND	ND	0.215	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichlorethene	0.3	ND	ND	0.014	ND	ND	ND	ND	ND	ND
Methylene chloride	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.4	ND	ND	0.291	0.01	ND	ND	0.046	0.1	0.064
Toluene	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	0.7	ND	ND	0.062	ND	ND	ND	ND	ND	ND
Xylene (total)	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Library Search VOC										
Unknown siloxane	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
Unknown siloxane/unknown	---	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Location		**LB-1**	**LB-1**	**LB-2**	**LB-2**	**LB-3**	**LB-3**	**LB-4**	**LB-4**
Consultant	NYSDEC	**Langan**	**Langan**	**Langan**	**Langan**	**Langan**	**Langan**	**Langan**	**Langan**
Sample Number	TAGM	018	019	016	017	020	021	023	024
Laboratory Sample No.	Recommended	156175	156175	156172	156173	2-2.5	4.5-5	1.5-2	5-5.5
Sample Depth (ft)	Soil Cleanup	2-2.5	5-5.5	3-3.5	5-5.5	156176	156177	156179	156180
Sample Date	Criteria	9/9/1999	9/9/1999	9/9/1999	9/9/1999	9/9/1999	9/9/1999	9/9/1999	9/9/1999
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VOLATILE ORGANIC COMPOUNDS									
Benzene	0.06	ND	ND	0.058	0.0023	0.048	0.0082 J	**0.098 J**	0.0022
Chloroform	0.3	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	0.1	0.4 J	0.01	0.02	0.012	0.0007 J	ND	ND	ND
trans-1,2-Dichlorethene	0.3	ND	ND	0.0007	ND	ND	ND	ND	ND
Methylene chloride	0.1	ND	0.004	0.0032	0.0039	0.0029 J	0.0034	ND	0.0041
Tetrachloroethene	1.4	**1.6**	0.16	0.0015	0.002	0.016	0.0031	**3**	0.064
Toluene	1.5	ND	ND	0.0096	0.0014 J	0.028	0.0048 J	0.1 J	0.002 J
Trichloroethene	0.7	0.11	0.006	0.0033	0.0023	ND	ND	ND	0.0015
Xylene (total)	1.2	ND	ND	0.0014 J	ND	0.0056	0.001J	0.084 J	ND
Library Search VOC									
Unknown siloxane	---	ND	0.0072	ND	0.0232	ND	ND	ND	ND
Unknown siloxane/unknown	---	ND	0.012	ND	ND	ND	ND	ND	ND

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Table 1 (Continued)
Summary of Historical Soil Sampling Analytical Results
Remedial Action Workplan (Revision)
Dayton Shopping Plaza
Queens, New York

Sample Location		**LB-5**	**LB-5**	**LB-6**	**LB-6**	**LB-6 (Dup)**	**LB-7**	**LB-7**	**LB-8**	**LB-8**
Consultant	NYSDEC	**Langan**	**Langan**	**Langan**	**Langan**	**Langan**	**Langan**	**Langan**	**Langan**	**Langan**
Sample Number	TAGM	025	026	027	028	029	012	013	014	015
Laboratory Sample No.	Recommended	156181	156182	156183	156184	156185	156168	156169	156170	156171
Sample Depth (ft)	Soil Cleanup	2-2.5	5-5.5	1.5-2	5-5.5	5-5.5	1.5-2	4-4.5	2-2.5	4-4.5
Sample Date	Criteria	9/9/1999	9/9/1999	9/9/1999	9/9/1999	9/9/1999	9/9/1999	9/9/1999	9/9/1999	9/9/1999
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VOLATILE ORGANIC COMPOUNDS										
Benzene	0.06	ND	ND	ND	ND	ND	**0.14**	ND	ND	ND
Chloroform	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	0.1	0.096	ND	ND	ND	ND	**1.3**	**3**	**11**	**59**
trans-1,2-Dichlorethene	0.3	ND	ND	ND	ND	ND	ND	0.11 J	**0.38 J**	**2.3 J**
Methylene chloride	0.1	ND	ND	ND	0.0042	0.0043	ND	ND	ND	ND
Tetrachloroethene	1.4	**5.4**	0.35	1.2	0.0024	0.0066	**2.9**	**18**	**30**	**77**
Toluene	1.5	ND	ND	ND	0.0007	0.001 J	0.28	ND	ND	ND
Trichloroethene	0.7	0.15	ND	ND	ND	0.0012	0.58	**2.6**	**7.6**	**24**
Xylene (total)	1.2	ND	ND	ND	ND	0.0007 J	0.087 J	ND	ND	ND
Library Search VOC										
Unknown siloxane	---	ND	ND	ND	ND	ND	ND	0.7	ND	ND
Unknown siloxane/unknown	---	ND	ND	ND	ND	ND	ND	ND	ND	ND

Sample Location	NYSDEC	LB-9	LB-9	LB-10	LB-10	LB-11	LB-11	LB-12	LB-12 (DUP)	LB-12
Sample Depth (feet)	TAGM	0.5'- 1.0'	5.0'-5.5'	0.5'-1.0'	4.5'-5.0'	0.5'-1.0'	5.0'-5.5'	0.5'-1.0'	0.5'-1'	4.5'-5.0'
Langan Sample ID	Recommended	053	054	055	056	057	058	059	052	060
Laboratory Sample ID	Soil Cleanup	N58734-4	N58734-5	N58734-6	N58734-7	N58734-8	N58734-9	N58734-10	N58734-3	N58734-11
Sample Date	Criteria	2/2/2004	2/2/2004	2/2/2004	2/2/2004	2/2/2004	2/2/2004	2/2/2004	2/2/2004	2/2/2004
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Dilution Factor		1	1	1/2	1	1/2	1	1	1	1
VOLATILE ORGANIC COMPOUNDS										
Benzene	0.06	ND	ND	ND	ND	0.001 J	ND	ND	ND	ND
Carbon Disulfide	2.7	ND	ND	ND	ND	0.002 J	ND	ND	ND	ND
cis-1,2-Dichloroethene	0.1	ND	0.072	0.019	0.078	**0.2**	0.025	0.043	0.033	0.047
trans-1,2-Dichloroethene	0.3	ND	ND	ND	ND	0.003 J	ND	ND	ND	ND
Tetrachloroethene	1.4	0.14	0.22	**15 D**	0.13	0.38 D	0.22	0.084	0.059	0.09
Toluene	1.5	ND	ND	ND	ND	0.006 J	ND	ND	ND	ND
Trichloroethene	0.7	ND	0.023	0.026	0.038	0.05	0.007 J	0.01 J	0.01 J	0.014
Xylene (total)	1.2	ND	ND	ND	ND	0.004 J	ND	ND	ND	ND

Notes:
NYSDEC - New York State Department of Environmental Commission
TAGM - Technical Administrative and General Management
ND: Not Detected
J: Estimated Value
D: Sample was diluted prior to analysis
Bolded and boxed values exceed NYSDEC TAGM Recommended Soil Cleanup Criteria

Table 2
Summary of Historical Groundwater Sampling Analytical Results
Interim Remedial Measure Workplan
Dayton Shopping Plaza
Queens, New York

Parameters	NYSDEC Groundwater Standards	Units	MW-1 11/20/95	MW-1 6/10/98	MW-1 2/3/04	MW-2 11/20/95	MW-2 10/06/00	MW-3 11/20/95	MW-3 6/10/98	MW-3 10/06/00	MW-3 2/19/01	MW-3 6/25/01	MW-3 Dup 6/25/01	MW-3 3/6/02	MW-3 2/3/04	MW-4 11/20/95	MW-4 6/10/98	MW-5 1/30/96	MW-5 6/10/98	MW-5 10/06/00	MW-5 2/19/01	MW-5 6/25/01	MW-5 3/6/02	MW-5 2/3/04	MW-6 1/30/96	MW-6 6/10/98
Acetone	50	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40	ND	ND
Bromoform	50	ug/l	ND	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	5	ug/l	ND	ND	ND	**20**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	ug/l	ND	ND	ND	**32**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**22**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	ug/l	ND	ND	ND	ND	ND	**823**	ND	ND	0.55	ND	ND	ND	ND	**80**	ND	ND	ND	ND	ND	ND	ND	7 J	ND	ND
Cis-1,2-Dichloroethene	5	ug/l	ND	ND	ND	ND	0.66	ND	**2,100**	**805**	**440**	**235**	**282**	**116**	**160**	ND	**45**	ND	**22**	ND	2	3.5	**18**	ND	ND	2.8
Isopropylbenzene	…	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3 J	**7**	ND
Trans-1,2-Dichloroethene	5	ug/l	ND	ND	ND	ND	ND	**21**	ND	**25**	**9.1**	**8.1**	**8.2**	3.7	4 J	3	1.7	**8**	ND	ND	ND	ND	0.81	ND	ND	ND
Methylene Chloride	5	ug/l	ND	4.6 B	ND	ND	ND	ND	3.5 B	ND	ND	ND	ND	ND	ND	ND	3.9 B	ND	4.6 B	ND	ND	ND	ND	3 J	ND	ND
Methyl tert-Butyl Ether (MTBE)	10	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.75	0.68	ND	ND	ND	ND	ND	ND	ND	ND	0.87	ND	ND	ND	ND
Tetrachloroethene	5	ug/l	5	ND	ND	3	ND	**713**	**5,000**	**152**	**291**	**144**	**149**	**38**	**71**	4	**13**	ND	1.4	ND	ND	ND	ND	ND	3	ND
Trichloroethene	5	ug/l	ND	ND	ND	ND	ND	**403**	**1,600**	**124**	**93**	**72**	**75**	**33**	**43**	**24**	**11**	ND	**6.6**	ND	ND	ND	3.2	ND	1	ND
Vinyl Chloride	2	ug/l	ND	ND	ND	ND	ND	**33**	ND	**149**	**8.3**	**2.9**	**2.9**	ND	**5 J**	**43**	1.8	**124**	1.8	ND	ND	ND	ND	ND	**153**	1.8

Parameters	NYSDEC Groundwater Standards	Units	MW-7 1/30/96	MW-7 6/10/98	MW-7 10/06/00	MW-7 2/19/01	MW-7 6/25/01	MW-7 3/6/02	MW-7 2/3/04	MW-8 1/30/96	MW-8 2/4/04	MW-9 1/30/96	MW-9 6/10/98	MW-9 10/06/00	MW-9 2/19/01	MW-9 6/25/01	MW-9 3/6/02	MW-9 2/3/04	MW-10 6/10/98	MW-10 2/4/04	MW-11 6/10/98	MW-11 2/3/04	DW-1 10/06/00	DW-1 2/4/04
Acetone	50	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**340 D**	ND	ND	ND	ND
Bromoform	50	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**11**	**37**	ND	ND	ND	ND
Cis-1,2-Dichloroethene	5	ug/l	ND	**17**	**8.6**	**13**	**12**	**8.3**	**7 J**	ND	**20**	ND	**14**	5	4.1	2.5	0.83	**9 J**	ND	ND	ND	ND	4	2 J
Trans-1,2-Dichloroethene	5	ug/l	ND	ND	ND	ND	ND	ND	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	…	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3 J	ND	ND	ND	ND
Methylene Chloride	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3 J	ND	ND	ND	ND
Methyl tert-Butyl Ether (MTBE)	10	ug/l	ND	ND	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ug/l	**27**	**19**	**6.5**	**26**	**14**	**8.2**	1 J	**36**	**21**	**33**	**28**	**7.8**	**4.7**	**13**	3.2	**16**	ND	ND	ND	ND	0.86	ND
Trichloroethene	5	ug/l	**6**	**18**	2.1	**13**	**8.3**	2.8	ND	**18**	**8 J**	3	**9.8**	2.2	1.2	1.3	ND	4 J	ND	ND	ND	ND	0.51	ND
Vinyl Chloride	2	ug/l	ND	ND	1.1	ND	ND	ND	ND	**44**	ND	**12**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
NYSDEC- New York State Department of Environmental Commission
TAGM - Technical and Administrative Guidance Memorandum
J -Indicates an estimated value.
E-Indicates value exceeds calibration range
D-Indicates sample was diluted prior to analysis
NA- Not Available
ND- Not Detected
DUP- Duplicate

TABLE 3
SUMMARY OF HISTORICAL SOIL-GAS ANALYTICAL RESULTS
INTERIM REMEDIAL MEASURE WORKPLAN
DAYTON SHOPPING CENTER, QUEENS NY

Sample ID	Environmental		New York State		SG-1	SG-2	SG-3	SG-4	SG-5	SG-5B		SG-6		SG-7		SG-8		SG-9		SG-9 (Dup)	
Langan Sample Number	Protection Agency		Department of							062		063		064		065		066		061	
Lab Sample Number	(EPA)		Health							N58688-2		N58688-3		N58688-4		N58688-5		N58688-6		N58688-1	
Sampling Date	Indoor Air		(NYSDOH)		3/24/1998	3/24/1998	3/24/1998	3/24/1998	3/24/1998	2/2/2004		2/2/2004		2/2/2004		2/2/2004		2/2/2004		2/2/2004	
Sample Depth (feet bgs)	75th Percentile		Indoor Air		Beauty & More	LA Furniture	LA Furniture	Exterior - Southwest	Exterior - Southeast	0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'	
Matrix			75th Percentile		Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Air		Air		Air		Air		Air		Air	
Units	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3
Acetone	11	27	NA	46	NA	NA	NA	NA	NA	95.9	228	119	283	69.8	166	139	330	47.3	112	40.9	97.2
1,3-Butadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	6.6	21	1.6	5.7	NA	NA	NA	NA	NA	14.1	45	6.8	22	13.8	44.1	1.5	4.8	0.55	1.8	0.5	1.6
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NA	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NA	NA	NA	<0.25	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl Chloride	NA	NA	<0.2	NA	NA	NA	NA	NA	NA	1.0	5.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.1	19	3.6	11	2.2 J	6.9 J	1.4	4.4	ND	ND	ND	ND
Chlorobenzene	NA	NA	NA	<0.25	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.69	3.4	0.88	0.54	NA	NA	NA	NA	NA	8.2	40	11.1	54.2	4.6	22	2.1	10	ND	ND	ND	ND
Chloromethane	NA	NA	<1.0	2.0	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	0.63	1.3	0.55	1.1
3-Chloropropene	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	0.13	0.8	<1.0	0.68	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.10	0.63
Cyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	25.7	88.5	ND	ND	ND	ND	ND	93.6	15.2	52.3	17.2	59.2
1,1-Dichloroethane	NA	NA	<0.2	<0.25	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0	ND	<0.3	<0.25	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	NA	ND	NA	<0.25	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0	ND	<0.2	<0.25	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	NA	NA	NA	<0.25	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NA	NA	<0.2	NA	NA	NA	NA	NA	NA	3.1	15	ND	ND	4.3	21	1.8	8.9	0.4	2	0.64	3.2
Dibromochloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	5.2	21	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	NA	NA	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	11.6	46	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Dichlorobenzene	NA	5.6	NA	<0.25	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Dichlorobenzene	NA	ND	NA	<0.25	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Dichlorobenzene	0.93	NA	<0.8	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	24.3	45.7	43.7	82.2	23.7	44.6	72.8	137	6.4	12	6.8	13
Ethylbenzene	2.2	9.6	1.1	2.8	NA	NA	NA	NA	NA	2.2	9.6	3.5	15	16.3	70.8	0.77 J	3.3 J	0.28 J	1.2 J	0.4	1.7
Ethyl Acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyltoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.31 J	1.5 J	ND	ND	ND	ND	ND	ND	ND	ND	0.12 J	0.59 J
Freon 113	NA	NA	<0.1	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.099 J	0.76 J
Freon 114	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES

ppbv - parts per billion volume
J -Indicates an estimated value.
NA- Not Available

ND- Not Detected
DUP- Duplicate

TABLE 3
SUMMARY OF HISTORICAL SOIL-GAS ANALYTICAL RESULTS
INTERIM REMEDIAL MEASURE WORKPLAN
DAYTON SHOPPING CENTER, QUEENS NY

Sample ID	Environmental		New York State		SG-1	SG-2	SG-3	SG-4	SG-5	SG-5B		SG-6		SG-7		SG-8		SG-9		SG-9 (Dup)	
Langan Sample Number	Protection Agency		Department of							062		063		064		065		066		061	
Lab Sample Number	(EPA)		Health							N58688-2		N58688-3		N58688-4		N58688-5		N58688-6		N58688-1	
Sampling Date	Indoor Air		(NYSDOH)		3/24/1998	3/24/1998	3/24/1998	3/24/1998	3/24/1998	2/2/2004		2/2/2004		2/2/2004		2/2/2004		2/2/2004		2/2/2004	
Sample Depth (feet bgs)	75th Percentile		Indoor Air		Beauty & More	LA Furniture	LA Furniture	Exterior - Southwest	Exterior - Southeast	0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'	
Matrix			75th Percentile		Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Air		Air		Air		Air		Air		Air	
Units	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3
Heptane	1.5	NA	NA	NA	NA	NA	NA	NA	NA	35.8	147	42.9	176	23.4	95.9	29.6	121	12.7	52	20.9	85.7
Hexachlorobutadiene	NA	NA	NA	NA						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	1.1	NA	1.0	6.5	NA	NA	NA	NA	NA	2.2	7.8	ND	ND	ND	ND	ND	ND	ND	ND	0.36	1.3
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.95	3.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.3	23	ND	ND	9.9	24	21.8	53.5	ND	ND	ND	ND
Methylene chloride	NA	NA	1.6	6.3	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17 J	0.59 J
Methyl ethyl ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	11.4	33.6	8.3	24	ND	ND	2.6	7.7	1.1	3.2	1	2.9
Methyl Isobutyl Ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.3	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert Butyl Ether	NA	NA	NA	6.7	NA	NA	NA	NA	NA	10.3	37.1	29.4	106	6.6	24	1.5	5.4	ND	ND	0.2	0.72
Propylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	10.4	17.9	ND	ND	ND	ND	ND	ND	1.6	2.7	1.6	2.7
Styrene	0.66	2.8	<2.4	0.68	NA	NA	NA	NA	NA	1.6	6.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5.5	30	1.2	1.4	ND	12.9	ND	3.7	ND	0.74	4.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	0	ND	<1.3	<0.25						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	NA	NA	<1.6	<0.25	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NA	NA	NA	NA						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	0.81	4.0	1.4	4.4	NA	NA	NA	NA	NA	0.65	3.2	ND	ND	ND	ND	ND	ND	ND	ND	0.14 J	0.69 J
1,3,5-Trimethylbenzene	1.1	5.4	<2.0	1.7	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	NA	NA	NA	NA						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	NA	NA	NA	NA						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	1.6	11	<1.5	1.2	2,585,000	40,800	1,292,500	278,900	68	32.7	222	16,500	112,000	5,710	38,700	44.6	302	0.78	5.3	0.8	5.4
Tetrahydrofuran	NA	NA	NA	NA						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	NA	NA	6.7	25						20.7	78	29.7	112	20.5	77.3	7	26	2.8	11	3.7	14
Trichloroethylene	0.84	4.5	<1.0	<0.25	570	9.5	570	380	ND	3.8	20	156	838	46.5	250	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	NA	NA	0.68	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.31	1.7
Vinyl chloride	NA	NA	<0.4	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate	NA	NA	NA	NA						ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	NA	18	2.2	4.7	NA	NA	NA	NA	NA	5.2	23	10.0	43	51.4	223	2.8	12	1	4.3	1.3	5.6
o-Xylene	2.1	9.3	1.2	3.1	NA	NA	NA	NA	NA	1.6	6.9	2.2 J	9.6 J	23.5	102	0.61 J	2.6 J	ND	ND	0.24	1
Xylenes (total)	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.8	30	12.1	52.6	74.9	325	3.5	15	1	4.3	1.6	6.9

NOTES
ppbv - parts per billion volume
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ND- Not Detected
DUP- Duplicate

TABLE 3
SUMMARY OF HISTORIC SOIL-GAS ANALYTICAL RESULTS
INTERIM REMEDIAL MEASURE WORKPLAN
DAYTON SHOPPING CENTER, QUEENS NY

Sample ID	Environmental		New York State		SG-10		SG-11		SG-12		SG-13		SG-14		SG-15		DUP (SG-15)	
Langan Sample Number	Protection Agency		Department of		067		068		086		084		088		090		091	
Lab Sample Number	(EPA)		Health		N58688-7		N58688-8		N86573-3		N86573-1		N86573-5		N86573-7		N86573-8	
Sampling Date	Indoor Air		(NYSDOH)		2/2/2004		2/2/2004		12/16/2004		12/16/2004		12/16/2004		12/16/2004		12/16/2004	
Sample Depth (feet bgs)	75th Percentile		Indoor Air		0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'	
Matrix			75th Percentile		Air		Air		Air		Air		Air		Air		Air	
Units	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3
Acetone	11	27	NA	46	74.8	178	149	354	14.2	33.7	35.2	83.6	19.5	46.3	20.3	48.2	5.4	13
1,3-Butadiene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	6.6	21	1.6	5.7	2.1	6.7	24.4	78	ND	ND	0.85 J	2.7 J	ND	ND	ND	ND	0.15 J	0.48 J
Bromodichloromethane	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NA	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NA	NA	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoethane	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl Chloride	NA	NA	<0.2	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	NA	NA	NA	NA	0.7	2.2	1.6	5	1.4 J	4.4 J	1.1 J	3.4 J	ND	ND	2.7	8.4	0.82	2.6
Chlorobenzene	NA	NA	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.35	1.6
Chloroethane	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.69	3.4	0.88	0.54	0.86	4.2	4.9	24	ND	ND	2.7	13	2.5	12	0.77 J	3.8 J	0.67	3.3
Chloromethane	NA	NA	<1.0	2	0.62	1.3	2.7	5.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Chloropropene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	0.13	0.8	<1.0	0.68	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	NA	NA	NA	NA	15.7	54	35	120	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	NA	NA	<0.2	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0	ND	<0.3	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	NA	ND	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0	ND	<0.2	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	NA	NA	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NA	NA	<0.2	NA	0.38 J	1.9 J	ND	ND	ND	ND	ND	ND	0.97 J	4.8 J	ND	ND	0.4	2
Dibromochloromethane	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	NA	NA	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Dichlorobenzene	NA	5.6	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Dichlorobenzene	NA	ND	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Dichlorobenzene	0.93	NA	<0.8	NA	ND	ND	ND	ND	9.8	59	ND	ND	2.8	17	ND	ND	0.17 J	1.0 J
trans-1,3-Dichloropropene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	NA	NA	NA	NA	3	5.6	6.4	12	145	273	57.2	108	27	50.8	19.6	36.9	5.5	10
Ethylbenzene	2.2	9.6	1.1	2.8	0.43	1.9	2.1	9.1	ND	ND	ND	ND	ND	ND	ND	ND	0.4	1.7
Ethyl Acetate	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyltoluene	NA	NA	NA	NA	ND	ND	0.73 J	3.6 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Freon 113	NA	NA	<0.1	NA	ND	ND	ND	ND	0.81 J	6.2 J	3.2	25	1.8	14	0.93 J	7.1 J	0.34	2.6
Freon 114	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES

