



*Environmental Management & Consulting*

September 24, 2013

New York City Office of Environmental Remediation  
E-Designation Program  
c/o Hannah Moore  
100 Gold Street, 2nd Floor  
New York, NY 10038

**Re: Fleet Renovation Projects  
E-104: Block 433, Lots 2, 4, 5, 6, 8, and 41, Queens CD 2  
Long Island City Rezoning – CEQR # 00 DCP 055Q  
Remedial Action Work Plan**

Dear Ms. Moore,

This letter outlines the results of the subsurface soil, groundwater, and soil vapor sampling conducted as part of the Remedial Investigation performed at the above-referenced property. As agreed upon during our May 21, 2013 meeting, because of the minimal disruption proposed by the renovations of the subject buildings, this letter is being submitted to address the Remedial Investigation conducted and the remedial measures to be employed.

**Site Location and Current Usage**

The Site consists of seven lots along Jackson Ave. and Ave. and 43rd Ave. located in the Long Island City section of Queens, New York. The Site is identified as Block 433 and Lots 2, 4, 5, 6, 8 and 41 on the New York City Tax Map. The property is currently occupied by 1-3 story buildings housing commercial, retail and light industrial businesses, the majority of which are currently vacant. There are two properties, lots 1 and 3, within the parcel that are not part of the renovation project and are not addressed by this Remedial Action Work Plan (RAWP). Figure 1 shows the Site location. The Site is approximately 25,000-square feet and is bounded by Jackson Avenue to the south, 43rd Avenue to the east, and the Fleet Tower project to the north and west. The Site layout is shown on Figure 2.

The seven individual lots that comprise the subject property are:

- **Lot 2** -- Lot 2 is known as 26-25 Jackson Avenue, covers an area of 2,000 square feet, and is developed with a 3-story 2,400-square foot building with a basement and a rear yard. The building is constructed of brick masonry bearing walls with wood joists, a concrete basement floor, and wood upper floors. This building was

- constructed prior to 1898 and appears to have always been utilized for commercial/retail purposes on the ground floor with apartments on the upper floors.
- **Lot 4** -- Lot 4 is known as 26-21 Jackson Avenue, covers an area of 2,000 square feet, and is developed with a 3-story 3,500-square foot building with a basement and a rear yard. The building is constructed of brick masonry bearing walls with wood joists, a concrete basement and first floor, and wood upper floors. The ground floor appeared to have been used for commercial purposes and the second and third floors consisted of one vacant apartment per floor. This building was constructed between 1915 and 1936 and appears to have always been utilized for commercial/retail purposes on the ground floor with apartments on the upper floors.
  - **Lot 5** -- Lot 5 is known as 26-19 Jackson Avenue, covers an area of 2,500 square feet, and is developed with a 2-story 5,050-square foot building with a basement. The building is constructed of concrete block and brick bearing walls with a brick veneer exterior, exposed steel beams in the basement, and concrete floors. Interior building materials include drywall walls, hardwood floors, and vinyl floor tiles. This building was constructed in 1960 and was previously utilized as an auto transmission business. Prior to 1960, this lot was developed with a 4-story structure.
  - **Lot 6** -- Lot 6 is known as 26-15 Jackson Avenue, covers an area of 4,267 square feet, and is developed with a 1-story 3,433-square foot building with a partial basement beneath a small asphalt front loading court/area. The building is constructed of concrete block and brick bearing walls, concrete floors with some areas of vinyl floor tile, and a wood ceiling. The partial basement is located beneath the front loading court/area and has a wood-framed ceiling. This building was constructed in 1958 and was occupied by auto-related businesses since 1977. Prior to 1958 this lot was developed with a 3-story dwelling/store.
  - **Lot 8** -- Lot 8 is known as 26-09 and 26-11 Jackson Avenue, covers an area of 6,450 square feet, and is developed with two 2-story buildings with basements that contain a total area of 15,500 square feet. Both buildings are constructed of brick and masonry bearing walls, concrete basement floors, steel beams in the basements, wood upper floors with vinyl tiles in some areas, wood ceilings, and drywall wall partitions. These buildings were constructed in 1956 and were occupied as auto-related businesses since 1991.
  - **Lot 41** -- Lot 41 is known as 27-10 43<sup>rd</sup> Avenue, covers an area of 2,000 square feet, and is developed with a 1-story 2,250-square foot garage building with a small partial basement. The building is constructed of concrete block and brick bearing walls, concrete floors, and a wood ceiling. A large bay door is present on the eastern side of the building along 43<sup>rd</sup> Avenue. This building was constructed in 1928 and has a history of auto-related and manufacturing uses. Prior to 1928 and as early as 1898, this lot was undeveloped.

### **Summary of Proposed Redevelopment Plan**

Lots 2, 4, 5, 6, 8 and 41 are scheduled to be renovated. The proposed future use of the structures is retail. Each of the buildings will have the interior floors (above the first) removed to create open space. There will be no residential uses. With the exception of slab cuts and incidental excavation for the installation of sub-slab depressurization systems in each of the buildings, it is not currently anticipated that any slab penetrations, trenching or soil excavation will be performed as part of the renovations. Figure 3 shows the layout of existing cellar building slabs, grade-level slabs, and exposed soil. The existing courtyard areas behind the buildings on lots 2, 4 and 5 are expected to remain, and will be covered with 4 inches of concrete. An alternative capping material may be installed with prior approval by OER. The portions of the Site that are proposed to be capped are shown on Figure 4

The Site Layout is shown on Figure 2. The current zoning designation is M1-6/R10, mixed use light manufacturing district where residential and non-residential uses are permitted, allowing a commercial floor area ratio of 10.0 or a residential floor area ratio of up to 10.0. The proposed use is consistent with existing zoning for the property.

### **Summary of the Work Performed under the Remedial Investigation**

FLS, on behalf of Hunter GC LLC performed the following scope of work:

- Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
- Installed 3 soil borings across the entire project Site, and collected 6 soil samples for chemical analysis from the soil borings to evaluate soil quality;
- Installed 4 temporary groundwater monitoring points throughout the Site to establish groundwater flow and collected 4 groundwater samples for chemical analysis to evaluate groundwater quality;
- Installed 5 soil vapor probes around Site perimeter and collected 5 samples for chemical analysis. Collected 5 indoor air samples.

Sampling locations are shown in Figure 5.

### **Summary of Environmental Findings**

- The elevation of the property ranges from 10.08 to 10.41 feet.
- The depth-to-groundwater ranges from 12.0 to 16.4 feet at the Site.
- The groundwater flow is generally from north to south beneath the Site.

- According to the geotechnical report conducted by RA Consultants LLC, bedrock was encountered at various depths and elevations across the site. Depth-to-bedrock ranged from 24 to 53.5 feet.
- The stratigraphy of the site consists of 4-6 feet of fill material, comprising a mixture of gravel, sand, silt, bricks, concrete fragments and other construction debris, underlain by layers of silty sand, clay, silt, peat and organic soils, glacial till and bedrock.
- None of the soil samples were found to contain pesticides or polychlorinated biphenyls (PCBs) at detectable concentrations, and no volatile organic compounds (VOCs) were detected at levels above Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs). The semi-volatile organic compounds (SVOC) analyses identified concentrations of several SVOCs exceeding their Track 1 Unrestricted Use SCOs, and dibenzo(a,h)anthracene (maximum of 0.68 ppm) and benzo(a)pyrene (maximum of 2.7 ppm) also exceeded Track 2 Restricted Commercial SCOs in 2 shallow samples. The metals analyses identified the presence of several metals at concentrations exceeding Track 1 SCOs, with barium and lead also exceeding Track 2 Restricted Commercial SCOs in 2 shallow and 1 deep soil samples. The SVOCs and metals present in the samples are indicative of urban fill material.
- None of the groundwater samples were found to contain VOCs, SVOCs, pesticides, or PCBs at levels exceeding the NYSDEC TOGS 1.1.1 Class GA Ambient Groundwater Quality Standards [GQS]). The analysis of dissolved (filtered) groundwater samples for metals identified the presence of the iron, manganese, and sodium at levels exceeding their GQSs, consistent with findings on many sites throughout the area.
- The soil vapor and indoor air analytical results for chlorinated VOCs were compared to values presented in the NYSDOH Final Guidance on Soil Vapor Intrusion (October 2006). The soil vapor sample analyses identified the presence of 1,1,1-trichloroethane (TCA) in three of five samples and ranged from 15 ug/m<sup>3</sup> to a maximum concentration of 1370 ug/m<sup>3</sup>, which when considered in conjunction with indoor air samples (TCA concentration of 2.1 ug/m<sup>3</sup> in one sample), leads to a recommendation by the NYSDOH guidance to mitigate for vapor intrusion. Tetrachloroethylene (PCE) was detected in all five soil vapor samples and ranged from 28 ug/m<sup>3</sup> to a maximum concentration of 600 ug/m<sup>3</sup> and in all five indoor air samples at a maximum concentration of 7.5 ug/m<sup>3</sup> which leads to a recommendation to monitor/ mitigate by the NYSDOH guidance. Trichloroethylene (TCE) was only detected at low points (maximum concentration of 4.7 ug/m<sup>3</sup>) in two soil vapor samples, and carbon tetrachloride was not detected in soil vapor.