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ND- Not Detected
DUP- Duplicate

TABLE 3
SUMMARY OF HISTORIC SOIL-GAS ANALYTICAL RESULTS
INTERIM REMEDIAL MEASURE WORKPLAN
DAYTON SHOPPING CENTER, QUEENS NY

Sample ID	Environmental	Environmental	New York State	New York State	SG-10		SG-11		SG-12		SG-13		SG-14		SG-15		DUP (SG-15)	
Langan Sample Number	Protection Agency	Protection Agency	Department of	Department of	067		068		086		084		088		090		091	
Lab Sample Number	(EPA)	(EPA)	Health	Health	N58688-7		N58688-8		N86573-3		N86573-1		N86573-5		N86573-7		N86573-8	
Sampling Date	Indoor Air	Indoor Air	(NYSDOH)	(NYSDOH)	2/2/2004		2/2/2004		12/16/2004		12/16/2004		12/16/2004		12/16/2004		12/16/2004	
Sample Depth (feet bgs)	75th Percentile	75th Percentile	Indoor Air	Indoor Air	0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'		0.5'-1'	
Matrix			75th Percentile	75th Percentile	Air		Air		Air		Air		Air		Air		Air	
Units	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3
Heptane	1.5	NA	NA	NA	16.9	69.3	37.9	155	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	1.1	NA	1.0	6.5	0.72	2.5	7.5	26	ND	ND	0.91 J	3.2 J	ND	ND	ND	ND	0.18 J	0.63 J
2-Hexanone	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	NA	NA	NA	NA	ND	ND	ND	ND	2.7	6.6	2.4	5.9	82.5	202	ND	ND	ND	ND
Methylene chloride	NA	NA	1.6	6.3	0.54	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	NA	NA	NA	NA	3.2	9.4	6.6	19	ND	ND	ND	ND	ND	ND	ND	ND	0.42	1.2
Methyl Isobutyl Ketone	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert Butyl Ether	NA	NA	NA	6.7	4.7	17	27.7	99.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Propylene	NA	NA	NA	NA	58.3	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	0.66	2.8	<2.4	0.68	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5.5	30	1.2	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11 J	0.60 J
1,1,2,2-Tetrachloroethane	0	ND	<1.3	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	NA	NA	<1.6	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	0.81	4	1.4	4.4	ND	ND	2.6	13	ND	ND	ND	ND	ND	ND	ND	ND	0.26	1.3
1,3,5-Trimethylbenzene	1.1	5.4	<2.0	1.7	ND	ND	0.93 J	4.6 J	ND	ND	ND	ND	ND	ND	ND	ND	0.13 J	0.64 J
2,2,4-Trimethylpentane	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tertiary Butyl Alcohol	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	2.5	7.6	4.7	14	0.55	1.7
Tetrachloroethylene	1.6	11	<1.5	1.2	3.7	25	6.7	45	0.94 J	6.4 J	285	1930	16.3	111	4.3	29	3.6	24
Tetrahydrofuran	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	NA	NA	6.7	25	6.4	24	16.6	62.6	ND	ND	1.8	6.8	1.2 J	4.5 J	ND	ND	0.39	1.5
Trichloroethylene	0.84	4.5	<1.0	<0.25	ND	ND	ND	ND	ND	ND	8	43	1.1 J	5.9 J	ND	ND	ND	ND
Trichlorofluoromethane	NA	NA	0.68	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	1.2
Vinyl chloride	NA	NA	<0.4	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	NA	18	2.2	4.7	1.3	5.6	6	26	ND	ND	ND	ND	ND	ND	ND	ND	1.1	4.8
o-Xylene	2.1	9.3	1.2	3.1	0.3 J	1.3 J	2.1	9.1	ND	ND	ND	ND	ND	ND	ND	ND	0.25	1.1
Xylenes (total)	NA	NA	NA	NA	1.6	6.9	8.2	36	ND	ND	1.0 J	4.3 J	ND	ND	ND	ND	1.3	5.6

NOTES
ppbv - parts per billion volume
J -Indicates an estimated value.
NA- Not Available
ND- Not Detected
DUP- Duplicate

TABLE 4
SUMMARY OF HISTORIC INDOOR AIR SAMPLING RESULTS
REMEDIAL ACTION WORKPLAN (REVISION)
DAYTON SHOPPING CENTER, QUEENS NY

Sample ID	Environmental Protection Agency (EPA) Indoor Air 75th Percentile		New York State Department of Health (NYSDOH) Indoor Air 75th Percentile		AS-1		AS-2		AS-DUP		AS-3		AS-4		AS-5		AS-6		AS-7		AS-8		AA-1		TB	TB
Langan Sample Number					070		071		069		072		073		087		085		089		092		074		075	093
Lab Sample Number					N58688-10		N58688-11		N58688-9		N58688-12		N58688-13		N86573-4		N86573-2		N86573-6		N86573-9		N58688-14		N58688-15	N86573-10
Sampling Date					2/2/2004		2/2/2004		2/2/2004		2/2/2004		2/2/2004		12/16/2004		12/16/2004		12/16/2004		12/16/2004		2/2/2004		2/2/2004	12/16/2004
Sample Depth (feet bgs)					---		---		---		---		---		---		---		---		---		---		---	---
Matrix					Air		Air		Air		Air		Air		Air		Air		Air		Air		Air		Air	Air
Units	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ppbv
Acetone	11	27	NA	46	17.9	42.5	2.9	6.9	2.6	6.2	3.6	8.6	42.4	101	ND	ND	76.4	181	17.8	42.3	ND	ND	ND	ND	ND	ND
1,3-Butadiene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	6.6	21	1.6	5.7	0.74 J	2.4 J	0.38 J	1.2 J	0.44	1.4	0.39	1.2	0.57	1.8	0.41	1.3	2.3	7.3	0.43	1.4	0.46	1.5	0.42	1.3	ND	ND
Bromodichloromethane	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NA	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NA	NA	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoethane	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl Chloride	NA	NA	<0.2	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	NA	NA	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.69	3.4	0.88	0.54	ND	ND	ND	ND	ND	ND	ND	ND	0.72	3.5	0.22 J	1.1 J	ND	ND	0.22	1.1	0.19 J	0.93 J	ND	ND	ND	ND
Chloromethane	NA	NA	<1.0	2.0	ND	ND	0.5	1	ND	ND	0.55	1.1	ND	ND	0.39 J	0.81 J	0.32	0.66	ND	ND	0.53	1.1	0.48	0.99	ND	ND
3-Chloropropene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	0.13	0.8	<1.0	0.68	ND	ND	ND	ND	0.072	0.45	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.094	0.59	ND	ND
Cyclohexane	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	NA	NA	<0.2	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0	ND	<0.3	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	NA	ND	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0	ND	<0.2	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	NA	NA	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NA	NA	<0.2	NA	0.52 J	ND	0.52	ND	0.49	ND	0.58	2.9	0.53	2.6	0.55	2.7	0.46	2.3	0.44	2.2	0.42	2.1	0.51	2.5	ND	ND
Dibromochloromethane	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	NA	NA	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Dichlorobenzene	NA	5.6	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.76	4.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Dichlorobenzene	NA	ND	NA	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.67	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Dichlorobenzene	0.93	NA	<0.8	NA	ND	ND	ND	ND	ND	0.78 J	ND	ND	ND	1.4	115	691	0.14 J	0.84 J	0.25	1.5	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	NA	NA	NA	NA	342	643	65.4	123	77.1	145	29.7	55.9	63.7	120	868 E	1630	111 E	209 E	74.4 E	140 E	40.4 E	76 E	4.8	9	ND	ND
Ethylbenzene	2.2	9.6	1.1	2.8	ND	ND	ND	ND	0.12 J	0.52 J	0.14	0.61	0.27	1.2	ND	ND	0.22	0.96	0.12 J	0.52 J	0.25	1.1	0.1	0.43	ND	ND
Ethyl Acetate	NA	NA	NA	NA	7.8	28	ND	ND	0.3	1.1	ND	ND	ND	ND	1.8	6.5	5.2	19	1.2	4.3	ND	ND	ND	ND	ND	ND
4-Ethyltoluene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11 J	0.54 J	ND	ND	ND	ND	ND	ND	ND	ND
Freon 113	NA	NA	<0.1	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.52	4	0.91	7	0.36	2.8	0.41	3.1	ND	ND	ND	0.28
Freon 114	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptane	1.5	NA	NA	NA	ND	ND	ND	ND	0.17 J	0.7 J	ND	ND	0.31	1.3	ND	ND	0.55	2.3	0.57	2.3	0.31	1.3	ND	ND	ND	ND
Hexachlorobutadiene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES

ppbv - parts per billion volume
J -Indicates an estimated value.
NA- Not Available
ND- Not Detected
DUP- Duplicate
[yellow box] : Indicates compound exceeds either NYSDOH or EPA criteria.

TABLE 4
SUMMARY OF HISTORIC INDOOR AIR SAMPLING RESULTS
REMEDIAL ACTION WORKPLAN (REVISION)
DAYTON SHOPPING CENTER, QUEENS NY

Sample ID	Environmental		New York State		AS-1		AS-2		AS-DUP		AS-3		AS-4		AS-5		AS-6		AS-7		AS-8		AA-1		TB	TB
Langan Sample Number	Protection Agency		Department of		070		071		069		072		073		087		085		089		092		074		075	093
Lab Sample Number	(EPA)		Health		N58688-10		N58688-11		N58688-9		N58688-12		N58688-13		N86573-4		N86573-2		N86573-6		N86573-9		N58688-14		N58688-15	N86573-10
Sampling Date	Indoor Air		(NYSDOH)		2/2/2004		2/2/2004		2/2/2004		2/2/2004		2/2/2004		12/16/2004		12/16/2004		12/16/2004		12/16/2004		2/2/2004		2/2/2004	12/16/2004
Sample Depth (feet bgs)	75th Percentile		Indoor Air		---		---		---		---		---		---		---		---		---		---		---	---
Matrix			75th Percentile		Air		Air		Air		Air		Air		Air		Air		Air		Air		Air		Air	Air
Units	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ppbv
Hexane	1.1	NA	1.0	6.5	ND	ND	ND	ND	0.24	0.85	ND	ND	ND	ND	0.42	1.5	1.7	6	0.29	1	0.6	2.1	ND	ND	ND	0.25
2-Hexanone	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	NA	NA	NA	NA	264	648	5	12	4.2	10	15.3	37.5	14.8	36.3	15.7	38.5	11.1	27.2	271 E	665 E	1.7	4.2	0.78	1.9	ND	ND
Methylene chloride	NA	NA	1.6	6.3	0.49 J	1.7 J	ND	ND	ND	ND	ND	ND	0.3	1	ND	ND	0.15 J	0.52 J	0.13 J	0.45 J	0.13 J	0.45 J	0.14	0.49	ND	ND
Methyl ethyl ketone	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.38	1.1	ND	ND	0.19 J	0.56 J	ND	ND	ND	ND
Methyl Isobutyl Ketone	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.16 J	0.66 J	ND	ND	ND	ND	ND	ND
Methyl Tert Butyl Ether	NA	NA	NA	6.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17 J	0.61 J	0.2	0.72	0.19 J	0.69 J	0.23	0.83	ND	ND	ND	ND
Propylene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	0.66	2.8	<2.4	0.68	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.19 J	0.81 J	ND	ND	0.11 J	0.47 J	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5.5	30	1.2	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	0	ND	<1.3	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	NA	NA	<1.6	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	0.81	4	1.4	4.4	ND	ND	0.35 J	1.7 J	0.41	2	0.26	1.3	0.4	2	ND	ND	0.37	1.8	0.31	1.5	0.57	2.8	0.12	0.59	ND	ND
1,3,5-Trimethylbenzene	1.1	5.4	<2.0	1.7	ND	ND	ND	ND	0.12 J	0.59 J	ND	ND	ND	ND	ND	ND	0.12 J	0.59 J	ND	ND	0.18 J	0.88 J	ND	ND	ND	ND
2,2,4-Trimethylpentane	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.48	2.2	0.13 J	0.61 J	0.36	1.7	ND	ND	ND	ND
Tertiary Butyl Alcohol	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	1.6	11	<1.5	1.2	4.8	33	19.3	131	21.6	146	3.9	26	2.3	16	ND	ND	12.2	82.7	20.9	142	0.099 J	0.67 J	0.23	1.6	ND	ND
Tetrahydrofuran	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	NA	NA	6.7	25	3.8	14	0.76	2.9	0.85	3.2	0.81	3.1	3.6	14	1.6	6	3.1	12	1.2	4.5	1.1	4.1	0.61	2.3	ND	ND
Trichloroethylene	0.84	4.5	<1.0	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	NA	NA	0.68	NA	ND	ND	0.24	1.3 J	0.2	1.1	0.28	1.6	ND	ND	0.34 J	1.9 J	0.22	1.2	0.25	1.4	0.3	1.7	0.25	1.4	ND	ND
Vinyl chloride	NA	NA	<0.4	<0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	NA	18	2.2	4.7	0.98 J	4.3 J	0.36 J	1.6 J	0.37	1.6	0.41	1.8	0.72	3.1	0.4	1.7	0.74	3.2	0.37	1.6	0.95	4.1	0.31	1.3	ND	ND
o-Xylene	2.1	9.3	1.2	3.1	ND	ND	ND	ND	0.15 J	0.65 J	ND	ND	0.29	1.3	ND	ND	0.24	1	0.13 J	0.56 J	0.36	1.6	0.095	0.41	ND	ND
Xylenes (total)	NA	NA	NA	NA	0.98 J	4.3 J	0.36 J	1.6 J	0.53	2.3	0.41	1.8	1.0	4.3	0.55	2.4	0.99	4.3	0.51	2.2	1.3	5.6	0.4	1.7	ND	ND

NOTES

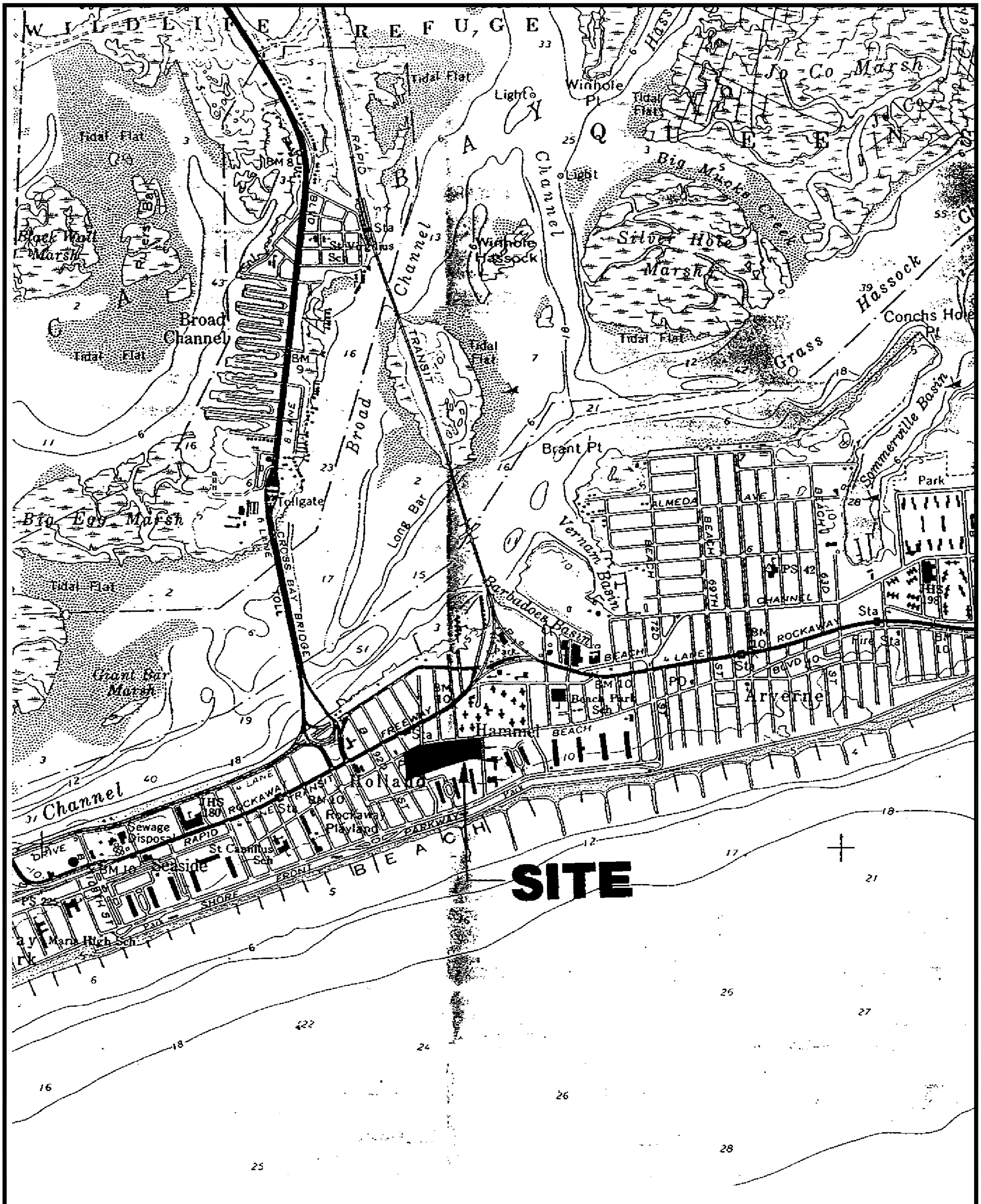
ppbv - parts per billion volume
J -Indicates an estimated value.
NA- Not Available
ND- Not Detected
DUP- Duplicate
: Indicates compound exceeds either NYSDOH or EPA criteria.

G:\Data9\1461901\Engineering Data\Environmental\Reports\Interim.Remedial.Measure.Workplan.2006.June\Tables\Table 3 & 4 - Historic Sub-slab Soil Vapor and Indoor Air Results.xls

Table 5
Interim Remedial Measure Proposed Schedule
Dayton Shopping Plaza - Far Rockaway Beach, Queens, New York

Task	Work Week Ending																	
	6/2	6/9	6/16	6/23	6/30	7/7	7/14	7/21	7/28	8/4	8/11	8/18	8/25	9/1	9/8	9/15	9/22	9/29
Submission of IRM Workplan	■	■																
Submission of Revised SRIR (Phase II)	■	■																
NYSDEC/NYSDOH Review			■	■	■													
Installation of IRM						■	■											
IRM / SVE Effectiveness Monitoring								■										
Ground Water Monitoring								■										
Laboratory Analysis									■	■	■							
Preparation of IRM Report												■	■					
Review of IRM Report by NYSDEC/NYSDOH														■	■	■	■	
NYSDEC/NYSDOH Comment Letter or NFA on IRMR																		■

FIGURES



MAP REFERENCE:FAR ROCKAWAY,N.Y. U.S.G.S. MAP (DATED 1969)

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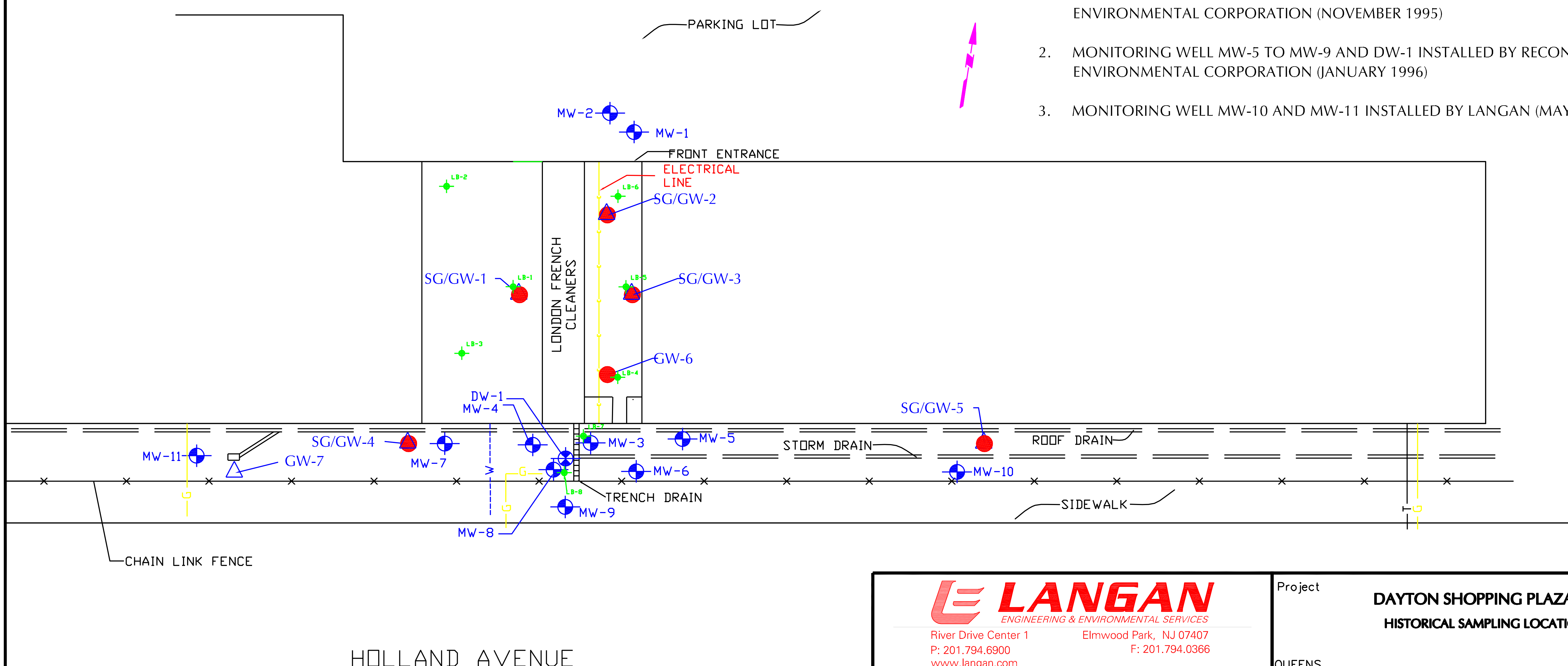
NJ Certificate of Authorization No: 24GA27996400