For more detailed results, consult the analytical data (Attachment A). Based on an evaluation of the data and this RAWP, disposal of significant amounts of hazardous waste is not suspected at this site.

## **Remedial Action Objectives**

Based on the results of the RI, the following Remedial Action Objectives have been identified for this Site:

### Soil

- Prevent direct contact with contaminated soil.

### Soil Vapor

- Prevent exposure to contaminants in soil vapor.
- Prevent migration of soil vapor into occupied structures.

## **Summary of the Remedy**

The proposed remedial action achieves protection of public health and the environment for the intended use of the property. The proposed remedial action achieves all of the remedial action objectives established for the project and addresses applicable standards, criterion, and guidance; is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants; is cost effective and implementable; and uses standards methods that are well established in the industry.

The proposed remedial action will consist of the following:

1. Performance of a Community Air Monitoring Program for particulates and volatile organic compounds during any soil excavation activities.
2. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking and staking excavation areas.
3. Excavation and removal of nominal amounts of soil to install sub-slab depressurization systems in each of the buildings.
4. Screening of excavated soil during intrusive work for indications of contamination by visual means, odor, and monitoring with a photo-ionization detector (PID).
5. Transportation and offsite disposal of all soil material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media onsite.
6. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
7. Demarcation of residual soil/fill.

8. Installation and operation of an active sub-slab depressurization system (SSDS), with monitoring ports.
9. Removal of underground storage tanks and closure of petroleum spills (if encountered) in compliance with applicable local, State and Federal laws and regulations.
10. Construction and maintenance of an engineered composite cover consisting of a combination of concrete slabs, concrete pavement, and clean fill to prevent human exposure to residual soil/ fill remaining under the Site.
11. Performance of all activities required for the remedial actions, including permitting requirements, in compliance with applicable laws and regulations.
12. Submission of a Remedial Closure Report (RCR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes any and all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.
13. Submission of an approved Site Management Plan (SMP) in the RCR for long-term management of residual contamination including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
14. Recording of a Declaration of Covenants and Restrictions that includes a listing of Engineering Controls and a requirement that management of these controls must be in compliance with an approved SMP; and Institutional Controls including prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER approval.
15. Details regarding proper working and handling procedures, personal protective equipment and air monitoring requirements during any subsurface penetrations are provided in the Construction Health and Safety Plan (CHASP). The CHASP is provided as Attachment B.

### **Soil/Fill Management**

With the exception of slab cuts and incidental excavation for the installation of sub-slab depressurization systems in each of the buildings, there currently are no plans for any excavation activities.

Soil and materials management onsite and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Appendix D.

### Estimated Soil/Fill Removal Quantities

With the exception of incidental excavation for the installation of sub-slab depressurization systems in each of the buildings, there currently are no planned excavation activities. Disposal locations will be reported to the OER Project Manager prior to the start of the Remedial Action.

### Import and Reuse of Soils

There currently are no plans to import or reuse any soils as part of this project. If the scope should change to include the import or reuse of soils, the activities will be performed accordingly. Import of soils onto the property and reuse of soils already onsite will be performed in conformance with the Soil/Materials Management Plan in Appendix 1.

### Contingency Hotspot End-Point Sampling

If any hotspots are encountered during the remedial action, hotspot removal will be performed in conjunction with remedial end-point sampling. End-point sampling frequency will consist of the following:

1. For excavations less than 20 feet in total perimeter, at least one bottom sample and one sidewall sample biased in the direction of surface runoff.
2. For excavations 20 to 300 feet in perimeter:
  - For surface removals, one sample from the top of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
  - For subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
3. For sampling of volatile organics, bottom samples should be taken within 24 hours of excavation, and should be taken from the zero to six-inch interval at the excavation floor. Samples taken after 24 hours should be taken at six to twelve inches.
4. For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

Post-remediation sample locations and depth will be biased towards the areas and depths of highest contamination identified during previous sampling episodes unless field indicators such as field instrument measurements or visual contamination identified during the remedial action indicate that other locations and depths may be more heavily contaminated. In all cases, post-remediation samples should be biased toward locations and depths of the highest expected contamination. New York State Department of Health ELAP certified labs will be used for all end-point sample analyses. Labs for end-point sample analyses will be reported in the RCR. The RCR will provide a tabular and map summary of all end-point sample results. End-point samples will be analyzed for trigger analytes (those for which SCO exceedance is identified) utilizing the following methodology. Soil analytical methods for Full List will include:

- Volatile organic compounds by EPA Method 8260;

- Semi-volatile organic compounds by EPA Method 8270;
- Pesticides/PCBs by EPA Method 8081/8082; and
- Target Analyte List metals

If either LNAPL and/or DNAPL are detected, appropriate samples will be collected for characterization and “finger print analysis” and required regulatory reporting (i.e. spills hotline) will be performed.

### **Engineering Controls**

Engineering Controls will be employed in the remedial action to address any residual contamination remaining at the site. The Site has 2 primary Engineering Control Systems. These are:

- A sub-slab depressurization system under the building slabs.
- A composite cover system.

Following are details of each of the engineering controls:

#### Sub-Slab Depressurization System

The potential migration of soil vapor will be mitigated with the construction of a SSDS in each structure. The sub-grade ventilation system will prevent the migration of soil vapors into the lowest levels of the structures. The layout of the SSDS systems are provided on Figure 6 and details of the SSDSs are shown on Figure 7.

A SSDS will be installed beneath each of the buildings to remove any sub-slab soil vapors that may accumulate beneath the buildings. Each SSDS will consist of a depressurization pit which will be dug through the existing cellar slab. It will be filled with clean gravel. Each depressurization pit will be connected with 4-inch diameter cast iron pipe that will be run to the roof. A suction fan will be utilized to vent each. Monitoring ports will be installed in each cellar.

If based on results of additional soil vapor sampling, active operation of the SSDS is no longer required as a necessary engineering control, the SSDS will be converted into a passive system.

The Remedial Closure Report will include photographs of the installation of the SSDSs as well as if any deviations have occurred due to construction scope changes. The Remedial Closure Report will include PE/RA certified as-built plans depicting SSDS lateral, blower, and riser pipe configuration and locations, as well as documentation proving that the active SSDS was appropriately designed to maintain negative pressure beneath the entire area of the building slab.

#### Composite Cover System

Exposure to any residual soil/fill will be prevented by an engineered, composite cover system to be built on the Site. This composite cover system will be comprised of

- Concrete building slabs and walls;

- New 4 inches of concrete pavement (or alternate material as approved by OER); and
- 1 foot of certified clean fill cover.

Figure 4 shows the location of each cover type built at the Site. The composite cover system is a permanent engineering control for the Site. The system will be inspected and reported at specified intervals as required by this RAWP and the SMP. A Soil Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying residual soil/fill is disturbed after the remedial action is complete. Maintenance of this composite cover system will be described in the Site Management Plan.

### **Institutional Controls**

Institutional Controls have been incorporated in this remedial action to manage any residual soil/fill and other media and render the Site protective of public health and the environment. Long-term employment of EC/ICs will be established in a Declaration of Covenant and Restrictions (DCR) assigned to the property by the title holder and will be implemented under a site-specific SMP that will be included in the RAR.

If Track 1 cannot be achieved, the Institutional Controls for this remedial action will be:

- The property will continue to be registered with an E-Designation with the NYC Department of Buildings. The Remedial Closure Report will include a description of all ECs and ICs, will summarize the requirements of the Site Management Plan, and will note that the property owner and property owner's successors and assigns must comply with the approved SMP;
- Submittal of a Site Management Plan in the RCR for approval by OER that provides procedures for appropriate operation, maintenance, monitoring, inspection, reporting and certification of ECs. The SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall comply with RCNY §43-1407(1)(3).
- Vegetable gardens and farming on the Site are prohibited;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP;

- The Site will be used for commercial and residential use and will not be used for a higher level of use without prior approval by OER.

### **Site Management Plan**

A Site Management Plan (SMP) will be implemented under this Remedial Action if Track 1 is not achieved. Site Management is the last phase of remediation and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion for the Remedial Action. The SMP describes appropriate methods and procedures to ensure implementation of all ECs and ICs in this RAWP. The Site Management Plan is submitted as part of the RCR but will be written in a manner that allows its use as an independent document. Site Management continues until terminated in writing by OER. The property owner is responsible to ensure that all Site Management responsibilities defined in the Site Management Plan are implemented.