Project

DAYTON PLAZA
SITE LOCATION MAP

QUEENS NEW YORK

Project No.	Date	Scale	Dwg. No.
1461905	01/18/05	1"=2000'	1



LEGEND

- MONITORING WELL LOCATION
- DEEP MONITORING WELL LOCATION
- LANGAN BORING (SEPTEMBER 1999)
- SUB-SLAB SOIL VAPOR LOCATION (SEPTEMBER 1999)
- TEMPORARY WELL POINT (SEPTEMBER 1999)

NOTES

1. MONITORING WELL MW-1 TO MW-4 INSTALLED BY RECON ENVIRONMENTAL CORPORATION (NOVEMBER 1995)
2. MONITORING WELL MW-5 TO MW-9 AND DW-1 INSTALLED BY RECON ENVIRONMENTAL CORPORATION (JANUARY 1996)
3. MONITORING WELL MW-10 AND MW-11 INSTALLED BY LANGAN (MAY 1998)

LANGAN
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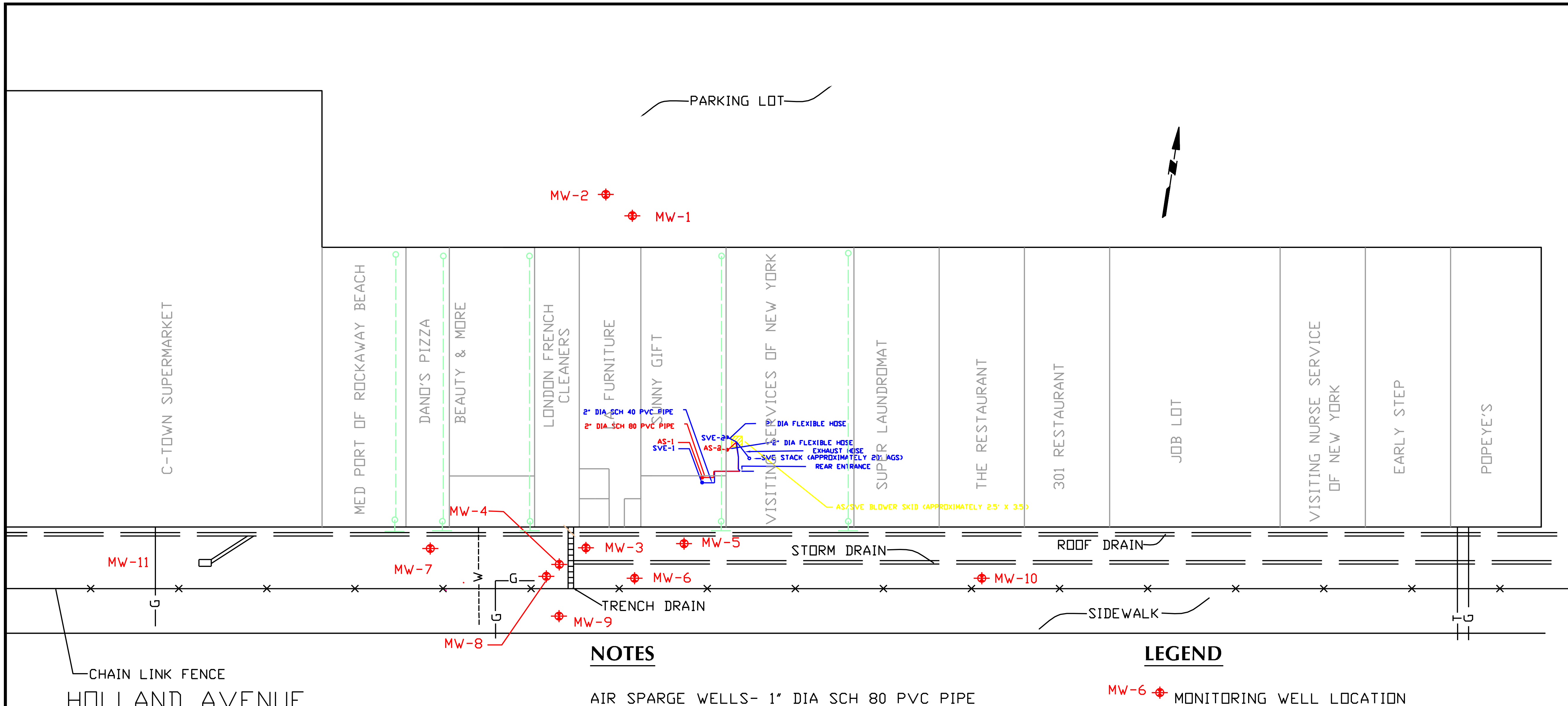
NJ Certificate of Authorization No: 24GA27996400

Project
DAYTON SHOPPING PLAZA
HISTORICAL SAMPLING LOCATIONS

QUEENS NEW YORK

Project No.	Date	Scale	Dwg. No.
1461905	9 JUNE 2006	1"=40'	2

Filename: G:\Data9\1461901\Cadd Data - 1461901\Dwg\IRM Workplan\RAWP Historical Sampling Locations.dwg Date: 6/9/2006 Time: 19:42 User: cpeterson Style Table: Langan Color.stb Layout: B Size Sheet (Bottom)



NOTES

AIR SPARGE WELLS- 1" DIA SCH 80 PVC PIPE
2' OF SCHREEN

SOIL VAPOR EXTRACTION WELLS - 2" DIA SCH 40 PVC PIPE
2.5' OF SCREEN (SVE-1)
3' OF SCREEN (SVE-2)

LEGEND

- MW-6 MONITORING WELL LOCATION
- AIR SPARGE EXTRACTION WELL LOCATION
- SOIL VAPOR EXTRACTION WELL LOCATION
- 6-INCH HDPE VERTICAL EXHAUST PIPE
- 4-INCH HDPE PIPE (VAPOR COLLECTION PIT)
- 4-INCH HDPE HORIZONAL HEADER

BLOWER SPECS

AS BLOWER

3 HP MONTOR, 230v
20 SCFM @ 6 PSI OF PRESSURE
MANUFACTURED BY BECKER, INC

SVE BLOWER

1 HP MONTOR, 230v
70 CFM @ 5-INCH WATER VACUUM
20-GALLON MOISTURE SEPARATOR
MANUFACTURED BY GAST INC.

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Project
DAYTON SHOPPING PLAZA
Interim Remedial Measure Workplan
Locations of AS/SVE Wells and Sub-Slab Venting System
QUEENS NEW YORK

Job No.	Date	Scale	Dwg. No.
1461905	9 JUNE 2006	1"=40'	3

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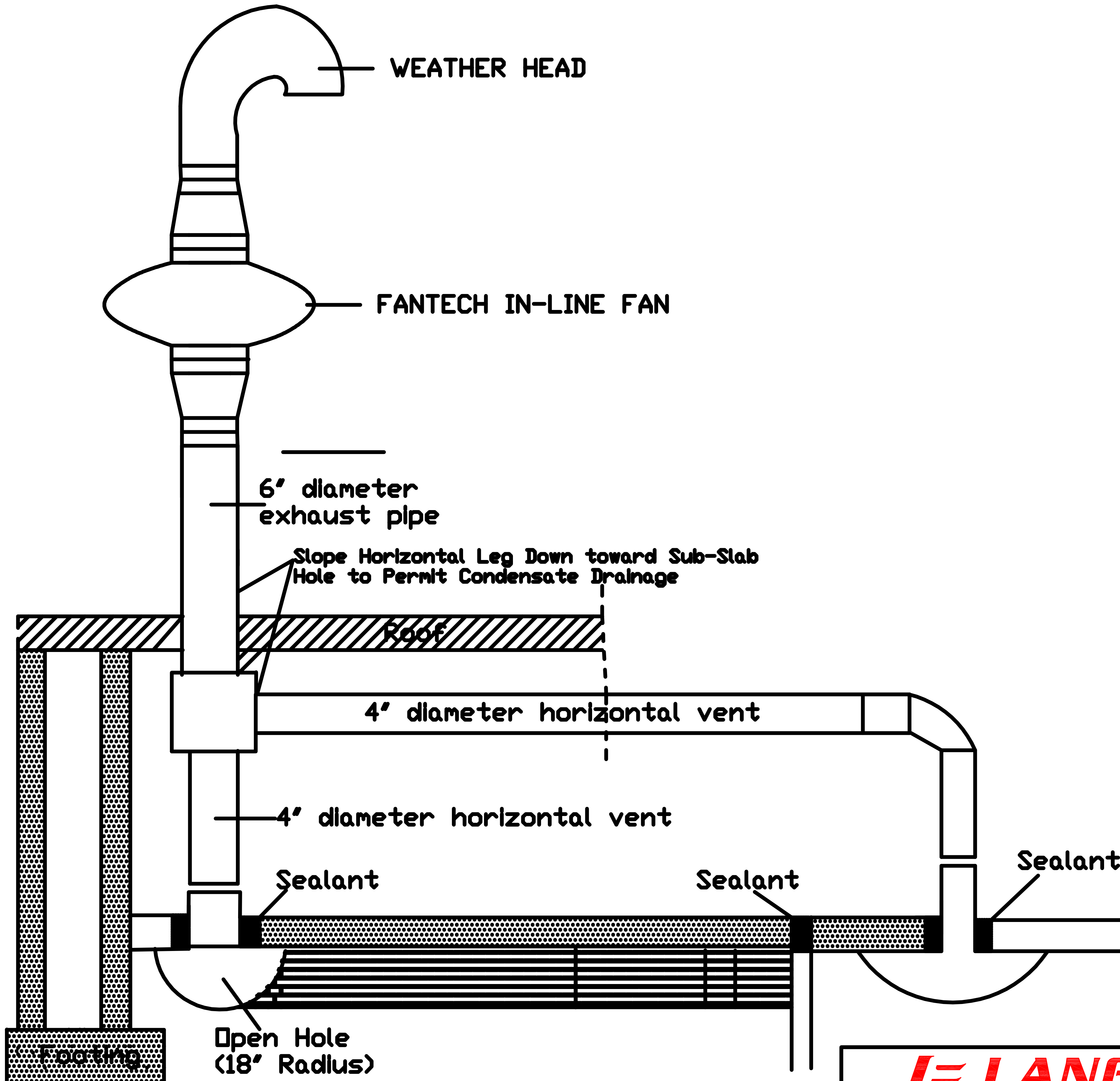

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NJ Certificate of Authorization No: 24GA27996400

Project

DAYTON SHOPPING PLAZA
INTERIM REMEDIAL MEASURE WORKPLAN
Sub-Slab Venting System Construction Details

FAR ROCKAWAY BEACH

QUEENS NEW YORK

Project No.	Date	Scale	Dwg. No.
1461905	9 JUNE 2006	NTS	4

APPENDIX A

OPERATION, MAINTENANCE AND EFFECTIVENESS MONITORING PLAN

OPERATION, MAINTENANCE AND EFFECTIVENESS MONITORING PLAN FOR THE INTERIM REMEDIAL MEASURE WORKPLAN

DAYTON SHOPPING PLAZA
86-15 ROCKAWAY BEACH BOULEVARD
QUEENS, NEW YORK
Site No. 2-41-035, Index No. W2-0942-02-10

Prepared For:

Rockaway Commons, LLC
48 East Old Country Road
Suite 203
Minneola, New York 11501

For Submittal to:

New York State Department of Environmental Conservation
Division of Environmental Remediation
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Steven A. Ciambruschini, P.G.
Senior Associate

June 2006
1461905

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1.0 INTRODUCTION

This Operation, Maintenance and Effectiveness Monitoring Plan (OMEMP) provides the procedures for operating, maintaining and monitoring the Air Sparging/Soil Vapor Extraction (AS/SVE) system and the active sub-slab vapor venting system, at the Dayton Shopping Plaza in Queens, New York (see Figure 1 of the revised RAWP). The design and construction details for the AS/SVE and the sub-slab vapor venting system are provided in the Interim Remedial Measure Workplan (IRMWP) and are referenced in this plan. The specific sampling procedures to be conducted during system operation are detailed in the IRMWP Quality Assurance Project Plan (QAPP). All major AS/SVE equipment (blowers, particulate filters, etc.) were installed inside retail space currently occupied by LA Furniture and adjacent to the London French Cleaners. AS/SVE system monitoring gauges and sample ports are located at the piping manifolds. The sub-slab vapor venting system will be installed at Beauty & More, Dano's Pizza and Med Port of Rockaway Beach to the west of London French Cleaners, and at Sunny Gift and The Visiting Services of New York to the east of London French Cleaners.

1.1 Performance Objectives

The in-situ AS/SVE remediation system performance will be evaluated based on the following three criteria:

- The comparison of the actual mass removal with the calculated mass removal for volatile organic compounds based on field screening and laboratory data;
- The attainment of asymptotic decline of concentrations of volatile organic compounds in the system exhaust; and
- The reduction of VOC concentrations in the on-site monitoring wells.

The AS/SVE remediation system will be augmented if the first and second criteria are not met. The effectiveness of the AS/SVE remediation system will be evaluated if the first and second criteria are met, but continued operation of the system does not produce a progressive reduction of the contaminant concentration in the groundwater at the site.

The active sub-slab vapor venting system performance will be evaluated based on the following two criteria:

- The results of the one-time exhaust air monitoring at the vent; and
- The results of the one –time indoor air sampling.

2.0 AS/SVE SYSTEM MASS REMOVAL MONITORING

The volatile organic mass that is mobilized by the remediation system will be collected by the SVE system. Monitoring the SVE system influent allows for measurement of the total system mass removal and the specific removal rates from particular areas at the site. This monitoring will be necessary both to determine the effectiveness of the system and to ensure compliance with established air emission limitations.

The two parameters that must be measured and recorded to determine the mass removal rate of the SVE system are the airflow rate and the volatile organic compound concentration in the extracted air. The mass flow rate will be determined by measuring the air velocity inside the system piping with a thermal anemometer. All measurements with the thermal anemometer will be made through properly installed sampling ports in accordance with the instrument manufacturer's recommendations. The volatile organic concentrations will be measured by collecting a 6-liter Summa® Canister sample for laboratory analysis for specific compounds to correlate measured photoionization detector (PID) readings for total volatile organic concentrations. Summa® canister samples will be collected quarterly during the first year of operation after which the system performance will be evaluated. Depending on sampling analytical results, the sampling frequency might be reduced to semi-annually instead. Samples will be collected from the effluent line during the operation of the SVE system. The canister sampling and PID monitoring procedures are provided in the QAPP.

The laboratory analytical results and the PID field data will provide concentration values in parts per million by volume (ppmv). The volumetric concentrations will be converted to mass concentrations per unit volume via the ideal gas law. The resulting concentration will then be in milligram per cubic meter (mg/m^3). The airflow will be calculated by multiplying the air velocity in feet per minute by the cross sectional area of the pipe, in square feet, which results in actual cubic feet per minute (acfm). Combining the airflow rate with the mass concentrations per unit volume will determine the volatile organic mass removal rate for the SVE system. In the case of PID measured concentrations, assumptions will be made about the molecular weight of the mixture of volatile organic compounds based on recent laboratory analytical results.

3.0 REMEDIATION SYSTEM MONITORING PROCEDURE

3.1 AS/SVE Remediation System

The AS/SVE remediation system blowers are controlled by a control panel. The control panel includes the basic motor controls (hand-off-auto switch) and can integrate an array of inputs from system sensors and other panels. The system will be configured in accordance with the design system interlocks.

It will be possible to monitor the following system operating parameters:

- The operational status of the blower;
- The AC current demand of the blower motor;
- The status of the moisture separator tank high liquid level sensor;
- The status of the SVE high air temperature sensors; and
- The status of the AS high air temperature sensors.

Standard system monitoring will consist of the following.

<u>In Equipment Room:</u>

1. Inspect the SVE blower. Verify that equipment is operating and there are no apparent system malfunctions.
2. Record the SVE influent and effluent air temperatures.
3. Record the SVE influent vacuums before and after particulate filter.
4. Record SVE air velocity using the air anemometer.
5. Record influent (before air dilution) and effluent volatile organic concentration.
6. Record liquid levels in the moisture separator.
7. Record the cumulative hour meter readings for the SVE blower.
8. Inspect the AS blower. Verify that equipment is operating and there are no apparent system malfunctions.
9. Record the AS influent and effluent air temperatures.
10. Record the AS influent air pressure before and after particulate filter and record the effluent air pressure of the blower.
11. Record AS air velocity using the anemometer.

At System Manifolds:

1. Record AS/SVE air flow rates from individual wells.
2. Record SVE vacuum and AS air pressure applied at each individual line.

Normal operating ranges will be established for flow rates, pressures, temperatures, and vacuums at each respective instrument and sampling location in order for the field personnel to determine if the system is operating appropriately. Except for the collection of Summa® Canister air samples, this monitoring procedure will be performed at each scheduled system monitoring.

3.2 Sub-slab Vapor Venting System

Upon system installation, volatile organic compound concentrations of the exhaust air, at the tip of the vent pipes, will be measured using a hand-held photo-ionization detector. The sub-slab vacuum will be measured on a monthly basis during the first six month after installation. In addition, a on-time indoor air sampling and analysis will be conducted to confirm the efficiency of the sub-slab vapor venting system in preventing the intrusion of soil gas into the retail spaces under consideration. The system performance will be evaluated after the first year and the need for additional indoor air sampling will be assessed.

4.0 REMEDIATION SYSTEM MAINTENANCE REQUIREMENTS

The majority of the remediation system equipment requires minimal maintenance. This will facilitate consistent operation at this remote installation. However, minor regular maintenance is required for some of the equipment. This section will discuss all the major system components and what maintenance is required for its operation.

4.1 Soil Vapor Extraction Blower

The SVE blower is a GAST regenerative blower Model No. RA4310A-2. The regular maintenance procedure for this unit is to inspect influent and effluent instrumentation.

4.2 SVE Blower Inlet Particulate Filter

The particulate filter condition would be inspected monthly. The filter cartridge would be clear any loose materials. If filter could not be cleared, then the cartridge would be replaced.

4.3 SVE Moisture Separator

The SVE moisture separator unit is built into the SVE blower unit. The regular maintenance procedure for this unit is as follows:

- The unit would be inspected at every monitoring event.
- The accumulated liquid would be drained as necessary. The accumulated liquid would be stored in drums, sampled and analyzed for VOCs prior to disposal.

4.4 Air Sparging Blower

The air sparging blower is a Becker, Inc. TEFC oil-less rotary vane, low pressure, air compressor, model No. DTLF-250. The regular maintenance procedure for this unit would be to inspect the influent and effluent instrumentation.

4.5 AS Blower Inlet Particulate Filter

The regular maintenance procedure for the inlet particulate filter is as follows:

- The filter would be inspected monthly.
- The filter cartridge would be cleared of any loose materials.
- If filter cannot be cleared, then cartridge would be replaced.

4.6 Active Sub-Slab Venting System

The system would be inspected periodically. Inspection would include the following:

- Periodic visual inspection of the concrete slabs, within the retail spaces under consideration, for cracks and openings. Any encountered cracks and openings would be sealed.
- Periodic inspection of the performance of the rotary turbine ventilator.
- Periodic inspection of the vent pipes for cracks and/or leaks.

5.0 REMEDIATION SYSTEM MONITORING AND MAINTENANCE SCHEDULE

5.1 AS/SVE Remedial System

As discussed in the IRMWP, the AS/SVE system was restarted in June 2005. Initial system start-up monitoring and maintenance was conducted as specified in the OMEMP of February 2003. The following summarizes the periodic system monitoring and maintenance schedule.

5.1.1 Periodic System Monitoring

The system will be monitored with routine site inspections. The system will be monitored on monthly basis in accordance with the monitoring procedure outlined in Section 3.0 of this report. The measured operating parameters will be compared to the established acceptable ranges and adjustments will be made as necessary.

5.1.2 Exhaust Air Sampling

Exhaust air sampling will be conducted on a quarterly basis during the first year after the NYSDEC approval of the IRMWP, after which the sampling frequency might be reduced to semi-annually. Six-liter Summa canisters will be used to collect the air exhaust samples and the analytical results will be compared to the Annual

Guideline Concentrations (AEC) or the Short-term Guideline Concentrations (SGC) in accordance with the NYSDEC, Division of Air Quality (DAQ) requirements.

5.1.3 Monitoring Well Sampling

Groundwater sampling of existing onsite monitoring wells will provide additional data on the system effectiveness. Semi-annual sampling of monitoring wells MW-3, MW-5, MW-7, MW-9 and annual sampling of 10 of the 11 shallow monitoring wells (all except MW-1) and deep monitoring well (DW-1) is proposed. Prior to sampling, a synoptic water level survey of all onsite monitoring wells will be completed. Water level gauging and monitoring well sampling will be completed in accordance with the QAPP.

A summary of the above-referenced sampling plan is included in Table 1A.

5.2 Sub-Slab Vapor Venting System

Once the system is installed, a one-time exhaust air monitoring using a hand-held PID, at the tip of the vent pipes, will be conducted to evaluate the system performance.

In addition, monthly system inspection will be conducted as specified in Section 3.0. Monthly inspection of vent pipes for leaks and quarterly inspection of slabs for cracks will be conducted. A summary of the indoor air-sampling plan is included in Table 2A.

5.3 Reporting

The operational status and significant modifications of the remediation system operating data will be compiled and evaluated in annual Status Reports.

The Status Reports will include the following data:

- AS/SVE system operating status summary;
- SVE system discharge sampling data;
- AS/SVE system VOC mass removal calculations;
- AS/SVE system operating performance data (flowrates, pressure/vacuum readings, hours of operation, *etc.*);
- AS/SVE system VOC removal trend evaluation;
- Groundwater VOC level trend evaluation;
- Indoor air sampling analytical results;
- Evaluation of the sub-slab venting system; and
- Any mitigation activities related to the sub-slab venting system.

Bimonthly progress reports documenting system performance will also be provided to NYSDEC.