The SMP will provide a detailed description of the procedures required to manage residual soil/fill left in place following completion of the remedial action in accordance with the Voluntary Cleanup Agreement with OER. This includes a plan for: (1) implementation of EC's and ICs; (2) implementation of monitoring programs; (3) operation and maintenance of EC's; (4) inspection and certification of EC's; and (5) reporting.

Site management activities, reporting, and EC/IC certification will be scheduled on a periodic basis to be established in the SMP and will be subject to review and modification by OER. The Site Management Plan will be based on a calendar year and certification reports will be due for submission to OER by July 1 of the year following the reporting period.

### **Remedial Action Management**

#### Project Organization and Oversight

Principal personnel who will participate in the remedial action include Arnold F. Fleming, the Professional Engineer (PE), Kevin A. McGuinness, PG, the Qualified Environmental Professionals (QEP) and Maya Zung the task manager.

#### Construction Health and Safety Plan

The site-specific Construction Health and Safety Plan (CHASP) are included in Appendix B. The Site Safety Coordinator will be Maya Zung. Remedial work performed under this RAP will be in full compliance with applicable health and safety laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements. Confined space entry, if any, will comply with OSHA requirements and industry standards and will address potential risks. The parties performing the remedial construction work will ensure that performance of work is in compliance with the CHASP and applicable laws and regulations. The CHASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice Of Satisfaction.

All field personnel involved in remedial activities will participate in training required under 29 CFR 1910.120, including 40-hour hazardous waste operator training and annual

8-hour refresher training. Site Safety Officer will be responsible for maintaining workers training records. Personnel entering any exclusion zone will be trained in the provisions of the CHASP and be required to sign a CHASP acknowledgment. Site-specific training will be provided to field personnel. Additional safety training may be added depending on the tasks performed. Emergency telephone numbers will be posted at the site location before any remedial work begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; PPE levels and other relevant safety topics. Meetings will be documented in a log book or specific form.

An emergency contact sheet with names and phone numbers is included in the CHASP. That document will define the specific project contacts for use in case of emergency.

#### Community Air Monitoring Plan

Real-time air monitoring for volatile organic compounds (VOCs) and particulate levels at the perimeter of the exclusion zone or work area will be performed if soil excavation is performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be performed during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection, for instance, will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence. Exceedances of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the OER Project Manager and included in the Daily Report.

#### VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted

and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will 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 will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone 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.

All 15-minute readings must be recorded and be available for OER personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

#### Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ( $\text{mcg}/\text{m}^3$ ) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150  $\text{mcg}/\text{m}^3$  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  $\text{mcg}/\text{m}^3$  above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150  $\text{mcg}/\text{m}^3$  of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for OER personnel to review.

#### Agency Approvals

All permits or government approvals required for remediation and construction have been or will be obtained prior to the start of remediation and construction. Acceptance of this

RAP by OER does not constitute satisfaction of these requirements and will not be a substitute for any required permit.

## **Site Preparation**

### Pre-Construction Meeting

OER will be invited to attend the pre-construction meeting at the Site with all parties involved in the remedial process prior to the start of remedial construction activities.

### Mobilization

Mobilization will be conducted as necessary for each phase of work at the Site. Mobilization includes field personnel orientation, equipment mobilization (including securing all sampling equipment needed for the field investigation), marking/staking sampling locations and utility mark-outs. Each field team member will attend an orientation meeting to become familiar with the general operation of the Site, health and safety requirements, and field procedures.

### Utility Marker Layouts, Easement Layouts

The presence of utilities and easements on the Site will be fully investigated prior to the performance of invasive work such as excavation or drilling under this plan by using, at a minimum, the One-Call System (811). Underground utilities may pose an electrocution, explosion, or other hazard during excavation or drilling activities. All invasive activities will be performed in compliance with applicable laws and regulations to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Markout Ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

Proper safety and protective measures pertaining to utilities and easements, and compliance with all laws and regulations will be employed during invasive and other work contemplated under this RAP. The integrity and safety of onsite and off-Site structures will be maintained during all invasive, excavation or other remedial activity performed under the RAP.

### Equipment and Material Staging

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations.

### Stabilized Construction Entrance

Steps will be taken to ensure that trucks departing the site will not track soil, fill or debris offsite. Such actions may include use of cleaned asphalt or concrete roads or use of stone or other aggregate-based egress paths between the truck inspection station and the property exit. Measures will be taken to ensure that adjacent roadways will be kept clean of project related soils, fill and debris.

### Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and debris will be removed. Brooms, shovels and potable water will be utilized for the removal of soil from vehicles and equipment, as necessary.

### Traffic Control

Drivers of trucks leaving the Site with soil/fill will be instructed to proceed without stopping in the vicinity of the site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the site will be reported to the OER Project Manager prior to the start of the remedial action.

### Demobilization

Demobilization will include:

- As necessary, restoration of temporary access areas and areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management areas, and access area);
- Removal of sediment from erosion control measures and truck wash and disposal of materials in accordance with applicable laws and regulations;
- Equipment decontamination, and;
- General refuse disposal.

Equipment will be decontaminated and demobilized at the completion of all field activities. Investigation equipment and large equipment (e.g., soil excavators) will be washed at the truck inspection station as necessary. In addition, all investigation and remediation derived waste will be appropriately disposed.

## **Reporting and Record Keeping**

### Daily Reports

If the scope of the project should change such that soil excavation is required then Daily Reporting procedures will be applied. Daily reports providing a general summary of activities for each day of *active remedial work* will be emailed to the OER Project Manager by the end of the following day. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of work performed;
- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);

- A summary of CAMP excursions, if any;
- Photograph of notable Site conditions and activities.

The frequency of the reporting period may be revised in consultation with OER project manager based on planned project tasks. Daily email reports are not intended to be the primary mode of communication for notification to OER of emergencies (accidents, spills), requests for changes to the RAP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAP will be communicated directly to the OER project manager by personal communication. Daily reports will be included as an Appendix in the RCR.

#### Record Keeping and Photo-Documentation

Job-site record keeping for all remedial work will be performed. These records will be maintained onsite during the project and will be available for inspection by OER staff. Representative photographs will be taken of the Site prior to any remedial activities and during major remedial activities to illustrate remedial program elements and contaminant source areas. Photographs will be submitted at the completion of the project in the RCR in digital format (i.e. jpeg files).

#### Complaint Management

All complaints from citizens will be promptly reported to OER. Complaints will be addressed and outcomes will also be reported to OER in daily reports. Notices to OER will include the nature of the complaint, the party providing the complaint, and the actions taken to resolve any problems.

#### Deviations from the Remedial Action Plan

All changes to the RAP will be reported to the OER Project Manager and will be documented in daily reports and reported in the RCR. The process to be followed if there are any deviations from the RAP will include a request for approval for the change from OER noting the following:

- Reasons for deviating from the approved RAP;
- Effect of the deviations on overall remedy; and
- Determination that the remedial action with the deviation(s) is protective of public health and the environment.

#### Remedial Closure Report

A Remedial Closure Report (RCR) will be submitted to OER following implementation of the remedial action defined in this RAWP. The RCR will document that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The RCR will include:

- As-built drawings for all constructed remedial elements, including the SSDS and composite cover systems, required certifications, manifests, and other written and photographic documentation of remedial work performed under this remedy;
- Site Management Plan;



## **FIGURES**

Figure 1 – Site Location

Figure 2 – Site Layout

Figure 3 – Lot Coverage Details

Figure 4 – Proposed Capped Areas

Figure 5 – Sampling Locations

Figure 6 – Proposed Sub-Slab Depressurization System Layout

Figure 7 – Sub-Slab Depressurization System Details

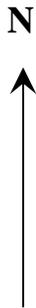
## **ATTACHMENTS**

Attachment A – Remedial Investigation Data

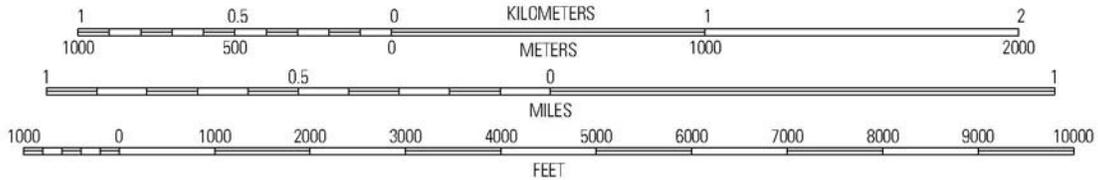
Attachment B – Environmental Construction Health and Safety Plan

Attachment C - Soil/ Materials Management Plan

# Figures



SCALE 1:24 000



## FIGURE 1: SITE LOCATION

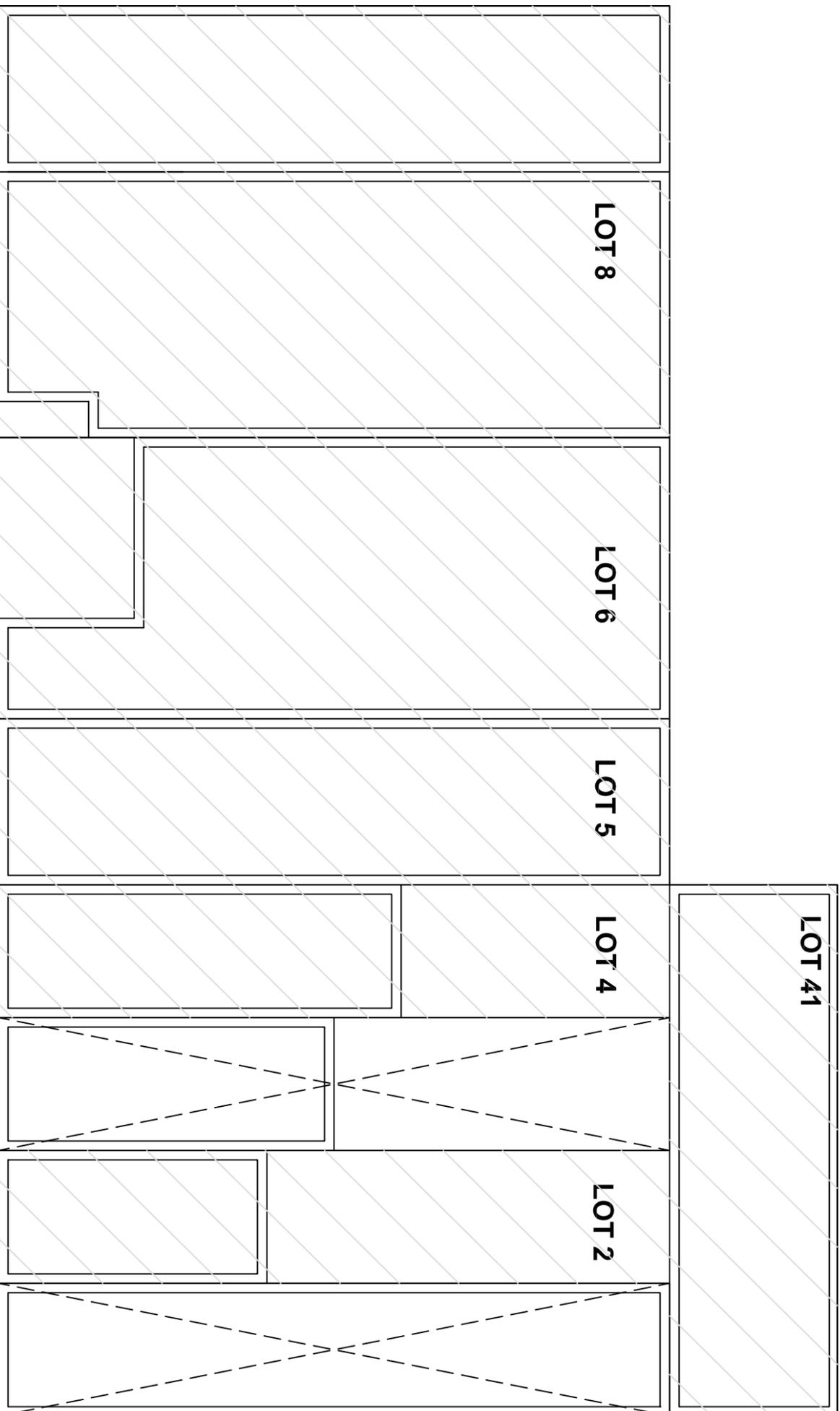
**SITE:** Fleet Renovation Project  
Block 433, Lots: 2, 4, 5, 6, 8, 41  
Long Island City, New York

**CLIENT:** Hunter GC, LLC

*Environmental Management & Consulting, 158 West 29th Street, New York, NY 10001*



JACKSON AVENUE (WIDE)



43RD AVENUE (WIDE)



Environmental Management & Consulting

158 West 29th Street, 9th Fl.  
New York, NY 10001

Fleet Renovation Project  
Block 433  
Lots: 2, 4, 5, 6, 8, 41

### FIGURE 2

### SITE LAYOUT

Date  
September 2013

Project Number  
10020-011

### LEGEND

 SPACE TO BE RENNOVATED



JACKSON AVENUE (WIDE)



43RD AVENUE (WIDE)



*Environmental Management & Consulting*

158 West 29th Street, 9th Fl.  
New York, NY 10001

**Fleet Renovation Project**  
Block 433  
Lots: 2, 4, 5, 6, 8, 41

**FIGURE 3**

**LOT  
COVER  
AGE  
DETAILS**

Date  
**September 2013**

Project Number  
**10020-011**

**LEGEND**

-  BASEMENT OUTLINE
-  BUILDING FOOTPRINT
-  PAVED AREA
-  EXPOSED SOIL



JACKSON AVENUE (WIDE)



43RD AVENUE (WIDE)