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TABLES

TABLE 1
Summary of Operation, Maintenance and Effectiveness Monitoring Program
Air Sparging and Soil Vapor Extraction System
Dayton Shopping Plaza - Queens, NY

System Component & Action	Monthly	Quarterly	Semi-Annual	Method	Analysis
SVE Wells					
Measure VOC concentration from SVE-1	X			PID	Total VOC in ppm
Measure VOC concentration from SVE-2	X			PID	Total VOC in ppm
Measure Vacuum in SVE-1	X			Magnehelic	Vacuum (in-H_2O)
Measure Vacuum in SVE-2	X			Magnehelic	Vacuum (in-H_2O)
EXHAUST					
Measure VOC concentration from exhaust sampling port	X			PID	Total VOC in ppm
Measure SVE exhaust flow rate	X			Thermal anemometer	SVE flow rate in cfm
Measure SVE exhaust pressure	X			Magnehelic	Exhaust pressure in psig
Collect emission sample for lab analysis (quarterly during the first year of operation after NYSDEC approval of the RAWP and semi-annually thereafter)		X	X	Summa Canister (see QAPP)	USEPA TO-15 (see QAPP)
SVE BLOWER					
Measure SVE system blower vacuum	X			System gauge	Blower vacuum (in-H2O)
Measure SVE blower temperature	X			System thermometer	Blower temperature ^oF
Check/Clean/Replace Air filter	(1)			See owners manual	NA
AS WELLS					
Measure Pressure in AS-1	X			Magnehelic	Pressure (psi)
Measure Pressure in AS-2	X			Magnehelic	Pressure (psi)
AS BLOWER					
Measure AS system blower vacuum	X			System gauge	Blower pressure (psi)
Measure AS system blower temperature	X			System thermometer	Blower temperature ^oF
MISCELLANEOUS					
Check/empty water separator drum	X			open separator drain valve	record volume in gallons
Check system hoses	X			Visual inspection	NA
Monitoring well sampling			X	see QAPP	VOCs (see QAPP)

NOTES:
(1) Air filter will be inspected monthly, cleaned and replaced as needed.

Acronyms/Abbreviations
SVE = Soil vapor extraction
AS = Air Sparging
QAPP = Quality Assurance Project Plan
in-H_2O - inches of water
psi = pounds per square inch
ppm = parts per million
^oF = Degrees Fahrenheit
PID = Photoionization detector
VOC = Volatile organic compounds

TABLE 2
Summary of Operation, Maintenance and Effectiveness Monitoring Program
Sub-slab Vapor Venting System
Dayton Shopping Plaza - Queens, NY

System Component & Action	Start-up	Monthly	Quarterly	Semi-Annual	Method	Analysis
EXHAUST AIR						
Measure VOC concentration of Exhaust Air	X				PID	Total VOC in ppm
INDOOR AIR						
Collect indoor air sample for lab analysis - First Year				X	Summa Canister (see QAPP)	USEPA TO-14 (see QAPP)
Collect indoor air sample for lab analysis - Second Year				(1)	Summa Canister (see QAPP)	USEPA TO-14 (see QAPP)
SLAB						
Measure Sub-slab Vacuum (first six months only)		X			Magnehelic Gauges	NA
Inspect the slab for cracks			X		Visual Inspection	NA
PIPING						
Inspect the pipes for leaks		X			Visual Inspection	NA

Acronyms/Abbreviations
QAPP = Quality Assurance Project Plan
ppm = parts per million
PID = Photo ionization detector
VOC = Volatile organic compounds
(1) Pending results of first one-time sampling event

APPENDIX B

AIR DISCHARGE CALCULATIONS

Air Sampling Results and Air Compliance Calculations
Dayton Shopping Plaza
Queens, New York

Compound	Molecular Weight	Off-Gas Concentration (AS off) (ppbv)	Off-gas Concentration (AS on) (ppbv)	Emission Rate (2) During Start-up (lb/hr)	Emission Rate After 1-mo of Start-up (4) (lb/hr)	AGC/SGC	Qc = AGC/200 (5)
cis-1,2-Dichloroethene	97	1,700	1,700	0.0016	0.00016	1,900/--	9.5
Trichloroethene	131.4	700	770	0.0010	0.00010	0.45/54,000	0.0023
Tetrachloroethene	165.8	4,700	5,900	0.0097	0.00097	1/1000	0.005
Trans-1,2-Dichloroethene	97	120	110	0.0001	0.00001	0.1/--	0.0005
Acetone(1)	58.1	1,800	410	0.0002	0.00002	28,000/180,000	140
2-Butanone (1)	72.1	1,500	470	0.0003	0.00003	1,000/59,000	5
Tetrahydrofuran (1)	72.1	2,200	690	0.0005	0.00005	1,400/74,000	7
TOTAL VOCs		**12,720**	**10,050**				

NOTES:

1. These compounds are components of the PVC primer and PVC cement used to glue the piping.
2. Emission rate was calculated using the formula: Emission (lb/hr) = C_{gas} * MW * Q_{cfm} * $3.66x10^{-6}/24$
3. Emission rate was calculated to be about 65 cfm.
4. After one-month of start-up, the VOC concentrations were reduced by more than one order of magnitude (about 30 times). For conservative calculations, it is assumed that the annual emission rate is only 10 times less the start-up emission rate.
5. NYSDEC DAR-1, page B-18, Section IV.G. states that for NYC, the emissions are acceptable if hourly emission rate is less than Q_c.

APPENDIX C

QUALITY ASSURANCE PROJECT PLAN

Appendix C

QUALITY ASSURANCE PROJECT PLAN FOR THE INTERIM REMEDIAL MEASURE WORKPLAN

DAYTON SHOPPING PLAZA
86-15 ROCKAWAY BEACH BOULEVARD
QUEENS, NEW YORK
Voluntary Cleanup Site No. V006202

Prepared For:

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For Submittal to:

New York State Department of Environmental Conservation
Division of Environmental Remediation
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Senior Associate

June 2006
1461905

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1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) was developed by Langan Engineering and Environmental Services, Inc. (Langan). The QAPP details the protocols and procedures that will be implemented during proposed remediation system monitoring documented in the June 2006 Interim Remedial Measure Workplan (IRMWP) at the Dayton Shopping Plaza in Queens, New York. The primary objective of the QAPP is to provide quality assurance (QA) and maintain quality control (QC) for all sampling and testing conducted as part of the proposed RAWP and to ensure that all activities are performed in a manner consistent with data quality objectives (DQO) described herein.

In summary, this QAPP identifies project responsibilities and prescribes guidance and specifications to satisfy QA/QC objectives and, thus, promote:

- Collection of representative samples;
- Generation of data that are valid for the objectives of the investigation;
- Documentation of consistent and complete field activities performed during the investigation; and
- Accountability of all field and laboratory activities.

The QA/QC objectives will be achieved by:

- Adhering to standard sample collection, sample handling and proper analytical protocols and procedures;
- Implementing a sample tracking system and chain-of-custody protocol;
- Confirming the quality of the sampling and analytical methods through quantitative and qualitative data assessment methods; and
- Ensuring that all aspects of the measurement process, from field through laboratory, are documented to provide data that are technically sound and legally defensible.

This QAPP was developed following the guidance and protocols described in the documents listed in Section 12.0 (References).

2.0 PROJECT OBJECTIVES / SCOPE OF WORK

Information regarding the subject property and data generated during implementation of previous environmental investigations is summarized in the IRMWP. As documented in these documents, additional sampling is proposed as part of the remediation system monitoring.

2.1 Project Objectives

The IRMWP was developed in accordance with the Voluntary Cleanup Agreement executed between Rockaway Commons LLC and NYSDEC to address the remedial system design, operation and monitoring of an Air Sparging and Soil Vapor Extraction (AS/SVE) system, and the installation of an active sub-slab vapor venting system. The AS/SVE system is designed to address soil and ground water impacted by tetrachloroethene (PCE) and associated daughter products. The sub-slab vapor venting system is designed to mitigate the sub-slab soil vapor intrusion into the retail spaces outside the radius of influence of the AS/SVE system.

The proposed revised RAWP includes Maintenance and Effectiveness Monitoring Program (OMEMP) for operation of the AS/SVE system and monitoring the sub-slab vapor venting system. This QAPP includes field and laboratory requirements for the facility air sampling and OMEMP as well as groundwater sampling.

2.2 Scope of Work

The project objectives outlined above will be achieved through the following:

- Semi-annual synoptic water level measurements of all onsite wells and groundwater sampling of 4 (MW-3, MW-5, MW-7, MW-9) of the onsite 12 wells using low-flow sampling techniques (*i.e.* bladder pump);

- Annual synoptic water level measurements of all onsite wells and groundwater sampling of 10 (DW-1, MW-2, MW-3, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10 and MW-11) of the onsite 12 wells using low-flow sampling techniques (*i.e.* bladder pump);
- Periodic field screening and emissions sampling of the AS/SVE system to verify system effectiveness; and
- Periodic indoor air sampling and analysis to verify the sub-slab vapor venting system effectiveness.

As specified in the IRMWP, an AS/SVE system has been installed and operated and shown to be effective in reducing VOC concentrations in ground water. An OMEMP has been proposed which will include semi-annual ground water monitoring, system diagnostic procedures, and emissions sampling to provide maintenance and effectiveness data for the AS/SVE system. In addition, the installation of an active sub-slab vapor venting system is proposed to be installed at specified retail locations to mitigate soil vapor intrusion into the buildings.

2.3 End Use Data

The field and laboratory data generated for the AS/SVE system and the sub-slab vapor venting system, operation and effectiveness monitoring will be used in conjunction with historical site data to assess the effectiveness of the remedial systems. The ambient air, emissions and ground water laboratory analytical data will be compared to the following criteria to identify exceedences:

- The ambient air data will be compared to the New York State Department of Health (NYSDOH), Bureau of Toxic Substance Assessment (BTSA), Indoor Health Assessment Section (IHAS) criteria, and the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL);

- The emissions data will be compared to the New York Department of Environmental Conservation, Division of Air Quality, Annual Guideline Concentrations or the Short-term Guideline Concentrations; and
- The ground water data will be compared to the most current NYSDEC Ground Water Standards (GWS).

The laboratory analytical data, field PID-measurements for total VOCs and qualitative field observations will be used to develop conclusions regarding the AS/SVE system performance and ground water quality. The indoor air sampling analytical results will be used to evaluate the performance of the sub-slab vapor venting system.

The level of analytical support must be carefully considered to ensure the data are of sufficient quality to satisfy the goals of the Remedial Action. USEPA's "Data Quality Objectives for Remedial Response Activities" (USEPA 540-G-87-0003) discusses five general levels of analytical support (designated Level I through Level V), which may be used depending on the intended uses of the data. Three of these five levels of analytical support will be employed for different components of the Remedial Action, as follows:

- <u>Level IV: Contract Laboratory Procedures (CLP) Routine Analytical Services (RAS)</u> - Level IV is characterized by rigorous QA/QC protocols and documentation. All ground water samples will be analyzed using Level IV procedures and protocols.

- <u>Level III: Laboratory Analysis</u> – Level III uses methods other than CLP RAS, this level primarily supports engineering studies using standard USEPA-approved procedures. The air and emissions samples will be analyzed using Level III procedures and protocols.

- <u>Level I: Field Screening</u> – This level is characterized by the use of portable instruments, such as a PID, which can provide real-time data to assist in the optimization of sampling point locations and for health and safety support. All routine air monitoring (as discussed in the Health and

Safety Plan) and system screening will be conducted using Level I analytical support.

The laboratory reports will follow the NYSDEC Category B reporting requirements.

3.0 PROJECT MANAGEMENT / PROJECT TEAM

Langan will implement the revised RAWP and this QAPP, including supervision of field activities, health and safety, and the evaluation and interpretation of data.

The following is a summary of the key project personnel and subcontractors and their primary responsibilities.

Rockaway Commons, LLC Project Manager:	**Manouchehn**
Langan Project Manager:	Steven Ciambruschini, PG, LEP
Langan Project Engineer:	Craig Peterson, P.E.
Langan Project QA/QC Officer:	Marshall King
Field Supervisor:	Craig Peterson
Site Health and Safety Officer:	Robert Koto, P.G.
Analytical Laboratory (groundwater):	Accutest Laboratories, Inc.
Analytical Laboratory (air):	Accutest Laboratories, Inc.
Laboratory QA/QC (groundwater):	Accutest Laboratories, Inc.
Laboratory QA/QC (air):	Accutest Laboratories, Inc.
Drilling Contractor:	Aquifer Drilling and Testing

3.1 Rockaway Commons, LLC Project Manager

The Project Manager will serve as Rockaway Commons' representative in reviewing the progress of work, participating in field meetings, and review of all reports and submittals to NYSDEC. The Project Manager will also serve as the primary contact person with the Langan Project Manager.

3.2 Langan Project Manager

The Langan Project Manager will be responsible for coordinating implementation of the elements of the IRMWP. The Langan Project Manager will be responsible for ensuring completion of the status reports as well as participating, as needed, in major project meetings, during the course of the project.

The Project Manager will also be responsible for the following:

- Adherence to project schedules;
- Development and monitoring of cost control measures;
- Reviewing and assessing the adequacy of the performance of technical staff and laboratory subcontractors;
- Maintaining full orderly project documentation;
- Interacting with the Rockaway Commons Project Manager and NYSDEC during the progress of the project; and
- Managing project specific problems and resolving project related issues.

3.3 Langan Project Engineer

The Langan Project Engineer is responsible for the AS/SVE system design, installation and operation; and the sub-slab vapor venting system design, installation and operation. The Langan Project Engineer will be responsible for reviewing the OMEMP data and adjusting the system accordingly to meet system goals. The Langan Project Engineer will also be responsible for any system modifications if necessary to achieve the remedial objectives. The Langan Project Engineer will interact with the Langan Project Manager regarding issues with the AS/SVE system, the sub-slab vapor venting system and the remedial objectives.

3.4 Langan Field Supervisor

The Langan Field Supervisor will be responsible for implementing the revised RAWP including the periodic monitoring as dictated in the OMEMP. The Langan Field Supervisor will interact with the Langan Project Manager and Langan

Project Engineer regarding issues with the remedial systems operation and monitoring.

3.5 Langan Project Quality Assurance and Quality Control Officer

The Project QA/QC Officer will be responsible for review of field and laboratory measurement and testing data for compliance with QA objectives (precision, accuracy and completeness criteria) as stated in this QAPP, and notification to the Langan Project Manager of any QC deficiencies. The data validation for all the testing results will be completed by Accutest Laboratories.

3.6 Laboratory Quality Assurance and Quality Control Officer

The Laboratory QA/QC Officer will be responsible for quality control procedures and QC checks in the laboratory, and will ensure strict adherence to laboratory protocols. In addition, the Laboratory QA/QC Officer will be responsible for tracking the movement of each sample from the time the sampling program begins until the final analytical data are assembled in the report. Test result reports and data management reports, including analytical results, quality control data, chain-of-custody, the appropriate historical data, will be assembled by computer. All calculations will be given a final check by the Laboratory QA/QC Officer. The QA/QC officers from Accutest (groundwater sampling and air sampling) will be designated by their respective companies.

3.7 Additional Subcontractors

The air emissions, groundwater samples and indoor air samples will be analyzed by Accutest Laboratories of Dayton, New Jersey (NYSDOH Certification No. 10983).

The drilling contractors for the project will be Aquifer Drilling and Testing of New Hyde Park, New York, a NYSDEC licensed driller.

3.8 Project Documentation and Records

A project file will be maintained by the Langan Project Manager, which will contain complete project documentation. This file will include project work plans; field notebook(s); field logs and data records; photographs; maps and drawings; sample identification documents; chain-of-custody records; the entire analytical data package(s) provided by the laboratory including QC documentation; gas chromatograms; mass spectra; data validation notes; references and literature; report notes and calculations; progress and technical reports; correspondence; and other pertinent information. All such project records will be accessible to Rockaway Commons and NYSDEC.

4.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

Data Quality Indicators (DQI) are qualitative and quantitative descriptors used to interpret the degree of acceptability or usability of data. The primary DQIs are precision, accuracy (bias), representativeness, comparability and completeness. Of these DQIs precision and accuracy are quantitative measures, and representativeness, completeness, and comparability are qualitative measures of data quality.

Within a quantitative and qualitative context, the DQIs with respect to data quality are measured through the use of Measurement Performance Criteria (MPC). In order to assess whether the MPC are met for each DQI, both laboratory and field QC samples will be collected. The QC samples include field duplicates; laboratory matrix spike/matrix spike duplicates; field, lab and trip blanks; and laboratory control samples such as surrogates. The QC sample requirements are discussed in Sections 8.1 and 8.2. To assess precision, comparability, and representativeness, QC samples include field duplicates and laboratory matrix spike/matrix spike duplicates. Matrix spikes, blanks and laboratory control samples are use to assess accuracy; and blanks, and split-samples and sampling procedures are used to assess representativeness.

The MPC and their use in the data validation process are described in Section 10.0 of this QAPP.

4.1 Data Precision

Precision is a measure of mutual agreement among individual measurements of the same property. Precision is measured by analyzing field duplicate and laboratory duplicate samples. The relative percent difference or RPD of duplicate measurements can be used to evaluate analytical precision. The smaller the RPD, the greater is the analytical precision. Relative Percent Difference is calculated from initial and duplicate sample analytical results using the following equation.

$$RPD\% = \frac{(C_1 - C_2)}{(C_1 + C_2) \div 2} \times 100$$

Where:

C1 = the larger of the two observed values.

C2 = the smaller of the two observed values.

Both spike recovery and RPD can be determined using the analytical results of matrix spike and matrix spike duplicate samples (MS/MSD).

Duplicate samples will be used to assess the overall effects of the sample collection and analysis procedures on precision; some samples will be collected in duplicate. One of the duplicates will be given a "coded" identifier and will be submitted as a 'blind' duplicate, along with the original sample for analysis. Comparisons of the results from the original sample and the blind duplicate will allow for an evaluation of the precision RPD. One coded field duplicate will be collected for every 20 environmental samples per media.

The referenced analytical methods cite precision control limits or give guidance on how to establish precision control limits. Control limits are typically generated from multiple analyses and inter-laboratory comparison studies. Control limits are method, compound, and matrix dependent.

Acceptable levels of laboratory precision will vary according to the sample matrix, the specific analytical methods, and the analyte concentration relative to the method detection limit (MDL). Quality assurance objectives for precision can also be supported using written laboratory standard operating procedures (SOPs) and properly calibrated instruments. Laboratory precision will be assessed by the analysis of matrix spike/matrix spike duplicate and/or laboratory duplicates. Laboratory precision is evaluated using USEPA guidelines for the specific method reference in concert with laboratory SOPs and this project-specific QAPP.

4.2 Data Accuracy

Accuracy/Bias is the degree of agreement of a measurement with an accepted reference or true value. The difference is usually expressed as a percentage. Accuracy is a measure of the bias of a system. In the field, routine calibration checks are performed to assess the accuracy of field instrumentation measures. The accuracy/bias of laboratory analytical measures is evaluated through the analysis of method blanks, sample matrix spikes, matrix spike duplicates, sample surrogate recoveries, performance evaluation samples, and Laboratory Control Samples. Accuracy/Bias-contamination is assessed by trip blanks, equipment blanks, method blanks, and instrument blanks that evaluate how the data is affected by contamination.

Accuracy may be expressed as a percent difference (%D) calculated by the following equation:

$$\%D = \frac{(V_t - V_m)}{V_t} \times 100$$

Where:

V_t = the true or real value expected.

V_m = the measured or observed value.

This same relationship holds for the expression of accuracy as a percent recovery (%R) of a known method analyte or surrogate spike:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

Where:

SSR = the spiked sample result.
SR = the unspiked sample result.
SA = the value of the spike added.

Acceptable levels of accuracy and precision will be achieved by close adherence to all sampling procedures, sample preservation, sampling implement, decontamination procedures, and analytical methodology. Failure to achieve acceptable levels of accuracy and precision will trigger the implementation of a corrective action as described in Section 11.0 of this QAPP.

The objective for field measurement accuracy is to achieve and maintain the manufacturer's specifications for field equipment. The objective for accuracy of laboratory determinations is to maintain a system, which can be demonstrated to achieve measurements that are within accuracy criteria.

4.3 Data Representativeness

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variation, or environmental condition. Representativeness will be controlled by the consistent collection and analysis of samples according to standardized procedures. Representativeness can be assessed through the measures of precision and accuracy. Field documentation, field duplicate analyses, laboratory QC sample results, and data trend analysis all provide indices for the evaluation of data representativeness.

The degree that the data collected during the RA represent actual conditions at the site is a function of the:

- Number and location of data collection points;
- Choice of parameters for physical and chemical analysis; and
- Choice of specific technologies for data collection.

Samples taken must be representative of the population. The sampling program has been developed on a "biased" sampling approach. The sample locations have been selected based on locations where known or suspected constituents associated with contaminants of concern may be present at the site and the results of previous investigations.

Representativeness of specific samples will be achieved by the following:

- Using appropriate sampling procedures, sample containers, and equipment;
- Using appropriate analytical methodologies for the parameters and detection limits required;
- Analyzing the sample within the appropriate holding time; and
- Properly preserving and storing the samples.

Dedicated sampling devices will be used to eliminate the potential for cross-contamination. Other sampling devices will be cleaned between samples to minimize the potential for cross contamination. In either case, the goal is not to produce samples that "misrepresent" actual sample quality conditions. Decontamination procedures are described in the Field Sampling Procedures. A trip blank, which consists of a VOC vial filled with deionized, analyte-free water at the laboratory, will be used to document possible cross contamination during storage and transportation of groundwater samples to the laboratory.

The laboratory will make every reasonable effort to assure that samples are adequately homogenized prior to taking aliquots for analysis in accordance with SOP, so that the reported results are representative of the sample received. It must be recognized that excess handling may expose the sample to significant risk of contamination or volatilization, therefore, sample handling will be minimized in accordance with SOP.

4.4 Data Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system relative to the amount that would be expected to be obtained under correct, normal conditions. Valid data are data that are soundly founded as evidenced by the successful attainment of the Data Quality Objectives set forth for their determination.

$$Completeness(A\%) = \frac{Valid}{Total} \times 100$$

Where:

Valid = No. valid values reported for parameter y

Total = No. of samples collected for analysis for y

Based on site accessibility, it is believed that 100 percent of the proposed samples can be collected. It is expected that the laboratory will provide data meeting QC acceptance criteria for 95 percent of all samples analyzed. The laboratory and project data validation subcontractors will review the laboratory data for completeness. Corrective actions to achieve a complete data set may include any of the following: 1) re-analysis; 2) re-extraction; and or 3) resampling.

The QA objective for completeness will be optimized by employing and evaluating QC checks throughout the analytical process so that sample data can be assessed for validity of results and to allow for reanalysis within the hold time, when possible, where QC indicates a problem.

4.5 Data Comparability

Comparability expresses the confidence with which one data set can be compared to another. The data generated from this site should be comparable with similar sample matrix measurements made by others during as previous site investigations.

To assure that the measurements are comparable, sample collection and analysis will follow standard analytical methods where specified; also, standard reporting units will be used for all data. Soil sample analytical data will be reported in units of milligrams per kilogram (mg/kg). Aqueous sample data for organic and inorganic analytes will be reported in micrograms per liter (µg/l). Air sample data will be reported in parts per billion by volume (ppbv) and micrograms per cubic meter (□g/m^3).

The comparability objective for this project will be attained by:

- Using standard methodologies;
- Reporting results from similar matrices in consistent units;
- Applying appropriate levels of QC within the context of the Laboratory Quality Assurance Program; and
- Participating in inter-laboratory performance evaluation studies in support of laboratory certification to document general laboratory performance.

4.6 Traceability

Traceability is defined as the ability to reconstruct and review all aspects of the measurement system through available documentation.

Field activities should have the following documentation to support traceability:

- Standard Operating Procedures;
- Field notebooks;
- Names of field personnel; and
- Field personnel training records.

The field measurements should be supported by the following additional documentation:

- Instrument identification numbers;
- Instrument calibration records;

- Instrument precision and accuracy data as measured in the field;
- Source and concentration of the standards; and
- Instrument maintenance records.

Laboratory data traceability documentation exists in two forms: that which links final numerical results to authoritative measurement standards, and that which explicitly describes the history of each sample from collection to analysis. The sample history will be provided by the subcontract laboratory as part of the analytical laboratory report.

5.0 ANALYTICAL PROCEDURES

5.1 Analytical Methods

Groundwater samples will be analyzed in accordance with Level IV Analytical Support, as outlined in Section 2.3 of this QAPP. The analysis will be conducted in accordance with USEPA SW-846 Methods and New York State Analytical Services Protocols (NYSASP) and as described in the USEPA Contract Laboratory Protocol (CLP). Level I Analytical Support will be utilized for PID headspace screening and air-monitoring analysis for VOCs as outlined in Section 2.1 of this QAPP. The methodologies for the analysis are summarized on Table 1.

5.2 Sample Containers, Preservatives and Holding Times

The types of containers used for specified analyses as well as the required preservation and applicable holding times are detailed in Table 1 of this QAPP. All sample containers will be obtained from an approved analytical laboratory. Sample containers for the groundwater samples will be cleaned and quality controlled in accordance with OSWER Directive No. 9240.0-50A "Specifications and Guidance for Obtaining Contaminant Free Sample Containers". All sample preservatives will be added to the containers by the laboratory as appropriate.

Summa canisters for emissions and indoor air sampling will be certified clean in accordance with USEPA Method TO-15 by the laboratory.

5.3 Laboratory Documentation

It is required that the selected laboratory be a participant in USEPA's CLP. Upon request, the laboratory will supply to Langan and/or Rockaway Commons a copy of its in-house Quality Assurance/Quality Control manual that is applicable to the analyses to be performed. The Quality Assurance/Quality Control manual will include, at a minimum, the following topics:

- Resumes;
- Personnel training and experience;
- Organizational structure;
- Equipment available;
- Reference materials/reagents;
- Control charts;
- Standard operating procedures;
- Data reduction/reporting;
- Chain-of-custody; and,
- Sample bottle preparation.

Also upon request, the laboratory will provide results of performance evaluation samples (within the previous six months) supplied by USEPA or a New York State-certified program (*e.g.*, Analytical Services Program – ASP) for those parameters of interest to the project. In turn, the performance evaluation samples will be submitted to the laboratory.

6.0 SAMPLING METHODS AND FIELD MEASUREMENTS

This section of the QAPP summarizes the procedures and requirements for the sampling specified in the IRMWP. The procedures for sample collection and field measurements are summarized below and include the following procedures:

- Field screening for VOCs
- System field screening for volatile organic compounds
- Monitoring well sampling
- Monitoring well synoptic water level and/or product measurements
- Decontamination

6.1 Emission and Indoor Air Sampling

Emissions and indoor air sampling will be completed in order to document the AS/SVE system effectiveness/operation and the efficiency of the sub-slab vapor venting system, respectively. The emissions and indoor air sampling will be accomplished using a PID, and SUMMA canisters as discussed below.

6.1.1 System Field Screening

As discussed in the OMEMP manual, part of the system monitoring procedures will include recording the SVE influent volatile organic concentration from individual operating wells using a 11.7 e.v. photo-ionization detector (PID). The PID will be connected to the sampling port for each individual well along the manifold using Tygon tubing. The PID will be turned on and allowed to measure the influent VOC concentration until the PID reading has stabilized. The tubing will be disconnected and the sampling port will be closed. The Tygon tubing will not adsorb VOC, which could bias the readings; however, dedicated tubing will be used for each reading event and sampling port.

In addition, the PID will be used to monitor the exhaust air of the sub-slab vapor venting system upon system installation (one exhaust air monitoring event). The Tygon tubing will placed inside the 6-inch diameter rotary turbine ventilator to record VOC concentrations of the exhaust air. A dedicated tubing will be used at each retail space that has a sub-slab vapor venting system.

6.1.2 Summa® Canister Sampling

Initial samples collected in October 2000 from the SVE effluent to establish target operating parameters for the AS/SVE system were collected with Tedlar bags. Additional samples using 6-liter Summa® Canisters will be collected at the discretion of the Project Engineer as part of the system re-startup from the SVE effluent ports, as specified in the OMEMP manual. One sample will be collected with the AS system on and one sample will be collected with the AS system off. The samples will be collected using USEPA Standard Operating Procedure (SOP) No. 2102 dated 21 October 1994. However, as stated in the OMEMP, one sample will be collected with the AS system on and as such a vacuum pump will not be necessary. The canister will be connected to the sampling port and allowed to fill passively under the influence of the system airflow.

Six-liter Summa® Canisters will be also used to collected one-time indoor air samples to evaluate the performance of the sub-slab vapor venting system.

6.2 Monitoring Well Sampling

Semi-annual ground water sampling of onsite monitoring wells as specified in the revised RAWP OMEMP (MW-3, MW-5, MW-7, MW-9) will be conducted to assess AS/SVE system effectiveness. Annual sampling of all onsite monitoring wells (except MW-1 and MW-4) will also be conducted. All sampling will be conducted using low flow sampling technique (*i.e.* bladder pump). Field parameters including temperature, pH, specific conductance, oxidation-reduction potential (ORP), and dissolved oxygen (DO) will be measured prior to well sampling to ensure stabilization. The appropriate sample preservative will be added to the bottle by the laboratory.

6.3 Synoptic Water Level Survey

Prior to sampling the monitoring wells within the OMEMP monitoring network, a synoptic water level survey of all site monitoring wells will be completed.

The water level measuring procedures are as follows:

- Open and screen each monitoring well head space with a PID.
- All measurements will be made relative to the marked survey datum (typically the top of the inner-most casing).
- The measurements will proceed from the anticipated least to most contaminated wells (based on existing data).
- Decontamination of the water level meter will be completed between monitoring wells as specified in Section 6.4.
- These data will be recorded in a logbook or data sheet along with the respective well number, date, time, and any pertinent comments.

6.4 Field Decontamination

Field decontamination of equipment during sampling proposed in the revised RAWP is discussed in Section 7.0 of the Field Sampling Procedures.

6.5 Field Documentation

Documentation of field observations and measurements will be primarily recorded in a field notebook. The field notebook will be project specific and will contain all field observations, notes, measurements, *etc*. Field log sheets may also be used as necessary, but will be considered secondary records.

6.6 Sample Handling and Custody

The sample handling, from collection in the field to shipment to the off-site laboratory, including tracking and custody requirements are outlined in this section.

6.6.1 Sample Identification

Samples will be identified in a format consistent with previous sampling events. Each sample will be assigned a unique number and location ID that will be recorded on the following documents: the daily log, the label affixed to the sample container, and the chain-of-custody record. Location IDs need not be unique; however, the sample number must be unique. Replicate/duplicate samples will be identified as "DUP" and will also have a unique number. This method will ensure that the duplicates are submitted as blind samples to the analytical laboratory.

6.6.2 Sample Handling

Samples will be stored on-site with ice as necessary, until they are shipped or picked up by the laboratory for analysis. Bottles will be packed tightly to protect the containers from damage during shipment. A chain-of-custody (COC) will accompany each shipment. Field personnel will be responsible for the security of the samples prior to shipment.

6.6.3 Sample Custody

Sample custody will be designed to assure that each sample is accounted for at all times. The program's sample custody procedures that will be followed during the sample handling activities from the field to the laboratory are summarized below. The laboratory is responsible for sample receipt from the designated shipping agent, completion of the COC documents, verification of proper sample preservation, recording cooler temperatures, maintaining samples in secure properly designated areas, and maintaining internal chain of custody documents. The laboratory will notify Langan immediately of any sample receipt issues that impact sample integrity and data quality. The objective of the sample custody identification and control system will be to assure, to the extent practicable, that:

- All samples scheduled for collection are uniquely identified;
- The correct samples are analyzed and are traceable to their records;
- Important sample characteristics are preserved;
- Samples are protected from loss or damage;
- Any alteration of samples (*e.g.*, filtration or preservation) is documented; and
- A historic record of sample integrity is established.

The COC form will include:

- The sample number and the sample bottle identification number, where applicable;
- The name(s) of the sampler(s) and the person shipping the samples;
- The purchase order number, if applicable;
- The project name and number;
- Signature of the Langan representative relinquishing the samples;
- The date and time the samples were delivered for shipping;
- The sample description(s);
- The matrix of the sample;
- The number of containers;
- Analysis and preservation information; and
- Analytical data reporting requirements

Correction or revision to a COC will be made by drawing a single line through the original entry, writing the revision, then initialing and dating the new entry.

7.0 EQUIPMENT CALIBRATION AND MAINTENANCE

A maintenance, calibration and operation program is implemented to ensure that routine calibration and maintenance is performed on all field instruments. The program provides instruments of the proper type, range, accuracy and precision to provide data compatible with the specified requirements and desired results.

Calibration of measuring and testing instruments is performed internally using in-house reference standards or externally by agencies or manufacturers.

7.1 Responsibility

The Project QA/QC Officer is responsible for ensuring that the field instruments used in the investigations are calibrated and maintained according to manufacturer specifications. Field instrument instruction manuals describing calibration, maintenance and field operating procedures for these instruments will be available as needed for reference by field personnel and other project personnel.

The Field personnel will be familiar with the field calibrations, operation and maintenance of the instruments, and will perform the prescribed field operating procedures outlined in the operation and field manuals accompanying the respective instruments. They will keep records of all field instrument calibrations and field checks in the field notebook.

7.2 Calibration

Field equipment, including PID and water quality meters will be calibrated at the start of each day of fieldwork. More frequent calibration may be warranted based on changes in responsiveness of the instruments or apparently anomalous readings. Instruments that fail calibration or become inoperable during use will be removed from service and tagged to prevent inadvertent use. If site-monitoring instruments should fail, the personnel will either provide replacement instruments or have the malfunction repaired immediately.

Calibration will be performed following manufacturers instruction as outlined in the instruction manuals for each field instrument including PID and water quality meters. All Field personnel shall have access to field equipment instruction manuals for all field instruments.

Records will be prepared and maintained for each piece of calibrated measuring and testing equipment to indicate that established calibration procedures have been followed (*e.g.* results of calibration, problems, corrective action).

8.0 INTERNAL QUALITY CONTROL CHECKS

The QC samples discussed below will be collected during the field program and analyzed by the laboratory to assess laboratory and field QA/QC procedures and the data quality.

8.1 Laboratory Internal QC Checks

The laboratory selected to perform analyses will be certified by the New York State Department of Health in accordance with the Analytical Services Protocols (ASP) and CLP, and will also demonstrate their capability to perform CLP analyses. In general, ASP/CLP protocols or certification programs require the laboratory to specify the qualifications of personnel; list available instrumentation; analyze performance evaluation samples; and adhere to and document standard operating procedures and quality assurance plans.

It will be the responsibility of the Laboratory QA/QC Officer to document, in each data package provided, that both initial and ongoing instrument and analytical QC functions have been met. Internal quality control checks, including replicates, spiked samples, duplicate samples, laboratory control samples, reagent specifications and checks, and calibration checks, are performed in accordance with the specific methodologies used. The minimum criteria used for analysis consists of a daily calibration, instrument blank analysis, and sample blank analysis. In addition, at least one spike, one duplicate and one control are analyzed daily for each parameter.

Matrix spike and matrix spike duplicate (MS/MSD) analyses will be collected and submitted to assess laboratory QA/QC. MS/MSD will be run at a frequency of one per twenty samples. The MS and MSD will be collected as separate samples and, thus two volumes of aqueous organic samples will be collected in addition to the routine sample.

8.2 Field Internal QC Checks

For field quality assurance, three types of QA/QC samples will be collected: duplicate, field and trip blank samples.

Field Duplicates

The standard frequency for obtaining duplicate samples is one for every twenty samples. Duplicate samples serve as check on the overall precision of the sampling and analytical methods. Duplicates will be collected in identical, laboratory prepared sample bottles, and will be analyzed for the same parameters. One set of samples will be given the sample identifier indicative of the sample location and the second set of sample bottles will be given a false sample identifier to disguise the identity of the replicated sample (*i.e.*, blind duplicate). Actual sample identifiers for duplicate samples will be noted in the field notebook. One duplicate sample will be collected during each type of sampling event (*i.e.*, groundwater, indoor air sampling, air emission sampling).

Field Blanks

Field blanks will be collected throughout the sampling events. Field blanks measure incidental or accidental sample contamination occurring during the entire sampling process of collection, transport, sample preparation and analysis. Field blanks can also check on the laboratory water quality and potential method contamination. Field blanks will be collected by pouring demonstrated analyte-free water over decontaminated soil and/or ground water sampling equipment and into the appropriate sample containers. Field blanks will be analyzed for the same parameters as samples. Field blanks will be collected at a rate of one per day during groundwater sampling and will be analyzed for the same parameters analyzed on that particular sampling day. Ambient air samples will be collected for any of the air sampling.

Trip Blanks

A trip blank sample will accompany field samples at a rate of one per shipment on days when VOC groundwater samples are collected. Trip blanks will originate at the contract laboratory, and will be labeled as trip blank. The water used for the trip blank must be the same as the method blank water used by the laboratory. The trip blanks will accompany the sample containers throughout transport and sampling activities, and will be returned to the laboratory with the field samples. As such, trip blanks will accompany each daily sample shipment containing well samples for volatile organic analysis. A blank Summa canister filled by the laboratory will accompany the respective air samples collected at the site. Trip blanks will be analyzed for volatile organic compounds.

9.0 ASSESSMENT AND OVERSIGHT

9.1 Laboratory Performance and System Audits

The analytical laboratory will conduct internal quality control checks and audits in accordance with their internal operating procedures, method specific criteria and governing laboratory or certification programs. Procedures for laboratory performance and system audits will be outlined in the Laboratory Quality Assurance Plan (LQAP). The Laboratory QA Officer will be primarily responsible for conducting these audits. The LQAP will be available to the project team during the project.

The systems audit consists of evaluation of all components of the measurement systems to determine their proper selection and use. Systems audits are normally conducted prior to or shortly after systems are operational, and are then performed on a regularly scheduled basis. Performance audits are conducted periodically, and include the analysis of performance evaluation samples.

9.2 Field Performance Audits

The QA/QC Officer or designee will be responsible for auditing project personnel. An audit will be conducted initially during the program to ensure that proper procedures are followed and that subsequent data will be valid. The audit will focus on the details of the QA program, and will evaluate the following:

- Project Responsibilities;
- Sample Custody Procedures;
- Document Control;
- Sample Identification System;
- Sampling Techniques;
- Adherence to the Approved QA Project Plan;
- Instrument Calibration;
- Decontamination Procedures; and
- Sample Packing and Shipping Procedures.

The audit will evaluate the implementation of the project QA program.

10.0 DATA REDUCTION, VERIFICATION, VALIDATION, USABILITY AND REPORTING

This section of the QAPP describes the process that will be followed to verify and validate the project data and field activities. Data verification and validation activities will be performed to ensure that data collected are consistent with project quality objectives and measurement performance criteria.

10.1 Data Reduction

All data transformation and data reduction procedures will be clearly documented and placed in the project files. All data transformation and data reduction activities performed on the project data will be carefully monitored by both the Project Manager and the QA Officer to ensure that data integrity is maintained.

10.2 Data Verification

Data verification and validation activities will be performed to ensure that data collected as part of the supplemental site characterization are consistent with project quality objectives and measurement performance criteria.

Upon receipt of both electronic and hard copy analytical data, internal checks will be performed to detect possible errors. The data check will be performed by the QA Officer. General checks will include the following:

- Verification of all data requested versus received (check of data against COCs);
- Verification of completeness of data packages; and
- Verification of cross references between primary and duplicate samples.

For data that are generated in the field, the Field Team Leader will work closely with field personnel to evaluate accuracy and integrity of data collection activities. The Field Team Leader will review field sheets and field notes to verify consistency with field observations and activities.

Prior to release by the off-site laboratories, the data will be reviewed internally by the laboratory QA/QC Officer against all specific QA/QC parameters. The laboratory will use a system of sign-offs in which each analyst will acknowledge that their part of the analysis is complete. Any deviations will be documented and explained in the final laboratory analytical report. The laboratory is responsible for the final results and overall quality of the laboratory data.

10.3 Data Usability / Validation

Acceptance criteria for all field and laboratory internal QA samples (field blanks, duplicates, MS/MSD) will be those specified in the corresponding analytical methodologies. It is noted that a full data validation will not be completed for the RA, rather a less rigorous data usability assessment will be performed.

The data usability evaluation will be completed following the protocols defined in the NYSDEC *Guidance for the Development of Data Usability Summary Reports* (September, 1997). Data usability evaluation will be completed to confirm that all QC data are within control limits of the measurement performance criteria (MPC).

Critical functions for determining the usability of generated data are:

- Strict adherence to the analytical methods;
- Assurance that the instrumentation employed was operated in accordance with defined operating procedures;
- Assurance that quality parameters built into the analytical procedures have been adhered to; and
- Confirmation that the DQOs have been met.

The procedures for assessing the precision, accuracy and completeness of data have been presented in Sections 4.0 of the QAPP. It will be the responsibility of the Project QA/QC Officer and the Laboratory QA/QC Officer to ensure that these procedures are followed. The data validation will be completed by Accutest Laboratories.

10.4 Reconciliation with User Requirements

Based on comparison of the field and laboratory QC to the MPCs, the Project QC officer will evaluate how well the analytical data satisfies the DQI and will develop statements in the Supplemental Remedial Investigation Report regarding the usability of the data relative to the project objectives, and project specific DQOs and end use of the data.

11.0 CORRECTIVE ACTION

If unacceptable conditions are identified as a result of audits or are observed during field sampling and analysis, the Project QA officer and the Project Manager will document the condition and initiate corrective procedures. The specific condition or problem will be identified, its cause will be determined, and appropriate action will be implemented.

Corrective actions may include, but are not limited to, the corrective action matrix presented below.

CORRECTIVE ACTION MATRIX	
Problem	**Corrective Action**
Sample exceeded holding time criteria.	Re-sample and re-analyze.
Field instruments are not within calibration limits.	Calibrate instrument and retest once an acceptable calibration has been obtained.
Procedures are observed that are not in accordance with the QAPP.	QA officer is notified and involved personnel are retrained.

The efficacy of any corrective action will be assessed by the project management to ensure that the deficiency or problem has been adequately addressed.

Corrective actions will be documented in the project progress reports, which will be provided to O&R on a monthly basis.

12.0 REFERENCES

U.S. Environmental Protection Agency, *USEPA Requirements for Quality Assurance Project Plans*, Development Press, Office of Solid Waste and Emergency Response Directive 9355, 0-7B, March 1987.

U.S. Environmental Protection Agency, *Data Quality Objectives for Remedial Response Activities*, Development Press, Office of Solid Waste and Emergency Response Directive 9355, 0-7B, March 1987.

U.S. Environmental Protection Agency. 1986, Revision 1990. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846*, Third Edition. Office of Solid Waste and Emergency Response, Washington, D.C.

U.S. Environmental Protection Agency, USEPA Contract Laboratory Program. *Statement of Work of Organics Analysis Multi-Media Multi-Concentration*, Document No. OLM01.0, 1991.

U.S. Environmental Protection Agency, *USEPA Quality Manual for Environmental Programs* (May 2000, USEPA Order 5360).

U.S. Environmental Protection Agency, *USEPA Checklist for Reviewing Quality Management Plans,* Version 2, September 2001.

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TABLES

Table 1
Proposed Analytical Methods and Analytes
Dayton Shopping Plaza – Queens, New York

Operation Maintenance and Effectiveness Monitoring

Parameter	Matrix	Analytical Method	Sample Container	Sample Preservation	Holding Times
TCL - VOC	Groundwater	USEPA Method 8260	40 ml clear glass VOA	HCl, 4°C	14 days
PCE, TCE, DCE VC	Air	USEPA TO-15	6-L SUMMA Canister	None Required	14 days

Acronyms/Abbreviations

VOC – Volatile organic compounds
PCE – Tetrachloroethene
TCE – Trichloroethene
DCE – Dichloroethene
VC – vinyl chloride
USEPA – United States Environmental Protection Agency
TCL – Target Compound List
HCl – hydrochloric acid
°C – Degrees Celsius
L – Liter
ml – milliliter

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TABLE 2
VOCs Reporting Limits (ppbv) by USEPA Method TO-15
Dayton Shopping Plaza- Queens, New York

Dichlorodifluoromethane (b)	0.2
1,2-Dichlorotetrafluoroethane (c)	0.2
Chloromethane	0.5
Vinyl Chloride	0.2
Bromomethane	0.2
Chloroethane	0.2
Trichlorofluoromethane (d)	0.2
1,1-Dichloroethene	0.2
1,1,2-Trichlorotrifluoroethane (e,f)	0.2
Methylene Chloride (f)	0.5
1,1-Dichloroethane	0.2
cis-1,2-Dichloroethene	0.2
Chloroform	0.2
1,1,1-Trichloroethane	0.2
Carbon Tetrachloride	0.2
Benzene	0.2
1,2-Dichloroethane	0.2
Trichloroethene	0.2
1,2-Dichloropropane	0.2
cis-1,3-Dichloropropene	0.2
Toluene	0.2
trans-1,3-Dichloropropene	0.2
1,1,2-Trichloroethane	0.2
Tetrachloroethene	0.2
1,2-Dibromoethane	0.2
Chlorobenzene	0.2
Ethylbenzene	0.2
m/p-Xylene (g)	0.2
o-Xylene	0.2
Styrene	0.2
1,1,2,2-Tetrachloroethane	0.2
1,3,5-Trimethylbenzene	0.2
1,2,4-Trimethylbenzene	0.2
1,3-Dichlorobenzene	0.2
1,4-Dichlorobenzene	0.2
Benzyl Chloride	0.2
1,2-Dichlorobenzene	0.2
1,2,4-Trichlorobenzene	0.2
Hexachlorobutadiene	0.2

Chlorodifluoromethane (b)	0.2
n-Butane	0.2
1,3-Butadiene	0.2
Pentane	0.5
Carbon Disulfide	0.2
3-Chloropropene	0.2
trans-1,2-Dichloroethene	0.2
n-Hexane	0.2
Cyclohexane	0.5
n-Heptane	0.2
Dibromomethane	0.2
Bromodichloromethane	0.2
n-Octane	0.2
Dibromochloromethane	0.2
Nonane	0.2
Bromoform	0.2
Cumene	0.2
n-Propylbenzene	0.2
Decane	0.2
alpha-Methylstyrene	0.2
n-Undecane	0.2
n-Dodecane	0.2
Naphthalene	0.2

Methanol	10
Ethyl Ether	0.5
Acetone	5
Acrylonitrile	0.5
Vinyl Acetate	0.5
2-Butanone	0.5
1-Butanol	0.5
4-Methyl-2-Pentanone	0.5
2-Hexanone	0.5
Methyl-t-Butylether	0.5
Acrolein	0.5
Acetonitrile	1.0
1,2,3-Trichlorpropane	0.5

ppbv = parts per billion volume

APPENDIX D

HEALTH AND SAFETY PLAN

APPENDIX D

HEALTH AND SAFETY PLAN FOR THE INTERIM REMEDIAL MEASURE WORKPLAN

DAYTON SHOPPING PLAZA
86-15 ROCKAWAY BEACH BOULEVARD
QUEENS, NEW YORK
Voluntary/Cleanup Site No. V006206

Prepared For:

Rockaway Commons, LLC
48 East Old Country Road
Suite 203
Mineola, New York 11501

For Submittal to:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

Craig J. Peterson, P.E.
Assistant Project Manager
New York State Professional Engineer's License No. 083777

Steven A. Ciambruschini, P.G.
Senior Associate

June 2006
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LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

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1.0 PROJECT IDENTIFICATION

The following information identifies the subject project and select key personnel.