*Environmental Management & Consulting*

158 West 29th Street, 9th Fl.  
New York, NY 10001

**Fleet Renovation Project**  
Block 433  
Lots: 2, 4, 5, 6, 8, 41

**FIGURE 4**

**PROPOSED  
CAPPED  
AREAS**

Date  
**September 2013**

Project Number  
**10020-011**

**LEGEND**

-  BASEMENT OUTLINE
-  BUILDING FOOTPRINT
-  PAVED AREA
-  CAPPED AREA



*Environmental Management & Consulting*

158 West 29th Street, 9th Fl.  
New York, NY 10001

**Fleet Renovation Project**  
Block 433  
Lots: 2, 4, 5, 6, 8, 41

**FIGURE 5**

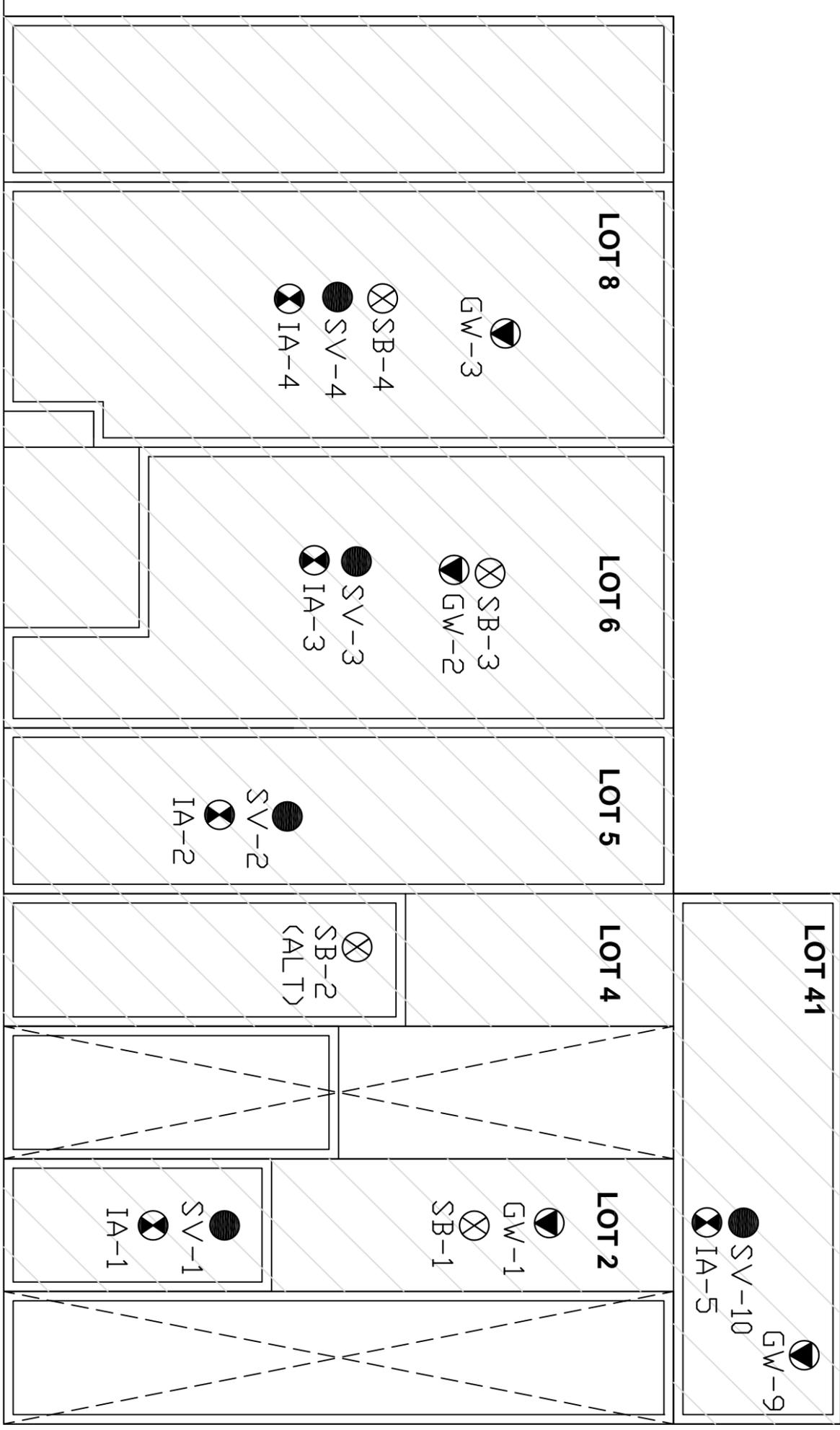
**SAMPLING LOCATIONS**

Date  
**September 2013**

Project Number  
**10020-011**

**LEGEND**

-  SPACE TO BE RENNOVATED
-  SOIL SAMPLE
-  GROUNDWATER SAMPLE
-  SOIL VAPOR SAMPLE
-  INDDOR AIR SAMPLE



*43RD AVENUE (WIDE)*

*JACKSON AVENUE (WIDE)*





*Environmental Management & Consulting*

158 West 29th Street, 9th Fl.  
New York, NY 10001

**Fleet Renovation Project**  
Block 433  
Lots: 2, 4, 5, 6, 8, 41

**FIGURE 6**

**PROPOSED  
SUB-SLAB  
SYSTEM  
DEPRESSURIZATION  
LAYOUT**

Date  
**September 2013**

Project Number  
**10020-011**

**LEGEND**

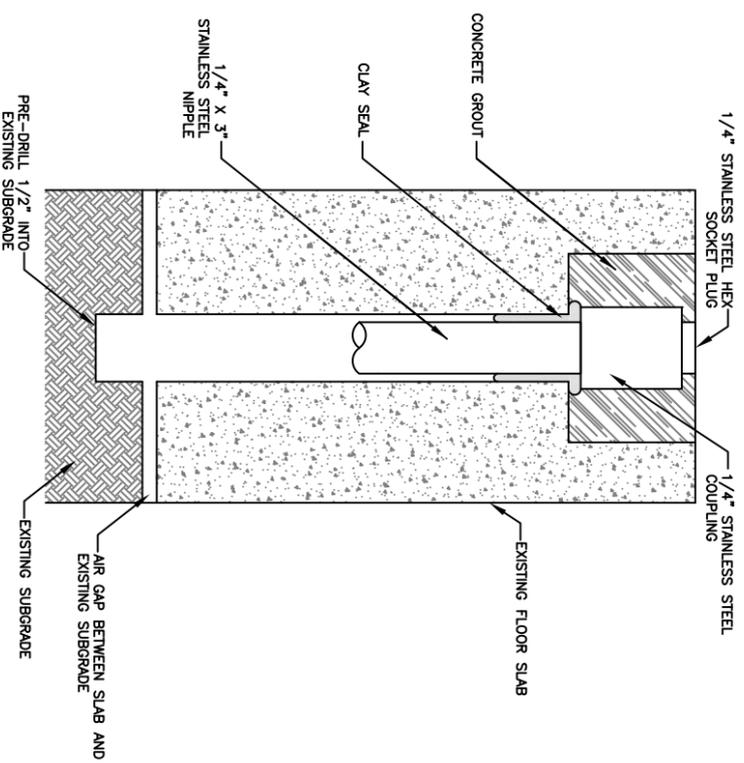
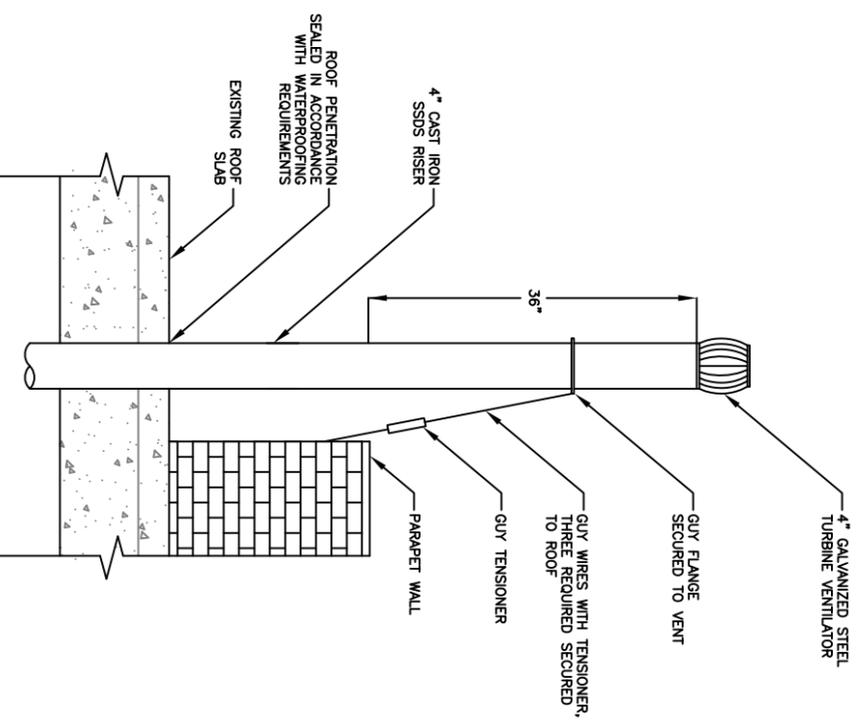
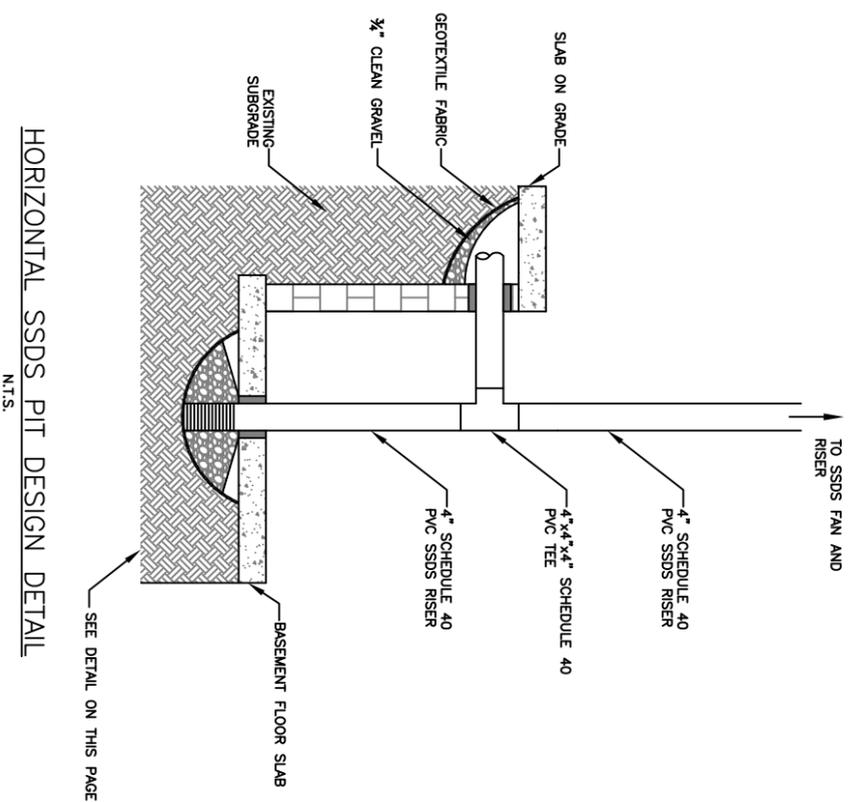
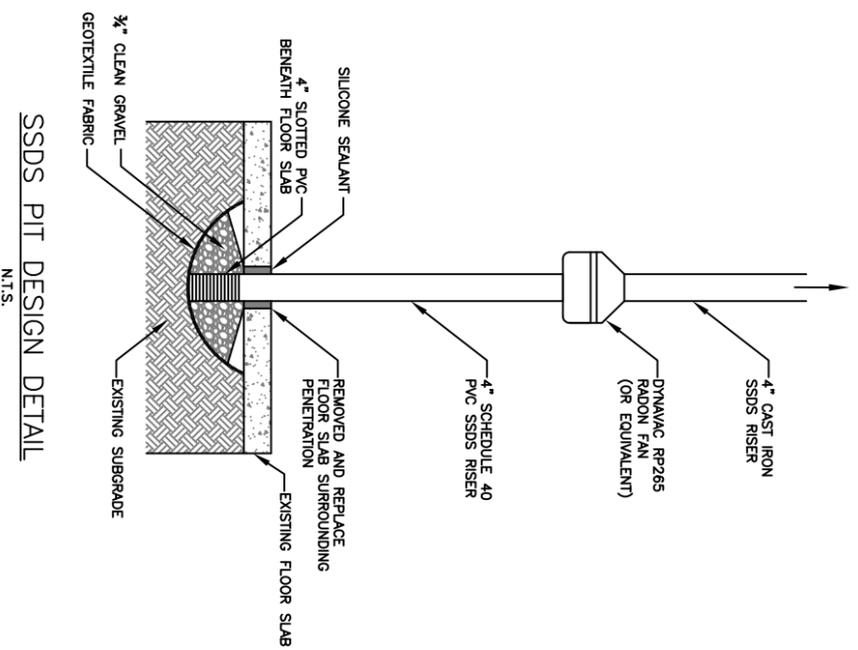
-  PROPOSED LOCATION OF SSDS PIT
-  PROPOSED PENETRATION OF BASEMENT WALL BENEATH PORTION OF BUILDING WITH NO BASEMENT
-  PROPOSED LOCATION OF SSDS MONITORING POINT
-  BASEMENT OUTLINE
-  BUILDING FOOTPRINT
-  PAVED AREA
-  CAPPED AREA