Client:	Rockaway Commons, LLC 48 Old Country Road Suite 203 Mineola, NY 11501
Site:	Dayton Shopping Plaza 85-15 Rockaway Beach Boulevard Queens, New York
Project:	Interim Remedial Measue
Langan Project Manager:	Steven Ciambruschini, PG, LEP
Site Health and Safety Officer/ Field Safety Officer:	Marshall King
Langan Health and Safety Officer:	Robert Y. Koto, P.G.
Version:	3.0
Version Date:	June 2006

The Langan Site Health and Safety Officer (SHSO) may assign an alternate, qualified Field Safety Officer (FSO) to perform his or her duties; however, the SHSO shall continue to have overall responsibility for implementation of the field health and safety program.

2.0 INTRODUCTION

This Health and Safety Plan (HASP) establishes guidelines and requirements for personnel safety during the completion of Remedial Action as documented in the IRMWP within previous identified areas of environmental concern at the Dayton Shopping Plaza located in Queens, New York (hereafter referred to as the "site").

This HASP was prepared by Langan Engineering and Environmental Services, Inc. (Langan). Where applicable, this HASP also incorporates health and safety requirements of OSHA General Industry Standards (29 CFR 1910) and Construction Standards (29 CFR 1926) relating to the potential contamination at the site. Langan is responsible for providing a health and safety representative to oversee implementation of this HASP. Langan personnel working at the site will comply with the requirements of this HASP. The project manager, site engineer, site health and safety officer, or other designated representative shall be responsible for informing all individuals assigned to work on the site, or visit the site beyond the clean/support zone, of the contents of this plan. As discussed in Section 11.0 all Langan personnel must sign the HASP. By signing the HASP Acknowledgment Form, individuals are recognizing the site Health and Safety hazards, known or suspected, and the protocols required to minimize exposure to such hazards.

This HASP was prepared in accordance with the following documents and/or guidelines:

- Occupational Safety and Health Administration (OSHA) regulations for hazardous site workers and general construction (29 CFR 1910.120 and 29 CFR 1926);
- National Institute for Occupational Safety and Health/OSHA/U.S. Coast Guard/U.S. Environmental Protection Agency, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, October 1985;
- U.S. Department of Health and Human Services, June 1997, Public Health Service, Centers for Disease Control, NIOSH, NIOSH Pocket Guide to Chemical Hazards;
- OSHA, "Permissible Exposure Limits," §29 CFR Part 1910, Subpart-Z, Toxic and Hazardous Substances; and,
- American Conference of Governmental Industrial Hygienists, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, 2001.

The level of protection and the procedures specified in this HASP represent the minimum health and safety requirements to be observed by site personnel engaged in remedial activities. Unknown conditions may exist, and known conditions may change. Therefore, this HASP should be considered a dynamic document. Its contents may change or undergo revision to reflect changes in project scope and site conditions. Any necessary revision to the Health and Safety procedures will be recorded in the Field Procedure Change Authorization Form (Attachment A), and will require authorization from Rockaway Commons' and Langan's SHSO/FSO, and/or Project Manager.

Should an employee find himself/herself in a potentially hazardous situation, the employee will immediately discontinue the hazardous procedure(s) and either personally take the appropriate preventative or corrective measures, or immediately notify the SHSO or Project Manager of the nature of the hazard. In the event of an immediately dangerous or life threatening situation, the employee always has "stop work" authority.

THE ULTIMATE RESPONSIBILITY FOR THE HEALTH AND SAFETY OF THE INDIVIDUAL EMPLOYEE RESTS WITH THE EMPLOYEE AND HIS OR HER COLLEAGUES. Each employee is responsible for exercising the utmost care and good judgment in protecting his or her own health and safety and that of fellow employees. Should any employee observe a potentially unsafe condition or situation, it is the responsibility of that employee to immediately bring the observed condition to the attention of the appropriate health and safety personnel as designated above and to follow-up the verbal notification by completing the Unsafe Conditions and Practices Form provided in Attachment B, a copy of which will be provided to Langan's SHSOs.

"Extenuating" circumstances such as budget or time constraints, equipment breakdown, changing or unexpected conditions, <u>never</u> justify unsafe work practices or procedures. In fact, the opposite is true. Under stressful circumstances all project personnel must be mindful of the potential to compromise health and safety standards, and be especially safety conscious. ALL SITE PERSONNEL ARE EXPECTED TO CONSIDER "SAFETY FIRST" AT ALL TIMES.

2.1 Site Location/Conditions

The Dayton Shopping Plaza consists of a 4.6 acre site located at 85-15 through 88-07 Rockaway Beach Boulevard in Queens, New York (Figure 1).

The site is currently occupied by a one-story shopping center building and adjoining asphalt paved parking areas. Dry cleaning operations are currently conducted near the central portion of the onsite building in retail space occupied by the London French Cleaners (LFC) (86-15 Rockaway Beach Boulevard). The retail space has been occupied by LFC for approximately seventeen years. Currently one self-contained dry cleaning unit is located in the LFC facility. The unit was installed in 1997. Prior to 1997, filters and spent tetrachloroethene (PCE) were stored onsite in 15-gallon and 55-gallon drums.

2.2 Environmental Investigations

The following is a chronology of the previous remedial activities and corresponding reports for the subject property:

- Phase I Environmental Site Assessment - RECON Environmental Corp. (RECON) (2/17/1995);
- Phase II Environmental Site Assessment - RECON Environmental Corp. (4/13/1996);
- Remedial Investigation - RECON Environmental Corp. (4/1/1996);
- Supplemental Remedial Investigation-Langan (1/5/1999);
- Phase II Remedial Investigation Report – Langan (2/29/2000)
- Installation and operation of an AS/SVE system – Langan (October 2000 to June 2001)
- Start-up Report Soil Vapor Extraction/Air Sparging Remedial System – Langan (2/5/01)

- Air Sparging/Soil Vapor Extraction Remedial System Semi-Annual Status Report (October 200 to June 2001)- Langan (8/20/01)
- Supplemental Remedial Investigation – Langan (April 2004)
- Supplemental Remedial Investigation (Phase II) – Langan (March 2005)

The reports document investigations conducted to delineate the extent of tetrachloroethene (PCE) and associated breakdown products in soil and ground and installation and operation of an air sparging/soil vapor extraction system on-site. Upon request, copies of these reports will be made available to on site personnel coordinating activities covered by this HASP.

2.3 Project Organization and Personnel

Project personnel and their respective roles are described below.

Mr. Steven Ciambruschini is Langan's Project Manager. Mr. Ciambruschini has the responsibility for all work on the project relating to health and safety, including achieving objectives, staffing, scheduling and budgeting. Mr. Ciambruschini or his designee is also responsible for supervision of on-site health and safety field work activities. Mr. Ciambruschini's business address and telephone number are:

Langan Engineering and Environmental Services, Inc.
619 River Drive
Center One
Elmwood Park, New Jersey 07407
Phone: 201-794-4549
Fax: 201-794-0366

Marshall King (201) 981-8555 (Cell Phone) or other appointee is Langan's Site SHSO, FSO, and site supervisor. Mr. King or other appointee has the responsibility of executing the RA Work Plan and implementing the HASP.

2.4 Key Personnel Responsibilities and Authorities

Langan's Project Manager has the following responsibilities:

- To ensure that the project is performed in a manner consistent with the Health and Safety program;
- To provide the SHSO with project information related to health and safety matters and development of the HASP;
- To implement the HASP; and
- To ensure compliance with this HASP by field personnel.

Langan's Project Manager has the authority to take the following actions:

- To temporarily suspend field activities, if the health and safety of field personnel are endangered; and
- To temporarily suspend any individual from field activities for infractions of the HASP.

The Langan Site Health and Safety Officer (SHSO), and their alternate Field Safety Officer (FSO), has the following responsibilities:

- To direct health and safety activities of field personnel;
- To report safety-related incidents or accidents to the Langan Project Manager;
- To assist the Langan Project Manager in all aspects of implementing the HASP;
- To maintain health and safety equipment on site, as specified in the HASP;
- To inspect health and safety activities on site, as specified in the HASP, and report results to Langan's Project Manager;
- To monitor compliance with the approved HASP;

- To assist the Langan Project Manager in ensuring that proper health and safety equipment is available for the project;
- To approve personnel to work on this site with regard to health and safety training.
- To assure that the project is being performed by personnel in a manner consistent with their respective HASPs;
- To supply and maintain the proper health and safety equipment and supplies; and
- To provide access to field project files to allow health and safety audits to be performed, or incidents to be investigated.

The SHSO and/or FSO has the authority to take the following actions:

- To temporarily suspend field activities, if health and safety of field personnel are endangered;
- To temporarily suspend any individual from field activities for infractions of the HASP;
- To suspend work or otherwise limit exposures to personnel if a HASP appears to be unsuitable or inadequate;
- To direct site personnel to change work practices if they are deemed to be hazardous to health and safety; and
- To remove field personnel from the project if their actions or condition endangers their health and safety or the health and safety of co-workers.

2.5 Subcontractors

Subcontractor might be required for tasks identified in the revised RAWP. Each subcontractor shall develop and implement their own HASP, which identifies a lead individual responsible for H&S compliance for each of their employees, lower-tier subcontractors, and consultants. The subcontractor's HASP will be at least as stringent as this Langan HASP. The subcontractor must be familiar with and abide by the requirements outlined in their own HASP. A subcontractor may elect to adopt Langan's HASP as its own provided that it has given written notification to Langan, but where Langan's HASP excludes provisions pertinent to the subcontractor's work (*e.g*. confined space entry) the subcontractor must provide written addendums to this HASP. Additionally, the subcontractor must:

- Ensure their employees are trained in the use of all appropriate PPE for the tasks involved;
- Notify Langan of any hazardous material brought onto the job site, the hazards associated with the material, and must provide a MSDS for the material;
- Have knowledge of, understand, and abide by all current federal, state, and local health and safety regulations pertinent to the work;
- Ensure their employees have received current training in the appropriate levels of 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER);
- Ensure their employees have been medically cleared to work in Hazardous Waste Sites and to wear a respirator, if necessary;
- Ensure their employees have been fit-tested within the year on the type respirator they will wear; and,
- Ensure that its employees have been briefed on this HASP and have signed the Compliance Agreement (Section 11.0).

3.0 SCOPE OF WORK

The project objectives outlined in the revised RAWP and QAPP will be achieved through the following:

- Collection of semi-annual groundwater samples from existing on-site monitoring wells; and

- Collection of periodic field screening, laboratory emissions samples and indoor air samples to verify effective operation of the air sparge/soil vapor extraction system and the sub-slab vapor venting system, respectively.

As specified in the revised RAWP, an AS/SVE system has been installed and operated on-site. An Operation Maintenance and Monitoring Plan has been proposed which includes semi-annual groundwater monitoring, system diagnostic procedures, and emissions sampling to provide maintenance and effectiveness data for the system.

In addition, quarterly indoor air sampling have been proposed to evaluate the performance of the proposed sub-slab vapor venting system to mitigate sub-slab soil vapor intrusion into select retail spaces at the site.

4.0 HAZARD ASSESSMENT

This section provides an assessment of general hazards that may be encountered during field activities at the site. Site hazards that potentially could be encountered during fieldwork include chemical hazards, physical hazards, and biological hazards. Each of these groups of potential hazards is addressed below.

4.1 General Hazard Assessment

A general hazard assessment was conducted for the required fieldwork described in Section 3.0, and the following potential hazards have been identified:

- Skin and eye contact with contaminants;
- Incidental ingestion of contaminants;
- Inhalation of dusts;
- Physical hazards associated with the use of heavy equipment;
- Tripping hazards;
- Noise exposure;
- Heat stress (depending on weather conditions);
- Cold exposure (depending on weather conditions);

- Biological hazards;
- Chemical hazards;
- Utilities (explosive and electrical hazards);
- Flammable hazards;
- Drum handling; and,
- Use of personal protective equipment (PPE).

For reference, Table 1 shows the site-related contaminants of concern (COCs) and the exposure limits. Specific chemical, physical and biological hazards are discussed in detail below.

Mitigation and controls will include, as needed, work procedures, work/rest regiment, dust control measures, personal protective equipment, and respiratory protection as appropriate.

4.2 Chemical Hazards

The following chemical hazard evaluation for the proposed remedial action is based on the available site information discussed in Section 2.2 and summarized in Table 1. The evaluation has been conducted to identify materials that potentially may be present at the site, and to ensure that work activities, personnel protection, and emergency response are consistent with the specific contaminants that potentially could be encountered.

4.2.1 Chemical Hazard Exposure Routes

Potential hazards and their exposure routes include:

- Incidental or inadvertent ingestion of potentially toxic substances via hand to mouth contact or deliberate ingestion of materials inadvertently contaminated with potentially toxic materials;
- Skin and eye contact with contaminants at the site and decontamination activities; and,
- Inhalation of dust.

For personnel the potential for exposure to the site chemicals is expected to be low to moderate. Any potential exposure is primarily expected to occur through inhalation and/or dermal contact and secondarily through accidental ingestion.

4.2.2 Control of Exposure to Chemical Hazards

Real time air monitoring for volatile organic compounds and total dust will be conducted as needed based on task, to assess employee exposure during remedial activities. The use of personal protective equipment, implementation of dust suppression measures, along with good personal hygiene practices and proper decontamination procedures will significantly reduce any potential for exposure to chemicals.

4.3 Physical Hazards

The following physical hazards could potentially be encountered during the construction activities:

- heat stress;
- cold exposure;
- working near heavy equipment;
- noise exposure;
- slip, trip, and fall hazards;
- use of PPE; and
- other physical hazards.

These hazards are further described below.

4.3.1 Heat Stress

Working in hot conditions and/or in protective clothing can greatly increase the likelihood of developing heat stress. This can result in health effects ranging from transient heat cramps to serious illness or death. Workers shall monitor themselves and others for signs of heat stress. The signs and symptoms of heat stress are as follows:

1. Heat rash (caused by continuous exposure to heat or humid air) including:
   - reddish blotches
2. Heat cramps (caused by heavy sweating with inadequate electrolyte replacement) including:
   - muscle spasms
   - pain in hands, feet, and abdomen
3. Heat exhaustion (from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration) including:
   - pale, cool, moist skin
   - heavy sweating
   - dizziness
   - nausea, and
   - fainting
4. Heat stroke (from failure of body temperature regulation) including:
   - red, hot, usually dry skin
   - lack of or reduced perspiration
   - nausea
   - dizziness and confusion
   - strong, rapid pulse
   - coma

This is a medical emergency and requires immediate professional medical attention.

4.3.2 Cold Exposure

Personnel exposed to cold temperatures and cool, windy conditions may experience cold stress in the form of frost bite. Workers will monitor themselves and others for signs of frost bite.

Signs of cold stress include yellow or white patches of skin on the fingertips, nose and ears. These areas will feel numb. The affected parts should be re-warmed by placing hands under armpits, or staying in a warm environment. Do not rub the affected parts or submerse in warm or hot water. The person will not return to work until additional protection (e.g., gloves, hard hat liner) is obtained. Personnel are encouraged to change into dry socks after the lunch break as perspiration held by the socks prompts cooling of the feet. Should clothing become wet, the person must change into dry clothes before resuming work. Wet clothing can lead to hypothermia.

4.3.3 Confined Space

Confined space entry is not anticipated as part of the remedial action activities. The HASP will be modified accordingly if confined space entry is necessary.

4.3.4 Working near Heavy Equipment

Personnel working in the immediate vicinity of heavy equipment specifically the AS/SVE system mechanical equipment (*i.e.* blowers) may encounter physical hazards resulting from contact with equipment. Field personnel should be aware of the presence of these hazards at all times and take appropriate precautions when working with the equipment.

The following are general work practices to be utilized when working near or with the AS/SVE equipment:

- Hand tools maybe required for general maintenance and system operation as such all hand tools must be kept in good condition, all damaged tools must be either repaired or replaced immediately and personnel must use the right tool for the right job.

- The site and AS/SVE equipment area is adequately cleared and kept clean and free of slip, trip and fall hazards.
- Personnel must be aware of the operation of the AS/SVE system and must know how to shut off the equipment in an emergency.
- The equipment presents a potential electrocution hazard and as such personnel must be aware of the electrical component of the AS/SVE system and use appropriate precaution.
- Lock-out Tag-out procedures must be utilized when performing maintenance on the AS/SVE system as appropriate.

4.3.5 Noise Exposure

The remedial action activities will not present a noise exposure hazard. The AS/SVE system equipment operate at a noise level below the OSHA 8-hour Time Weight Average (TWA) of 85 decibels. However, if noise levels of any operation exceeds, the OSHA standard, a hearing protection program meeting the requirements of 29 CFR 1910.95 will be implemented.

4.3.6 Slip, Trip, and Fall Hazards

Care should be exercised when walking at the site, especially when carrying equipment. The presence of surface debris, uneven surfaces, facility equipment contribute to tripping hazards. Elevated work is not anticipated, however, if the need arises the HASP will be modified accordingly. Applicable OSHA standards for fall protection (29 CFR 1910.21 through 29 CFR 1910.32) shall apply, as necessary.

4.3.7 Hand and Power Tools

In order to complete the various tasks for the project, personnel may utilize hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Ground Fault Circuit Interrupters (GFCIs) are required for all portable tools. Tools powered by gasoline or diesel will be minimized and special precautions will be taken when transporting and using fuels. Spill prevention and mitigation equipment will be utilized in instances when fuel powered equipment is used at the site.

4.3.8 Use of Personal Protective Equipment (PPE)

Personal protective equipment increases physical exertion and impairs visibility, hearing and manual dexterity. Working in PPE also increases the chances of heat stress.

4.3.9 Utilities (Electrocution, Fire and Explosion Hazards)

The RAWP does not require intrusive work such as drilling or excavation and as such the possibility of encountering underground utilities is not a hazard associated with the RAWP. If intrusive work will be required, the HASP will be modified accordingly to address the potential for underground utility hazards.

4.3.10 Drum Handling

Drum handling will be limited to the storing of purge water from monitoring well sampling and AS/SVE moisture trap accumulations. The movement and opening of drums for sampling is not anticipated, however, if necessary drum sampling will be done in accordance with 29 CFR 1910.120(j). Accidents may occur during handling of drums and other hazardous waste containers. Hazards include detonation, fires, explosions, vapor generation, and physical injury resulting from moving heavy containers by hand and working around stacked drums, heavy equipment, and deteriorated drums. OSHA regulations (29 CFR Parts 1910 and 1926) include general requirements and standards for storing, containing, and handling chemicals and containers, and for maintaining equipment used for handling materials. USEPA regulations 40 CFR Part

265 stipulates requirements for types of containers, maintenance of containers and containment structures, and design and maintenance of storage areas.

4.4 Biological Hazards

The site is in an urban setting and the probability of personnel being impacted by biological hazards such as poisonous plants and insects is minimal. However, the following section addresses these hazards.

Insects, including bees, wasps, hornets, mosquitoes, and spiders, may be present at this site. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life threatening condition, in addition, mosquito bites may lead to St. Louis encephalitis or West Nile encephalitis. Personnel that have been bitten or stung by an insect at the site should notify the SHSO/FSO of such immediately.

Lyme disease is caused by infection from a deer tick that carries a spirochete. During the painless tick bite, the spirochete may be transmitted into the bloodstream, which could lead to the worker contracting Lyme disease. This flu-like illness is out of season, commonly happening between May and October when ticks are more active. Symptoms can include a stiff neck, chills, fever, sore throat, headache, fatigue and joint pain. Early signs may include an expanding skin rash and joint pain. If left untreated, Lyme disease can cause serious nerve or heart problems as well as a disabling type of arthritis. If personnel feel sick or have signs similar to those above, they should notify the SHSO/FSO immediately. There aren’t any heavily wooded areas on site or within close proximity to the site, however, It is recommended that personnel check themselves when in areas that could harbor deer ticks, wear light color clothing and visually check themselves and their buddy when coming from the site as a precaution. If a tick is found biting an individual, the SHSO/FSO should be contacted immediately. The tick can be removed by pulling gently at the head with tweezers. The affected area should then be disinfected with an antiseptic wipe.

The following is a list of preventive measures for mitigating exposure to insects and poisonous plants:

- Apply insect repellent prior to fieldwork and or as often as needed throughout the shift.
- Wear proper protective clothing (work boots, socks and light colored pants).
- Field personnel who may have insect or plant allergies (i.e. bee sting) should provide this information to the SHSO/FSO prior to commencing work, and will have allergy medication on site.

The SHSO/FSO will instruct the project personnel in the recognition and procedures for encountering potentially hazardous insects at the site.

5.0 GENERAL HEALTH AND SAFETY REQUIREMENTS

This section deals with general health and safety programs and procedures that are required to be used during remedial action activities.

5.1 Medical Surveillance Program

All personnel engaged in field activities on this project must have baseline physical examinations and be participants in their employer's medical surveillance program. This program must meet the requirements of 29 CFR 1910.120(f).

In the unlikely event of an exposure event occurring, the affected employee will be sent for any necessary evaluation and treatment at the designated hospital.

5.2 Training

Pursuant to 29 CFR 1910.120, site workers conducting activities documented in the RAWP and this HASP will have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations unless otherwise authorized to work by the SHSO/FSO. Annual eight-hour refresher training will be required of all workers to maintain their qualifications for site work. At the discretion of the SHSO/FSO, three days of directly supervised on-the-job training may suffice. This training will address the duties the employees are expected to perform.

During the initial site briefing, those individuals that have received first aid, CPR, and blood borne pathogen training will be identified. The training will be consistent with the requirements of the American Red Cross Association. If no CPR or first aid trained personnel are available, local medical and emergency medical facilities and personnel will be utilized as necessary.

5.3 Incident Reporting

Should any employee observe a potentially unsafe condition or situation, it is the responsibility of that employee to immediately bring the observed condition to the attention of the SHSO/FSO. The SHSO/FSO must follow-up the verbal notification by completing the Unsafe Conditions and Practices Form provided in Attachment B.

Should employees find themselves in a potentially hazardous situation, the employee will immediately discontinue the hazardous procedure(s) and either personally takes the appropriate preventative or corrective measures, or immediately notifies the SHSO/FSO of the nature of the hazard. In the event of an immediately dangerous or life-threatening situation (IDLH), the employee always has “stop work” authority.

All accidents must immediately be reported to the SHSO/FSO. Injuries or illnesses meeting the definition of an OSHA Recordable Injury or Illness will be logged on the OSHA 200 and the OSHA 101 or equivalent record completed. The OSHA 200 log for the site will be maintained on site. Copies will be provided to the SHSO/FSO.

If anyone on site witnesses a near-accident they must complete the Incident Report (Attachment C) and submit it to the Langan Health & Safety Officer within 72 hours. Near accidents are incidents that, depending on the circumstances, could have resulted in death, personal injury and/or property/equipment damage.

5.4 Excavations

Entry into on-site excavations beyond what is permissible under OSHA 29 CFR 1926 Subpart P (*i.e.,* excavation standard) by field personnel is not anticipated for the proposed scope of work. The HASP will be modified accordingly if entry into excavations becomes necessary.

5.5 General Work Practice Guidelines

The following work practice guidelines are intended to prevent injuries and adverse health effects. These guidelines represent the minimum standard procedures for reducing potential risks associated with various aspects of this project, and are to be followed by on-site personnel <u>at all times</u>.

- Do not handle soils or any other potentially contaminated items unless wearing appropriate gloves. Treat all soil and water as if it were contaminated.
- Always make an effort to approach any potentially contaminated feature/facility from upwind.
- Smoking, eating, drinking, chewing tobacco or toothpicks, storing food or food containers, or having open fires will not be permitted on site during intrusive activities. Eating, drinking, and smoking are permitted only in areas designated by the SHSO/FSO. Thoroughly wash hands and, if necessary, face before eating or putting anything in your mouth (*i.e.*, avoid hand-to-mouth contamination). Good personal hygiene will be practiced by field personnel to avoid ingestion of contaminants.
- Be alert to potentially changing exposure conditions, for example, as evidenced by perceptible odors or oily sheen on water.
- Be alert to the symptoms of fatigue and heat/cold stress and their effects on the normal caution and judgment of personnel.

- Hearing protection is available and should be included in the standard field and utilized during designated activities.
- Always use an appropriate level of personal protective equipment. Insufficient levels of protection can result in preventable exposure; excessive levels of safety equipment can impair efficiency and increase the potential for accidents to occur.
- Be aware of the effect of inclement weather (*e.g.,* rain, snow, ice, lightning) has on site safety. Be prepared to suspend activities as conditions warrant.
- Extreme caution must be used when activities occur near overhead utility lines.
- Personnel will bring to the attention of the SHSO/FSO any observed or known unsafe condition or practice associated with work activities that they are unable to correct themselves.
- Personnel will leave the work area immediately and notify the SHSO/FSO if potential hazards are identified.
- Personnel must avoid unnecessary contamination (*e.g.,* avoid walking through known or suspected "hot" zones, kneeling or sitting on the ground, leaning against potentially contaminated drums or equipment, *etc.*)
- Personnel will use the "Buddy System" (*i.e.,* working in pairs) when on-site. Buddies will prearrange hand signals for communication (see Section 5.15). Visual contact will be maintained between crew members at all times. Crew members must observe each other for symptoms of potential overexposure.
- Entry and exit to the site is through designated gates only.
- Work areas will be kept clear and uncluttered. Debris and other trip, slip or fall hazards will be removed as frequently as feasible.

5.6 Respiratory Protection

Based on the current analytical data, respiratory protection is not contemplated as necessary for the planned work. Respiratory protection will be utilized, if necessary, in accordance with the Respiratory Protection Program. The Respiratory Protection Program requires respirator users to be medically qualified, have current fit tests and have completed respiratory protection use training. Documentation of fit tests must be provided to the SHSO for any on-site field personnel. Medical qualification, fit test, and training records must be kept on site.

5.7 OSHA Information Poster/ OSHA 200 Log

A copy of the OSHA information poster will be present at the site. In accordance with the Occupational Safety and Health Act of 1970, it will be posted at full size (11 in x 17 in) in any vehicle used for the field work.

5.8 Initial Site Safety Meeting and Signing of Safety Briefing Form

Upon arrival at the site, the SHSO/FSO will meet with the contractors involved with on-site construction related activities to confirm the following site specific information:

- Directions from the job site to emergency medical facilities;
- Telephone numbers of the emergency personnel and Langan Project Manager; and
- The primary and alternate emergency assembly and evacuation routes.

Contractors/subcontractor will be responsible for attending an initial site safety meeting with the SHSO and/or FSO before work activity starts. During this meeting, it will be verified that all personnel have been provided with or have reviewed a HASP for the work activities to be performed for this project, the HASP will be reviewed, discussed, and any questions answered.

On-site personnel following the HASP will sign the "HASP Compliance Agreement" (see Section 11.0). Individuals refusing to sign the Form will not be allowed to conduct work which will disturb on-site soils.

The SHSO/FSO will conduct a daily safety briefing for all on-site personnel conducting remedial action field activities and will complete Health and Safety Briefing Form (see Attachment D).

5.9 Site Safety Briefings

During field operations, the SHSO/FSO will hold site safety briefings as needed to review and plan health and safety aspects of scheduled work. All field personnel who are following this HASP are required to attend these briefings. Documentation of all such safety meetings is required.

5.10 Hazard Communication Program

Compliance with the requirements of the OSHA Hazard Communication Standard is required by OSHA Regulations 29 CFR 1910.120. All personnel who will be required to work on site will be required to attend an initial on-site briefing conducted by the SHSO/FSO where each known contaminant on the site is discussed and the action levels are reviewed.

Material Safety Data Sheets (MSDS) will be available in the project area for all products brought on site. These safety data will be reviewed during the initial site safety meeting. The SHSO will maintain a MSDS file. Additional training for safe use of these materials during site safety meetings and briefings will be conducted as required.

5.11 Underground and Overhead Structures

As discussed in Section 4.3.9, intrusive work is not part of the revised RAWP. If however it becomes necessary, the HASP will be modified accordingly to address underground and overhead utility hazards.

5.12 Traffic Control

Some of the revised RAWP activities might require the work within a traffic area. The facility has active traffic within the parking areas. The proposed RAWP activities will occur inside retail spaces and within retail loading zones behind the facility, therefore traffic will be less than the other parts of the site. However, during site activities taking place outside of the site facility, field personnel must wear traffic vests and utilize high visibility cones and/or flashing lights.

5.13 First Aid Kit and Eye Wash Stations

A basic first aid kit will be available at the site during completion of all site work. This kit will be of an appropriate size in relation to the number of personnel on site and will include latex gloves, CPR barrier and eye wash solution.

For tasks involving a high potential for eye contact with hazardous materials, a portable eye wash station capable of dispensing solution for a minimum of 15 minutes will be made available near the task.

5.14 Communications

Verbal communication between site workers should be adequate. Constant communication between Project Managers, Site Supervisors and the SHSO/FSO will be possible through use of cellular phones. Although not anticipated, if the protective equipment requirements are changed to include respiratory protection, the field team will review the following basic hand signal communications during a safety briefing prior to donning respiratory protection equipment.

HAND SIGNAL	**MEANING**
Hand gripping throat	Cannot breathe.
Grips partner’s wrist or points to Contamination Reduction Zone	Leave area immediately.

Hands on top of head	Need assistance
Thumbs up	O.K., I understand.
Thumbs down	No, I don't understand
"Stick Break" with Fists	Take a break. Stop work.

6.0 AIR QUALITY MONITORING AND ACTIONS LEVELS

Atmospheric air monitoring results are used to establish or revise work zones and levels of personal protective equipment. Site-specific action levels will be used for this decision-making process.

All manufacturer instructions for monitoring instrumentation and calibration will be available on site. A calibration log is provided in Attachment E of this HASP. Instrument action levels for air monitoring are provided in Table 2.

It is not anticipated that personal monitoring will be required for this project.

6.1 Work Area Monitoring

Air monitoring shall be conducted at the following times or as specified by the site supervisor:

- Upon initial entry to rule out IDLH conditions;
- When the possibility of an IDLH condition or flammable atmosphere has developed;
- As an on-going check of the levels of contaminants in the breathing zone;
- When work is initiated on a different portion of the site;
- When contaminants other than those previously identified are encountered;
- When a different operation is initiated;
- When work involves the handling of leaking drums or containers or, when working in areas with obvious liquid contamination.

Air monitoring will consist, at a minimum, of the criteria listed on Table 2. This data will be made available for review by all interested persons. Air monitoring instruments will be calibrated and maintained in accordance with the manufacturer's specifications.

6.2 Community Air Monitoring Requirements

The New York State Department of Health (NYSDOH) has issued guidelines on community air monitoring of fugitive dust emissions and VOCs during intrusive activities at contaminated sites (*e.g*. excavation, drilling, *etc*.). These guidelines are contained within the Department's Generic Community Air Monitoring Program (CAMP) document. The RAWP activities proposed in the revised RAWP does not involve intrusive work. However, continuous monitoring for VOCs will be conducted during the installation of the proposed sub0salb vapor venting system. Periodic monitoring for VOCs will be conducted during non-intrusive activities including groundwater sampling and AS/SVE system monitoring. The monitoring well head space and breathing zone will be screened during the groundwater sampling. A community air-monitoring program including both VOC and dust monitoring will be implemented as discussed below.

6.2.1 General

- Conduct real-time air monitoring for VOCs and dust during intrusive activities.
- Monitoring frequency depends on weather/wind conditions, level of activity, and as specified below.
- Monitor and record direction and estimated speed of prevailing wind daily and as conditions change.

6.2.2 VOC Monitoring

- Prior to initiating work and periodically during work, establish background VOC levels around and upwind of the work area. Record all later VOC levels relative to background, (*i.e.*, ppm above background).

- Monitor the breathing zone at the downwind perimeter of the Work Zone/Decontamination Zone, where contaminated soils are disturbed, handled or stored, and where odors are noted.
- In general, monitor every 30 minutes when soil is being disturbed, or when new odors are encountered.
- If VOC levels exceed 5 ppm (above background) at locations noted above, immediately conduct further downwind monitoring at the nearest public exposure point. (The nearest exposure point will consist of the property line and within the onsite strip mall during activities conducted outside the building and within the building during activities conducted within the building (*i.e.*, installation of sub-slab vapor venting system).
- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 ppm above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion ozone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less, but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.
- Record all 15-minute readings in field notebook.

6.2.3 Dust Monitoring

The activities outlined in the scope of work (Section 3.0) are not anticipated to produce visible or excessive airborne dust. However, if during intrusive activities dust is observed by the SHSO, the following procedure will be used:

- Prior to initiating work and periodically during work, establish background dust levels around and upwind of the work area. Record all later dust levels relative to background using a portable dust meter (*i.e.*, ug/m^3 above background).
- Monitor the breathing zone continuously at upwind and perimeter of the Work Zone/Decontamination Zone at two temporary monitoring stations.
- In general, if visible dust is not observed, monitoring will be conducted once per hour at locations noted above, and four times a day at upwind locations and at the nearest downwind public exposure point.
- If dusty conditions are observed despite implementing the dust control measures, then dust monitoring will be implemented.
- If dust is observed leaving the downwind perimeter of the Work Zone/Decontamination Zone, immediately conduct further downwind monitoring at half the distance to the nearest public exposure point (i.e., property line) and at upwind locations.
- Record levels in field notebook.
- Suggested Action Levels for dust suppression/discontinuing work:
    - If the downwind PM-10 particulate level is 100 ug/m^3 greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 ug/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

The SHSO may discontinue dust monitoring depending on weather conditions, soil conditions, and effectiveness of dust control measures. If soil is handled in a wet state preventing significant airborne dust, then real-time dust monitoring will not be conducted. Conversely, if site conditions become dryer and significant amounts of dust may become airborne, then the SHSO must require real-time dust monitoring to verify that dust concentrations are below the action levels. Sampling locations will be dictated based on wind direction. SHSO must require real-time dust monitoring to verify that dust concentrations are below action levels.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 Definition of Levels of Protection

The following scheme will be used to designate the required levels of respiratory protection and PPE: D, Modified Level D, and C. These levels of protection are described in Table 3.

7.2 Determination of Levels of Protection

The level of protection selected is based primarily on:

- The type, toxicity, and measured concentration of the chemical substance; and
- The potential or measured exposure to substances in the air, splashes of liquid, or other direct contact.

The level of protection for activities where there is little chance of exposure or contact with potential site contaminants will be Level D. Modified Level D will be worn for activities where there may be incidental skin contact with soil, waste, or groundwater. Modified Level D will consist of Level D, with nitrile gloves for any material handling.

The level of protection to be worn by field personnel will be determined and controlled by the SHSO/FSO. The level of protection may be upgraded or downgraded depending upon air monitoring results, visual signs of contamination or physical degradation of the PPE being used.

This HASP provides only for Level D or Level C protection. The need for Level B respiratory protection and PPE is not expected during project work and is, therefore, not covered by this HASP. Level C procedures are included herein as a contingency.

In the event of an emergency, workers must wear appropriate levels of protection for that activity. The SHSO/FSO would determine the appropriate level of protection at the time of the emergency. All intrusive work would be shut down during these activities.

7.3 On-Hand Safety Equipment

The following personnel protection and first aid equipment shall be available in the support vehicles/areas for the field crew:

- Fire extinguisher, rated at least 1A, 10BC;
- Standard Industrial First Aid Kit, fully stocked;
- Portable emergency Eyewash Unit/access to clean water (capable of providing at least 15 minutes of continuous flushing ability); and,
- Field wash equipment.

8.0 SITE CONTROL MEASURES

The primary purpose for site controls is to establish the hazardous area perimeter, to reduce migration of contaminants into clean areas, and to prevent access or exposure to hazardous materials by unauthorized personnel. At the end of each work day, the site should be secured or guarded to prevent unauthorized entry.

8.1 Designation of Work Zones

On-site safety zones are not required because intrusive field activities will not be completed as part of the revised RAWP. If intrusive work will be completed, the HASP will be modified to address work zone designations.

8.2 Contamination Control Procedures

There may be on-site areas where contaminated media may be encountered. It is very important that all site workers avoid and minimize contamination and use good hygiene practices. Good hygiene practices include washing hands and face prior to eating, drinking and at the end of the work day, and making provisions to keep used PPE, dirty boots and clothing outside of vehicles and clean areas.

Intrusive work is not part of the RAWP and as such personnel decontamination will not be routinely required. However, personnel and equipment that have been on site will be decontaminated prior to leaving the area as necessary. All decontamination procedures and facilities will be under the control of the SHSO/FSO.

8.2.1 Personnel Decontamination

The field personnel should wash their hands and face, remove gross contamination on boots and clothing on site.

Decontamination (decon) facilities will be located near the decon pad if necessary. Additional field decontamination stations will be established at the location of excavations to facilitate personnel and equipment decontamination that have been involved with on-site work. This field decontamination setup will consist of two tubs on the ground, one a wash tub and one a rinse tub. Typically, the RAWP will be done in Level D and as such, the PPE will be removed and placed in appropriate receptacles for disposal.

Decontamination steps if necessary are:

Step 1: Equipment drop	Deposit equipment (*e.g.*, hand tools, monitoring instruments, etc.) on plastic drop cloth.
Step 2: Outer garment, boots	Wash outer garment, boots, outer gloves with a soapy gloves wash water solution and scrub brushes. Personnel will then proceed to the next station.
Step 3: Outer garment, boots	Rinse outer garment, boots, outer gloves with clear gloves rinse water.
Step 4: Remove outer gloves	Remove outer gloves. Deposit in provided container with plastic liner.
Step 5: Cartridge/respirator change	If workers have left the work zone only to change cartridges or respirator, this is the last step in the decon procedure. New outer gloves are now donned, joints taped and worker returns to exclusion zone.
Step 6: Suit & boot removal	Remove boots and protective suite and deposit in provided container with plastic liner.

Step 7: Respirator Removal	Remove respirator. Deposit in provided container. Avoid touching face with hands.
Step 8: Wash and rinse inner-	Wash and rinse inner gloves.
Step 9: Remove inner gloves	Remove inner gloves and deposit in provided container with plastic liner. Avoid touching the outside of the gloves during removal.
Step 10: Field wash	Wash hands and face thoroughly. Shower as soon as reasonable.

8.2.2 Equipment Decontamination

As discussed in the revised RAWP, field equipment decontamination will be limited because dedicated pre-decontaminated equipment will be used whenever possible. The type of equipment used during groundwater sampling can be decontaminated within a plastic bucket or tub. Decontamination fluids will be collected and drummed and temporarily stored on site. No fluids will be permitted to spill onto the ground or enter sanitary drains. Equipment and materials used during field activities will be removed from the site as expeditiously as practical. At the conclusion of the fieldwork, a general site cleanup will be performed.

9.0 EMERGENCY RESPONSE PLAN

Site personnel will familiarize themselves with the location of the nearest phone, medical facilities and evacuation routes upon arrival at the site. Evacuation routes will be covered in the daily site briefings.

If an unanticipated, potentially hazardous situation arises such as medical emergency, fire, visible contamination, or unusual or excessive odors, <u>site</u>

personnel will cease operation, move away to a safe area, follow the established procedures. When help arrives, site personnel will defer all emergency response authority to appropriate responding agency personnel.

Emergency notification telephone numbers are in Attachment F of this document.

9.1 Emergency Alerting Procedures

Personnel will operate using the "buddy system" on site. Each individual will maintain visual/aural contact with another individual or group at all times. Separate groups will be aware of any other group(s) locations at all times.

9.2 Medical Emergency

In the event of a serious medical emergency, site personnel will contact 911, inform them of the nature of the emergency, and then notify the SHSO/FSO.

Injured or ill personnel will be decontaminated if their medical condition permits it, prior to arrival of the emergency response personnel. If the injured or ill person cannot be moved, emergency personnel will be provided with a briefing on the potential contaminants and appropriate personal protective equipment when they arrive on site. All nearby intrusive activities will be stopped during the emergency.

Any personnel responding to an incident involving blood or other potentially infectious materials will assume all "source personnel" are infectious and will utilize "Universal Precautions" and comply with 1910.1030 "Bloodborne Pathogens."

9.2.1 Potential Chemical Exposures

If personnel experience any of the following symptoms, they should cease work and report the occurrence to the SHSO/FSO promptly:

- skin, eye, or respiratory system irritations;
- skin rashes/burns;

- headaches, dizziness;
- nausea/GI tract problems;
- muscle spasms/tremors;
- nervous system problems;
- chills; and
- fatigue.

The SHSO/FSO will evacuate the area (upwind if possible) and evaluate affected personnel for signs and symptoms of exposure. Appropriate first aid measures will be taken moving the person to fresh air and then transport to the local hospital (Figure 2) for a complete physical examination soon as possible. The work activity will not resume until the atmospheric conditions are evaluated and additional protective measures taken, if necessary. Note that the above symptoms are not necessarily caused by chemical exposure.

9.2.2 Injury or Unknown Illness

Should any person be injured or become ill, initiate the following emergency response plan and notify the SHSO/FSO as soon as possible.

1. Proceed to nearest first aid.
2. Remove outer protective garments and gross contamination, (additional decontamination can be postponed until the injured is stabilized).
3. If necessary, wash injury area with soap and water.
4. Provide immediate emergency treatment of injuries.
5. Transport to hospital for additional evaluation.

9.2.3 Hospital Directions

The closest hospital to the site is listed below:

St. John’s Episcopal Hospital
11504 Rockaway Beach Blvd
Far Rockaway, NY 11694-2312 US

The driving directions are as follows:

- Start out going Southwest on ROCKAWAY BEACH BLVD toward BEACH 99TH ST. and proceed for 0.18 miles.
- Turn RIGHT onto BEACH 102ND STREET and proceed for 0.06 miles
- Turn LEFT onto ROCKAWAY BEACH BOULEVARD and proceed for 0.74 miles. The hospital is on the left-hand side of the road.
- The total distance is 0.98 miles and total estimated travel time is 2 minutes.

The SHSO/FSO will confirm the directions to the hospital prior to remedial action field activities, being alert for construction and road closures.

9.3 Fire and Explosions

Fire prevention is the best contingency plan. There is no smoking on the site and care should be exercised to avoid idling a vehicle over dry grass or other combustible materials. Fire extinguishers will be located on site at intrusive activity and inspected weekly. Carbon dioxide or dry chemical fire extinguishers are effective for fires involving wood, grass, or flammable liquids. They are appropriate only for small, localized fires. No attempt should be made to use these extinguishers for well-established fires or large areas or volumes of flammable liquids.

In the event of fire:

1. If the situation can be easily controlled with available fire extinguishers without jeopardizing the health and safety of site personnel, take immediate action to do so.
2. Immediately notify site emergency personnel and the local fire department at 911 for backup.
3. Evacuate the area until the situation is resolved.

If the fire cannot easily be controlled or in the event on an explosion:

1. Immediately notify site emergency personnel and the local fire department.
2. Clear the area of all personnel working in the immediate vicinity.
3. Isolate the fire to prevent spreading, if possible.