JACKSON AVENUE (WIDE)

43RD AVENUE (WIDE)





*Environmental Management & Consulting*  
158 West 29th Street, 9th Fl.  
New York, NY 10001

**Fleet Renovation Project**  
Block 433  
Lots: 2, 4, 5, 6, 8, 41

**FIGURE 7**

**SUB-SLAB  
DEPRESSURIZATION  
SYSTEM  
DETAILS**

Date  
**September 2013**

Project Number  
**10020-011**

**LEGEND**

# Attachment A

Remedial Investigation Report

**Table 1  
Volatile Organic Compounds in Soil**

Rockrose Development, Fleet Site  
Jackson Avenue, Long Island City, New York

Client Sample ID:		NY SCO - Commercial w/CP-51 (10/10) (6 NYCRR 375-6 1206)	SB-1(0-2')	SB-1(6-8')	SB-2 ALT(0-2)	SB-2 ALT(6-8)	SB-3(0-2)	SB-3(12-14)	SB-4(0-2)	SB-4(6-8)
Lab Sample ID:			JB13726-1	JB13726-2	JB13726-3	JB13726-4	JB13726-5	JB13726-6	JB13726-7	JB13726-8
Date Sampled:			8/8/2012	8/8/2012	8/7/2012	8/7/2012	8/13/2012	8/13/2012	8/6/2012	8/6/2012
Matrix:			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
<b>GC/MS Volatiles</b>										
Acetone	ug/kg	500000	ND (2.2)	ND (2.1)	ND (2.1)	15.5	ND (2.2)	ND (2.2)	ND (2.3)	13.1 J
Benzene	ug/kg	44000	ND (0.15)	ND (0.15)	ND (0.15)	0.80 J	ND (0.16)	ND (0.15)	ND (0.16)	ND (0.16)
Bromochloromethane	ug/kg	-	ND (0.34)	ND (0.33)	ND (0.33)	ND (0.35)	ND (0.35)	ND (0.34)	ND (0.36)	ND (0.37)
Bromodichloromethane	ug/kg	-	ND (0.14)	ND (0.13)	ND (0.13)	ND (0.14)	ND (0.14)	ND (0.13)	ND (0.14)	ND (0.15)
Bromoform	ug/kg	-	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.20)	ND (0.20)	ND (0.19)	ND (0.21)	ND (0.21)
Bromomethane	ug/kg	-	ND (0.35)	ND (0.34)	ND (0.34)	ND (0.36)	ND (0.36)	ND (0.35)	ND (0.37)	ND (0.38)
2-Butanone (MEK)	ug/kg	500000	ND (3.1)	ND (3.0)	ND (3.0)	ND (3.2)	ND (3.1)	ND (3.0)	ND (3.3)	ND (3.3)
Carbon disulfide	ug/kg	-	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.16)	ND (0.15)	ND (0.15)	ND (0.16)	ND (0.16)
Carbon tetrachloride	ug/kg	22000	ND (0.17)	ND (0.17)	ND (0.16)	ND (0.18)	ND (0.17)	ND (0.17)	ND (0.18)	ND (0.18)
Chlorobenzene	ug/kg	500000	ND (0.14)	ND (0.14)	ND (0.13)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.15)	ND (0.15)
Chloroethane	ug/kg	-	ND (0.29)	ND (0.29)	ND (0.28)	ND (0.30)	ND (0.30)	ND (0.29)	ND (0.31)	ND (0.31)
Chloroform	ug/kg	350000	ND (0.11)	ND (0.10)	ND (0.10)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
Chloromethane	ug/kg	-	ND (0.24)	ND (0.23)	ND (0.23)	ND (0.25)	ND (0.24)	ND (0.24)	ND (0.25)	ND (0.26)
Cyclohexane	ug/kg	-	ND (0.16)	ND (0.16)	ND (0.15)	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.17)	ND (0.17)
1,2-Dibromo-3-chloropropane	ug/kg	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.2)
Dibromochloromethane	ug/kg	-	ND (0.21)	ND (0.21)	ND (0.20)	ND (0.22)	ND (0.21)	ND (0.21)	ND (0.22)	ND (0.23)
1,2-Dibromoethane	ug/kg	-	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.17)	ND (0.17)	ND (0.16)	ND (0.17)	ND (0.18)
1,2-Dichlorobenzene	ug/kg	500000	ND (0.24)	ND (0.24)	ND (0.23)	ND (0.25)	ND (0.25)	ND (0.24)	ND (0.26)	ND (0.26)
1,3-Dichlorobenzene	ug/kg	280000	ND (0.24)	ND (0.24)	ND (0.23)	ND (0.25)	ND (0.24)	ND (0.24)	ND (0.26)	ND (0.26)
1,4-Dichlorobenzene	ug/kg	130000	ND (0.23)	ND (0.22)	ND (0.22)	ND (0.23)	ND (0.23)	ND (0.22)	ND (0.24)	ND (0.24)
Dichlorodifluoromethane	ug/kg	-	ND (0.29)	ND (0.29)	ND (0.28)	ND (0.30)	ND (0.30)	ND (0.29)	ND (0.31)	ND (0.32)
1,1-Dichloroethane	ug/kg	240000	ND (0.18)	ND (0.17)	ND (0.17)	ND (0.18)	ND (0.18)	ND (0.17)	ND (0.19)	ND (0.19)
1,2-Dichloroethane	ug/kg	30000	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.18)	ND (0.18)	ND (0.17)	ND (0.18)	ND (0.19)
1,1-Dichloroethene	ug/kg	500000	ND (0.33)	ND (0.32)	ND (0.32)	ND (0.34)	ND (0.34)	ND (0.33)	ND (0.35)	ND (0.36)
cis-1,2-Dichloroethene	ug/kg	500000	ND (0.24)	ND (0.23)	ND (0.23)	ND (0.24)	ND (0.24)	ND (0.23)	ND (0.25)	ND (0.25)
trans-1,2-Dichloroethene	ug/kg	500000	ND (0.31)	ND (0.30)	ND (0.29)	ND (0.32)	ND (0.31)	ND (0.30)	ND (0.33)	ND (0.33)
1,2-Dichloropropane	ug/kg	-	ND (0.20)	ND (0.19)	ND (0.19)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.21)	ND (0.21)
cis-1,3-Dichloropropene	ug/kg	-	ND (0.18)	ND (0.17)	ND (0.17)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.19)	ND (0.19)
trans-1,3-Dichloropropene	ug/kg	-	ND (0.20)	ND (0.19)	ND (0.19)	ND (0.21)	ND (0.20)	ND (0.20)	ND (0.21)	ND (0.21)
1,4-Dioxane	ug/kg	130000	ND (77)	ND (75)	ND (74)	ND (79)	ND (78)	ND (76)	ND (81)	ND (82)
Ethylbenzene	ug/kg	390000	ND (0.34)	ND (0.33)	ND (0.33)	ND (0.35)	ND (0.34)	ND (0.34)	ND (0.36)	ND (0.36)
Freon 113	ug/kg	-	ND (0.55)	ND (0.54)	ND (0.53)	ND (0.57)	ND (0.56)	ND (0.55)	ND (0.59)	ND (0.60)
2-Hexanone	ug/kg	-	ND (0.80)	ND (0.78)	ND (0.77)	ND (0.83)	ND (0.81)	ND (0.79)	ND (0.85)	ND (0.86)
Isopropylbenzene	ug/kg	-	ND (0.096)	ND (0.093)	ND (0.092)	ND (0.099)	ND (0.097)	ND (0.095)	ND (0.10)	ND (0.10)
Methyl Acetate	ug/kg	-	ND (3.4)	ND (3.3)	ND (3.2)	ND (3.5)	ND (3.4)	ND (3.3)	ND (3.6)	ND (3.6)
Methylcyclohexane	ug/kg	-	ND (0.22)	ND (0.21)	ND (0.21)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.23)	ND (0.23)
Methyl Tert Butyl Ether	ug/kg	500000	ND (0.30)	ND (0.30)	ND (0.29)	ND (0.31)	ND (0.31)	ND (0.30)	ND (0.32)	ND (0.33)
4-Methyl-2-pentanone(MIBK)	ug/kg	-	ND (0.97)	ND (0.94)	ND (0.93)	ND (1.0)	ND (0.98)	ND (0.96)	ND (1.0)	ND (1.0)
Methylene chloride	ug/kg	500000	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.7)	ND (1.7)	ND (1.6)	ND (1.7)	ND (1.8)
Styrene	ug/kg	-	ND (0.12)	ND (0.12)	ND (0.11)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.13)	ND (0.13)
1,1,2,2-Tetrachloroethane	ug/kg	-	ND (0.17)	ND (0.17)	ND (0.16)	ND (0.18)	ND (0.17)	ND (0.17)	ND (0.18)	ND (0.18)
Tetrachloroethene	ug/kg	150000	ND (0.22)	ND (0.22)	ND (0.21)	ND (0.23)	18.4	ND (0.22)	ND (0.24)	ND (0.24)
Toluene	ug/kg	500000	ND (0.14)	ND (0.13)	ND (0.13)	0.59 J	0.49 J	ND (0.13)	ND (0.14)	ND (0.15)
1,2,3-Trichlorobenzene	ug/kg	-	ND (0.21)	ND (0.21)	ND (0.20)	ND (0.22)	ND (0.21)	ND (0.21)	ND (0.22)	ND (0.23)
1,2,4-Trichlorobenzene	ug/kg	-	ND (0.18)	ND (0.17)	ND (0.17)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.19)	ND (0.19)
1,1,1-Trichloroethane	ug/kg	500000	ND (0.14)	ND (0.13)	ND (0.13)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.15)	ND (0.15)
1,1,2-Trichloroethane	ug/kg	-	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.23)	ND (0.23)	ND (0.22)	ND (0.24)	ND (0.24)
Trichloroethene	ug/kg	200000	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.23)	ND (0.23)	ND (0.22)	ND (0.24)	ND (0.24)
Trichlorofluoromethane	ug/kg	-	ND (0.38)	ND (0.37)	ND (0.37)	ND (0.40)	ND (0.39)	ND (0.38)	ND (0.41)	ND (0.41)
Vinyl chloride	ug/kg	13000	ND (0.19)	ND (0.18)	ND (0.18)	ND (0.19)	ND (0.19)	ND (0.18)	ND (0.20)	ND (0.20)
m,p-Xylene	ug/kg	500000	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.23)	ND (0.23)	ND (0.22)	ND (0.24)	ND (0.24)
o-Xylene	ug/kg	500000	ND (0.18)	ND (0.17)	ND (0.17)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.19)	ND (0.19)
Xylene (total)	ug/kg	500000	ND (0.18)	ND (0.17)	ND (0.17)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.19)	ND (0.19)