9.4 Chemical Spills/ Releases, Disposal and Removal

All chemical spills will be immediately reported to the SHSO/FSO. All spills will be contained and cleaned up before work resumes. Adequate absorbent materials will be on hand to address the type and quantity of chemical brought on site. The materials being used to contain the spill can be absorbed and transferred into proper containers for disposal. The spill area will be returned to its original (pre-spill) condition. Spilled materials will be drummed and moved to the staging area.

9.5 Unforeseen Circumstances

The Health and Safety procedures specified in this plan are based on the best information available at the time. Unknown conditions may exist and known conditions may change. This plan cannot possibly account for every unknown or anticipate every contingency. If personnel suspect or encounter areas of substantially higher levels of contamination, or should any situation arise which is obviously beyond the scope of the safety procedures specified herein, work activities will be modified or halted pending discussion with the SHSO and implementation of appropriate protective measures.

9.6 Accident and Incident Reports

If an incident or accident occurs on site, the SHSO and Project Manager will be notified and the Incident Report (Attachment C) will be completed. The report will be completed by an eyewitness along with assistance from the SHSO. The report will be forwarded to the Project Manager as soon as possible for further investigation or follow-up.

9.7 Emergency Contacts

Emergency notification telephone numbers are summarized in Attachment F. These numbers will be posted at the site or will readily available with other emergency information.

10.0 APPROVAL PROCESS

Revisions to the HASP must be approved by the SHSO, Rockaway Commons, LLC Project Manager and Langan Project Manager before implementation.

This Health and Safety Plan for field activities relating to the site is hereby approved by the following personnel:

Rockaway Commons, LLC Project Manager- _____________ Date:____________

Langan Project Manager - _____________ Date:_____________

Langan SHSO - _____________ Date:_____________

11.0 COMPLIANCE AGREEMENTS

All Langan personnel who will be working on the site, must read the HASP and sign the attached.

HASP COMPLIANCE AGREEMENT

By signing you are indicating that you have read and understand the HASP, received a site orientation and agree to follow the safety procedures outlined herein.

Name Date

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12.0 REFERENCES

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TABLES

TABLE 1
CONTAMINANTS OF CONCERN
DAYTON SHOPPING PLAZA
QUEENS, NEW YORK

Contaminant	Skin Absor Haz.	PEL[a]	TLV[b]	REL[c]	STEL[d]	IDLH[e]	Odor Thres-hold	IP[f]
Benzene [i,j]	Yes	1 ppm	0.5 ppm	0.1 ppm	5 ppm	500 ppm	61 ppm	9.25 eV
Carbon Tetrachloride [i,j]	Yes	10 ppm	5 ppm	2 ppm	25 ppm	200 ppm	140-584 ppm	11.47 eV
Chlorobenzene	Yes	75 ppm	10 ppm	NA[k]	NA[k]	1000 ppm	1.3 ppm	9.07 eV
Chloroethane	Yes	1000 ppm	1000 ppm	1000 ppm	NA[k]	3800 ppm	4.2 ppm	10.97 eV
Chloroform	Yes	50 ppm	10 ppm	2 ppm	50 ppm	500 ppm	133-276 ppm	11.42 eV
(cis & trans) 1,2-Dichloroethene (DCE)	No	200 ppm	200 ppm	200 ppm	NA[k]	1000 ppm	17 ppm	NA
Tetrachloroethene (PCE)[h]	Yes	100 ppm	25 ppm	Low as possible	100 ppm	150 ppm	47 ppm	9.32 eV
Trichloroethene (TCE)[j]	No	100 ppm	50 ppm	25 ppm	100 ppm	1000 ppm	82 – 110 ppm	9.45 eV
Vinyl Chloride (VC)[i,j]	No	1 ppm	5 ppm	Low as possible	NA	NA	NA	10.00 eV

Note:

a OSHA Permissible Exposure Limit (PEL). PCE & TCE averaged over an 8-hour period, not to exceed 200 ppm over any 15-minute period or 300-ppm for 5 minutes over any 3-hour period. DCE averaged over an 8-hr time period. VC averaged over an 8-hr period not to exceed 15 ppm over any 15-minute period.

b American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV). Averaged over an 8-hr period.

c National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit (REL). Averaged over a 10-hr period.

d Short-Term Exposure Limit

e Immediately Dangerous to Life & Health

f Ionization Potential taken from HNU Systems, Inc., United Kingdom Copyright 1997-1999. (http://www.hnu.co.uk/downloads/ips.pdf)

h Suspected carcinogen in humans

i Known carcinogen in humans

j Known mutagen

k NA – Not available

l All information other than ionization potential taken from NJ Department of Health and Senior Services, Division of Epidemiology, Environmental and Occupational Health – Right-to-Know Fact Sheets for individual chemicals. (http://www.state.nj.us/health/eoh/rtkweb/rtkhsfs.htm)

TABLE 2
INSTRUMENTATION ACTION LEVELS
DAYTON SHOPPING PLAZA
QUEENS, NEW YORK

Instrument	Action Level	Level of Protection / Action Required
PID	≤ 1 ppm within the work area	Level D
	> 1 ppm within the work area sustained for five minutes	Check for PCE with colorimetric tubes
	> 2.5 ppm within work area sustained for five minutes	Level C with minimum half face APR with combination organic vapor/HEPA (P100) cartridges
	> 15 ppm within work area sustained for five minutes	Level C with minimum full face APR with combination organic vapor/HEPA (P100) cartridges
	> 50 ppm within work area sustained for five minutes	Stop Work/Re-evaluate PPE level
Colormetric Tube – PCE	> 1 ppm within the work area	Level C with minimum half face APR with combination organic vapor/HEPA (P100) cartridges
	> 10 ppm within the work area	Level C with minimum full face APR with combination organic vapor/HEPA (P100) cartridges
	> 50 ppm within the work area	Stop Work / Backfill source of emissions and re-evaluate.

*PID readings are taken at personnel breathing zone height.

TABLE 3
PERSONAL PROTECTIVE EQUIPMENT
DAYTON SHOPPING PLAZA
QUEENS, NEW YORK

Respiratory Protection*:*

Level D:	No respirator required.
Level C:	Fullface, Air Purifying Respirator (APR) with combination HEPA (dusts, fumes, aerosols) and organic vapor cartridges. The respirator will be NIOSH-approved.
Level C - supplemental by task	Fullface, Air Purifying Respirator (APR) with combination HEPA (dusts, fumes, aerosols), acid gas, organic vapor cartridges. The respirator will be NIOSH-approved.

Personal Protective Clothing*:*

Level D:	Hard-hat, traffic vest (if working on or adjacent to the roadway), long sleeve work shirt & work pants, safety glasses or goggles, steel-toed boots, hearing protection (if needed).
Level D - supplemental PPE by task	Drilling of Monitoring Wells: Latex inner surgical gloves and outer nitrile or neoprene gloves Ground Water sampling: Latex inner surgical gloves and outer nitrile or neoprene gloves
Level C:	Polycoated Tyvek disposable suit or equivalent, Outer Gloves: Nitrile or neoprene, Inner gloves: Latex Surgical, Chemically resistant outer boots, Hard-hat, Traffic Vest (whenever working on or adjacent to the roadway).

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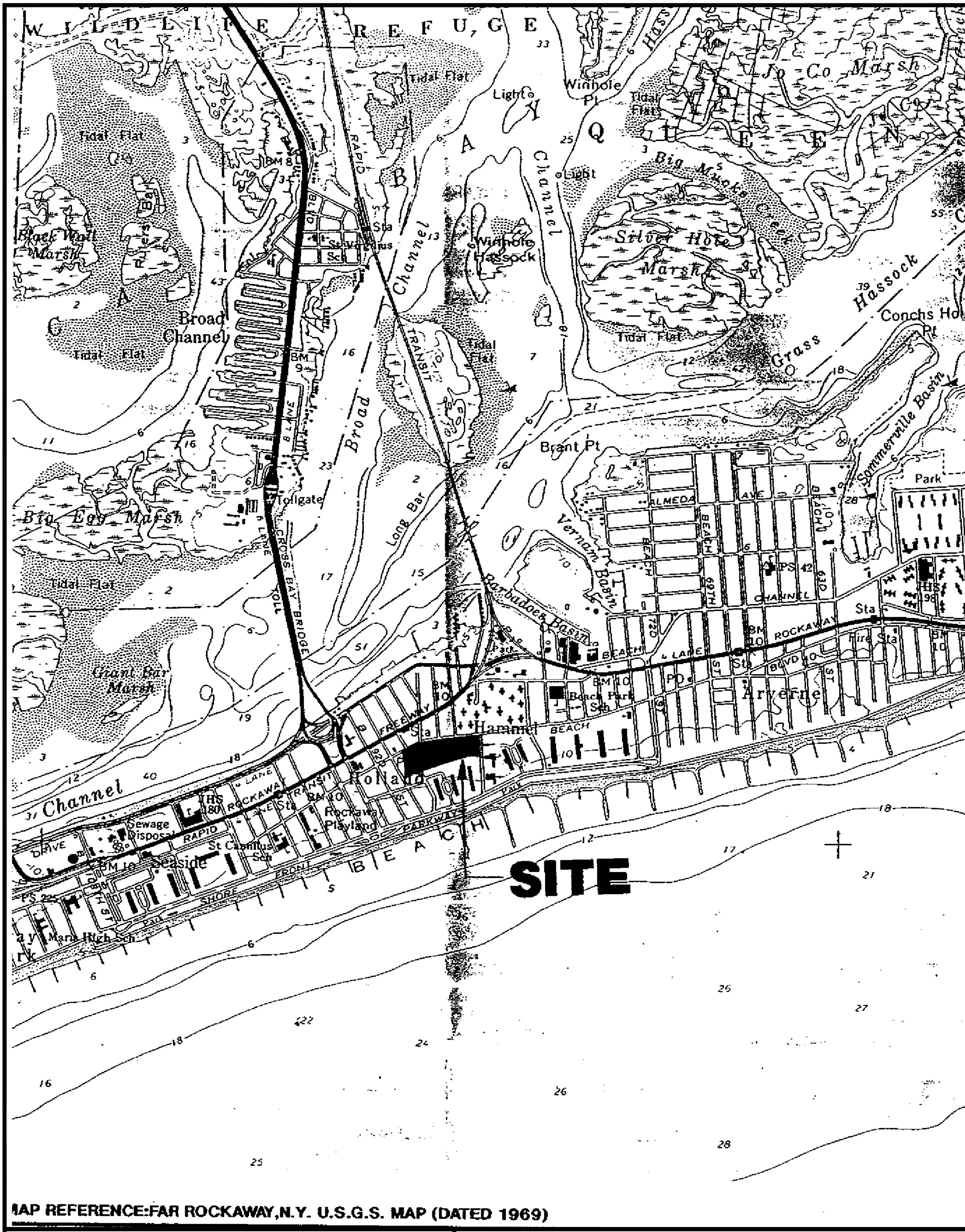
FIGURES



MAP REFERENCE:FAR ROCKAWAY,N.Y. U.S.G.S. MAP (DATED 1969)

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

River Drive Center 1 Elmwood Park, NJ 07407
P: 201.794.6900 F: 201.794.0366
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NEW JERSEY PENNSYLVANIA NEW YORK CONNECTICUT FLORIDA

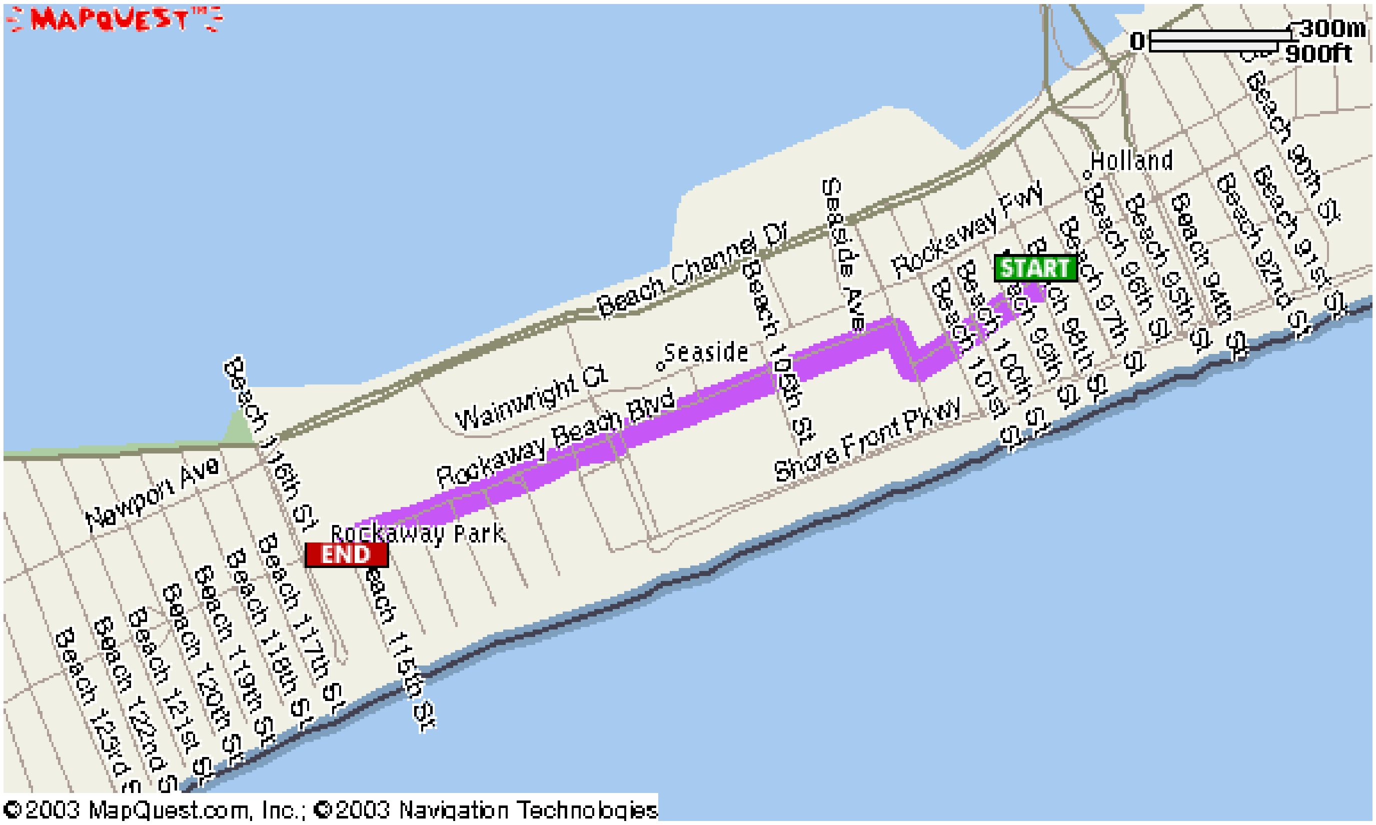
NJ Certificate of Authorization No: 24GA27996400

Project

DAYTON PLAZA
SITE LOCATION MAP

QUEENS NEW YORK

Project No.	Date	Scale	Dwg. No.
1461905	01/18/05	1"=2000'	1



Site:
Dayton Plaza
85-15 Rockaway Beach Blvd
Rockaway, NY 11694 US

Hospital
St. John's Episcopal Hospital
11504 Rockaway Beach Blvd
Far Rockaway, NY 11694-2312 US

Driving Directions

1.Start out going Southwest on ROCKAWAY BEACH BLVD toward BEACH 99TH ST.	0.18 Miles
2.Turn RIGHT onto BEACH 102ND ST.	0.06 Miles
3.Turn LEFT onto ROCKAWAY BEACH BLVD.	0.74 Miles

Total Distance: 0.98 miles
Total Estimated Time: 2 minutes

Langan
Engineering and Environmental Services

- ELMWOOD PARK, NJ – NEW YORK, NY – MIAMI, FL – PHILADELPHIA, PA –
- DOYLESTOWN, PA – NEW HAVEN, CT -

Hospital Route – St. Johns Episcopal Hospital
Dayton Shopping Plaza

Queens | New York

Project	SCALE	DATE	
1461905	**N.T.S.**	**10/2005**	**FIGURE 2**

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ATTACHMENT A

HASP Change Authorization Form

Attachment A

HASP CHANGE AUTHORIZATION FORM

Section to be changed:___________________________________

Duration of Authorization Requested Date:_________________

________ Today only

________ Duration of Task

_______ Other (Specify)____

Description of Procedures Modification:

____

____

Justification:

____

____

____

____
Person Requesting Change

____
Name

____
Title

____
Signature

____

Verbal Authorization Received From:

____
Name Time

____
Title

Approvals:

____
Langan Project Manager

____
Langan HSO

____
Rockaway Commons,LLC Project Manager

____
Langan SSO

ATTACHMENT B

Unsafe Conditions and Practices Form

UNSAFE CONDITIONS AND PRACTICES FORM

DESCRIPTION OF CIRCUMSTANCES REGARDING UNSAFE CONDITION OR PRACTICE: ______________________________

____

____

____

____

IS THIS CONDITION EXISTING OR POTENTIAL?: ______________________________

REPORTED TO: ______________________________

REPORTED BY: ______________________________

DATE REPORTED: ______________________________

COMMENTS: ______________________________

____

____

____

ATTACHMENT C

Health and Safety Briefing Form

Attachment C

HEALTH AND SAFETY BRIEFING FORM

The following personnel were present at a pre-job safety briefing conducted at __________ (time) on ______________ (date) at _____________________________ (location), and have read this Health and Safety Plan for the Remedial Action Work Plan at the Dayton Shopping Plaza and are familiar with its provisions:

Name	Signature
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________

Fully charged ABC class fire extinguisher available on Site? __________

Fully stocked First Aid Kit available on Site? __________

All project personnel advised of location of nearest phone? __________

All project personnel advised of location of designated medical facility? __________

____

Name of Field Team Leader or Site Safety Officer

____

Signature Date

ATTACHMENT D
Calibration Log

Attachment D

PID/FID CALIBRATION LOG

Date	Time	Inst Type	Inst #	Media	Initial Reading	Span #	Calib Reading	Performed By:

ATTACHMENT E
Incident Report

LANGAN EMPLOYEE EXPOSURE/INJURY INCIDENT REPORT
(Submit a Separate Report for Each Employee and/or Incident)

Date:____________________

Employee's Name:__________________________ Employee No:_____________
Sex: M _____ F _____ Age: ______

Region:____________________________________Location:__________________

Project: ___________________________________ Project No:_________________

Incident:____

Type: Possible Exposure ______ Exposure _______ Physical Injury ______

Location:____

Date of Incident: _______________________ Time of Incident:_________________

Date of Report Incident: ____

Person(s) to Whom Incident was Reported: _____________________________

Weather Conditions During Incident: Temperature _________Humidity _________

Wind Speed and Direction: _______________ Cloud Cover: __________________

Clear: ________________________________Precipitation:____________________

Materials Potentially Encountered: ____________________________________

Chemical (give name of description - liquid, solid, gas, vapor, fume, mist):

____

____

Radiological:____

Other:____

Nature of the Exposure/Injury: (State the nature of the exposure/injury in detail and list the parts of the body affected. Attach extra sheets if necessary).

____

____

____

____

____

Did you receive medical care? Yes ___ No ___ If so, when ________________

Where? On Site ________________ Off Site ________________

By Whom: Name of Paramedic: ____________________________________

Name of Physician: ____________________________________

Other: ____

If Off Site, name facility (hospital, clinic, etc): ____________________________

____

Length of stay at the facility? ____________________________________

Was the Site Safety Officer contacted? Yes ______ No _______ When? _________

Was the Corporate Health and Safety Officer contacted? Yes _______ No______

If so, who was the contact? ____________________________________

Did the exposure/injury result in permanent disability? Yes _______ No ________

If so, explain: ____

____

____

____

Has the employee returned to work? Yes ________ No ________

List the names of other persons affected during this incident:

____

____

____

____

List the names of persons who witnessed the exposure/injury incident:

____

____

____

____

Possible cause of the exposure/injury incident: ____________________________

____

____

____

____

____

What was the name and title of the field team leader or immediate supervisor at the site of the incident?

____

Was the operation being conducted under an established Health and Safety Plan?
Yes ___________ No ____________ If yes, attach a copy. If no, explain

____

____

____

____

____

Describe protective equipment and clothing used by the employee:

____

____

____

____

____

Did any limitations in safety equipment or protective clothing contribute to or affect exposure? If so, explain:

____

____

____

What was the employee doing when the exposure/injury occurred? (Describe briefly as Site Reconnaissance, Site Characterization, or Sampling, etc.):

____
____
____
____
____

Where exactly on site or off site did the exposure/injury occur?

____
____
____
____
____

How did the exposure/injury occur? (Describe fully what factors led up to and/or contributed to the incident):

____
____
____
____
____
____
____

Name of person(s) initiating report, job title, phone number:

____
____
____

________________________ ________________________

Employee Signature Date

________________________ ________________________

Site Safety Officer Signature or
Field Team Leader Signature Date

ATTACHMENT F

Emergency Notification Numbers

Attachment F

EMERGENCY NOTIFICATION NUMBERS

The following list provides names and telephone numbers for emergency contact personnel.

Fire:	911			
Police:	911			
Ambulance:	911			
Hospital: St. John's Episcopal Hospital	718.474.2070			
Address: 11504 Rockaway Beach Blvd				
Chemical Trauma Capabilities?	**Yes:**	X	**No:**	
Decontamination Capabilities?	**Yes:**	X	**No:**	
Directions From Site to Hospital:	Start out going Southwest on ROCKAWAY BEACH BLVD toward BEACH 99TH ST., Turn RIGHT onto BEACH 102ND ST. and Turn LEFT onto ROCKAWAY BEACH BLVD.			
Note: See Figure 2 for route to hospital. Distance from the site to the hospital is: 0.98 mile The approximate driving time is: 2 minutes				
Poison Control Center:	800.336.6997			
Electric Company: Long Island Power Authority	1.800.490.0075			
Gas Company: Long Island Power Authority	1.800.490.0045			
Water Company: NYC DEP	718.595.7000			
National Response Center:	800.424.8802			
Center for Disease Control:	404.639.3311 (24-hour)			
Pesticide Information Service:	800.424.9346			
ATF (explosion information)	202.927.8310			
Chemtrec:	800.424.9300			
State Environmental Agency: NYSDEC Spills	800.457.7362			
U.S. EPA Region Name: II	Region Number: 212.637.3000			
Langan Project Manager:	Steven Ciambruschini 201.398.4549			
Langan Corporate Health & Safety Officer:	Robert Y. Koto 201.398.4566			
Site Health and Safety Officer:	Marshall King 201.981.8555			
Client Contact: Rockaway Commons, LLC	Manouchehn Malekan (516) 877-1677			