**Notes**

All results given in micrograms per kilogram (ug/kg)

Samples analyzed for VOCs using EPA Method 8260.

Results Compared to New York State Department of Environmental Conservation, Division of Environmental Remediation 6 NYCRR PART 375 Restricted Use Soil Cleanup Objectives, Protection of public health - Commercial Use.

**Bold/highlighted values exceeded the NYSDEC Part 375 RSCO - Commercial Use.**

ND = Not Detected

NS = No Standard

J = Data indicates the presence of a compound less than the qualitative, reporting detection limit (RDL) but greater than the quantitative, method detection limit (MDL). Therefore, the result is estimated.



**Table 1**  
**Volatile Organic Compounds in Groundwater**

Rockrose Development, Fleet Site

Jackson Avenue, Long Island City, New York

Client Sample ID:		NY TOGS Class	GW-1	GW-1	GW-2	GW-2	GW-3	GW-3	GW-9	GW-9
Lab Sample ID:		GA GW Standards	JB13738-6	JB13738-6F	JB13738-4	JB13738-4F	JB13738-5	JB13738-5F	JB13738-9	JB13738-9F
Date Sampled:		(NYSDEC 6/2004) <sup>1</sup>	8/10/2012	8/10/2012	8/10/2012	8/10/2012	8/10/2012	8/10/2012	8/14/2012	8/14/2012
Matrix:			Ground Water	Groundwater Filtered						
<b>GC/MS Volatiles (SW846 8260B)</b>										
Acetone	ug/l	-	ND (3.3)	-	ND (3.3)	-	ND (3.3)	-	ND (3.3)	-
Benzene	ug/l	1	ND (0.24)	-						
Bromochloromethane	ug/l	5	ND (0.30)	-						
Bromodichloromethane	ug/l	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-
Bromoform	ug/l	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-
Bromomethane	ug/l	5	ND (0.22)	-						
2-Butanone (MEK)	ug/l	-	ND (2.4)	-	ND (2.4)	-	ND (2.4)	-	ND (2.4)	-
Carbon disulfide	ug/l	60	ND (0.19)	-						
Carbon tetrachloride	ug/l	5	ND (0.22)	-						
Chlorobenzene	ug/l	5	ND (0.23)	-						
Chloroethane	ug/l	5	ND (0.26)	-						
Chloroform	ug/l	7	ND (0.20)	-						
Chloromethane	ug/l	5	ND (0.21)	-						
Cyclohexane	ug/l	-	ND (0.35)	-	ND (0.35)	-	ND (0.35)	-	ND (0.35)	-
1,2-Dibromo-3-chloropropane	ug/l	0.04	ND (0.54)	-						
Dibromochloromethane	ug/l	-	ND (0.14)	-	ND (0.14)	-	ND (0.14)	-	ND (0.14)	-
1,2-Dibromoethane	ug/l	0.006	ND (0.20)	-						
1,2-Dichlorobenzene	ug/l	3	ND (0.22)	-						
1,3-Dichlorobenzene	ug/l	3	ND (0.22)	-						
1,4-Dichlorobenzene	ug/l	3	ND (0.30)	-						
Dichlorodifluoromethane	ug/l	5	ND (0.27)	-						
1,1-Dichloroethane	ug/l	5	ND (0.11)	-						
1,2-Dichloroethane	ug/l	0.6	ND (0.26)	-						
1,1-Dichloroethene	ug/l	5	ND (0.19)	-						
cis-1,2-Dichloroethene	ug/l	5	ND (0.19)	-						
trans-1,2-Dichloroethene	ug/l	5	ND (0.21)	-						
1,2-Dichloropropane	ug/l	1	ND (0.48)	-						
cis-1,3-Dichloropropene	ug/l	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-
trans-1,3-Dichloropropene	ug/l	-	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-
1,4-Dioxane	ug/l	-	ND (75)	-	ND (75)	-	ND (75)	-	ND (75)	-
Ethylbenzene	ug/l	5	ND (0.23)	-						
Freon 113	ug/l	5	ND (0.53)	-						
2-Hexanone	ug/l	-	ND (1.1)	-	ND (1.1)	-	ND (1.1)	-	ND (1.1)	-
Isopropylbenzene	ug/l	5	ND (0.45)	-						
Methyl Acetate	ug/l	-	ND (1.2)	-	ND (1.2)	-	ND (1.2)	-	ND (1.2)	-
Methylcyclohexane	ug/l	-	ND (0.26)	-	ND (0.26)	-	ND (0.26)	-	ND (0.26)	-
Methyl Tert Butyl Ether	ug/l	10	ND (0.16)	-						
1-Methyl-2-pentanone(MIBK)	ug/l	-	ND (0.83)	-	ND (0.83)	-	ND (0.83)	-	ND (0.83)	-
Methylene chloride	ug/l	5	ND (0.70)	-						
Styrene	ug/l	5	ND (0.21)	-						
1,1,2,2-Tetrachloroethane	ug/l	5	ND (0.21)	-						
Tetrachloroethene	ug/l	5	ND (0.28)	-						
Toluene	ug/l	5	ND (0.23)	-						
1,2,3-Trichlorobenzene	ug/l	5	ND (0.28)	-						
1,2,4-Trichlorobenzene	ug/l	5	ND (0.20)	-						
1,1,1-Trichloroethane	ug/l	5	ND (0.24)	-						
1,1,2-Trichloroethane	ug/l	1	ND (0.29)	-						
Trichloroethene	ug/l	5	ND (0.22)	-						
Trichlorofluoromethane	ug/l	5	ND (0.27)	-						
Vinyl chloride	ug/l	2	ND (0.21)	-						
m,p-Xylene	ug/l	-	ND (0.42)	-	ND (0.42)	-	ND (0.42)	-	ND (0.42)	-
o-Xylene	ug/l	5	ND (0.24)	-						
Xylene (total)	ug/l	5	ND (0.24)	-						

**Notes**

All results given in micrograms per liter (ug/L)

Samples analyzed for VOCs using EPA Method 8260.

Results Compared to New York State Technical and Operational Series (TOGS) 1.1.1 , Ambient Water Quality Standards

**Bold/highlighted values exceeded the NYSDEC TOGS 1.1.1.**

ND = Not Detected

NS = No Standard

estimated.



**Table 1**  
**Volatile Organic Compounds in Soil Vapor**

Rockrose Development, Fleet Site  
Jackson Avenue, Long Island City, New York

Client Sample ID:	IA-1	IA-2	IA-3	IA-4	IA-5	SV-1	SV-10	SV-2	SV-3	SV-4
Lab Sample ID:	JB13706-2	JB13706-4	JB13706-14	JB13706-6	JB13706-12	JB13706-1	JB13706-11	JB13706-3	JB13706-13	JB13706-5
Date Sampled:	8/8/2012	8/8/2012	8/13/2012	8/8/2012	8/13/2012	8/8/2012	8/13/2012	8/8/2012	8/13/2012	8/8/2012
Matrix:	Indoor Air Comp.	Soil Vapor Comp.								
<b>GC/MS Volatiles (TO-15) - ug/m3</b>										
Acetone	ppbv	8.8	8.6	12.4	29.8	80.5	10	72.8	15	34
1,3-Butadiene	ppbv	ND (0.024)	ND (0.097)	ND (0.19)	ND (0.097)	ND (0.097)				
Benzene	ppbv	0.35	0.21	0.24	0.45	0.37	5.2	29.2	25.4	1
Bromodichloromethane	ppbv	ND (0.030)	ND (0.12)	ND (0.24)	ND (0.12)	ND (0.12)				
Bromoform	ppbv	ND (0.037)	ND (0.15)	ND (0.30)	ND (0.15)	ND (0.15)				
Bromomethane	ppbv	ND (0.037)	ND (0.15)	ND (0.29)	ND (0.15)	ND (0.15)				
Bromoethene	ppbv	ND (0.037)	ND (0.15)	ND (0.29)	ND (0.15)	ND (0.15)				
Benzyl Chloride	ppbv	ND (0.041)	ND (0.041)	ND (0.041)	ND (0.041)	ND (0.16)	ND (0.33)	ND (0.16)	ND (0.16)	ND (0.16)
Carbon disulfide	ppbv	0.48	0.28	0.27	0.36	0.16 J	0.8	0.98 J	0.84	ND (0.13)
Chlorobenzene	ppbv	ND (0.027)	ND (0.027)	ND (0.027)	ND (0.027)	ND (0.11)	ND (0.22)	ND (0.11)	ND (0.11)	ND (0.11)
Chloroethane	ppbv	ND (0.039)	ND (0.039)	ND (0.039)	ND (0.039)	ND (0.16)	ND (0.31)	ND (0.16)	ND (0.16)	ND (0.16)
Chloroform	ppbv	0.18 J	0.18 J	1.7	0.19 J	ND (0.028)	ND (0.11)	ND (0.22)	25.3	12.7
Chloromethane	ppbv	0.55	0.73	0.67	1.5	0.54	0.47 J	ND (0.30)	ND (0.15)	0.52 J
3-Chloropropene	ppbv	ND (0.041)	ND (0.041)	ND (0.041)	ND (0.041)	ND (0.17)	ND (0.33)	ND (0.17)	ND (0.17)	ND (0.17)
2-Chlorotoluene	ppbv	ND (0.031)	ND (0.031)	ND (0.031)	ND (0.031)	ND (0.12)	ND (0.25)	ND (0.12)	ND (0.12)	ND (0.12)
Carbon tetrachloride	ppbv	ND (0.040)	ND (0.040)	0.10 J	ND (0.040)	ND (0.040)	ND (0.16)	ND (0.32)	ND (0.16)	ND (0.16)
Cyclohexane	ppbv	ND (0.034)	ND (0.034)	0.092 J	ND (0.034)	0.15 J	0.61 J	5.8	3.5	ND (0.13)
1,1-Dichloroethane	ppbv	ND (0.028)	ND (0.028)	ND (0.028)	ND (0.028)	ND (0.11)	ND (0.22)	ND (0.11)	ND (0.11)	ND (0.11)
1,1-Dichloroethylene	ppbv	ND (0.046)	ND (0.046)	ND (0.046)	ND (0.046)	ND (0.18)	ND (0.37)	ND (0.18)	ND (0.18)	ND (0.18)
1,2-Dibromoethane	ppbv	ND (0.027)	ND (0.027)	ND (0.027)	ND (0.027)	ND (0.11)	ND (0.22)	ND (0.11)	ND (0.11)	ND (0.11)
1,2-Dichloroethane	ppbv	ND (0.043)	ND (0.043)	ND (0.043)	ND (0.043)	ND (0.17)	ND (0.35)	ND (0.17)	ND (0.17)	ND (0.17)
1,2-Dichloropropane	ppbv	ND (0.038)	ND (0.038)	ND (0.038)	ND (0.038)	ND (0.15)	ND (0.31)	ND (0.15)	ND (0.15)	ND (0.15)
1,4-Dioxane	ppbv	ND (0.056)	ND (0.056)	ND (0.056)	ND (0.056)	ND (0.22)	ND (0.45)	ND (0.22)	ND (0.22)	ND (0.22)
Dichlorodifluoromethane	ppbv	0.52	0.55	1.5	0.52	0.44	0.42 J	ND (0.30)	0.70 J	1.2
Dibromochloromethane	ppbv	ND (0.027)	ND (0.027)	ND (0.027)	ND (0.027)	ND (0.11)	ND (0.22)	ND (0.11)	ND (0.11)	ND (0.11)
trans-1,2-Dichloroethylene	ppbv	ND (0.033)	ND (0.033)	ND (0.033)	ND (0.033)	ND (0.13)	ND (0.26)	ND (0.13)	ND (0.13)	ND (0.13)
cis-1,2-Dichloroethylene	ppbv	0.44	ND (0.038)	ND (0.038)	ND (0.038)	0.52 J	ND (0.30)	ND (0.15)	ND (0.15)	ND (0.15)
cis-1,3-Dichloropropene	ppbv	ND (0.043)	ND (0.043)	ND (0.043)	ND (0.043)	ND (0.17)	ND (0.34)	ND (0.17)	ND (0.17)	ND (0.17)
m-Dichlorobenzene	ppbv	ND (0.037)	ND (0.037)	ND (0.037)	ND (0.037)	ND (0.15)	ND (0.30)	ND (0.15)	ND (0.15)	ND (0.15)
o-Dichlorobenzene	ppbv	ND (0.027)	ND (0.027)	ND (0.027)	ND (0.027)	ND (0.11)	ND (0.21)	ND (0.11)	ND (0.11)	ND (0.11)
p-Dichlorobenzene	ppbv	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.10)	ND (0.20)	ND (0.10)	ND (0.10)	ND (0.10)
trans-1,3-Dichloropropene	ppbv	ND (0.039)	ND (0.039)	ND (0.039)	ND (0.039)	ND (0.16)	ND (0.31)	ND (0.16)	ND (0.16)	ND (0.16)
Ethanol	ppbv	3.1	1.1	2.5	6	16.8	12.2	22.3	13.4	8.8
Ethylbenzene	ppbv	0.22	0.2	0.52	0.72	0.34	5.4	43.8	58	1.5
Ethyl Acetate	ppbv	1.1	0.95	0.25	1.4	0.5	1.6	ND (0.49)	ND (0.24)	ND (0.24)
4-Ethyltoluene	ppbv	0.21	ND (0.024)	0.76	0.29	0.16 J	1.7	13.2	26.1	3.9
Freon 113	ppbv	ND (0.034)	ND (0.034)	ND (0.034)	ND (0.034)	ND (0.14)	ND (0.27)	ND (0.14)	ND (0.14)	ND (0.14)
Freon 114	ppbv	ND (0.031)	ND (0.031)	ND (0.031)	ND (0.031)	ND (0.12)	ND (0.25)	ND (0.12)	ND (0.12)	ND (0.12)
Heptane	ppbv	0.21	ND (0.033)	0.14 J	0.56	1.6	4.3	35.5	21.9	0.91
Hexachlorobutadiene	ppbv	ND (0.046)	ND (0.046)	ND (0.046)	ND (0.046)	ND (0.18)	ND (0.37)	ND (0.18)	ND (0.18)	ND (0.18)
Hexane	ppbv	0.31	0.23	0.24	0.55	0.59	7.1	51.6	28.3	1.3
2-Hexanone	ppbv	ND (0.043)	0.18 J	0.31	1.5	ND (0.043)	ND (0.17)	ND (0.34)	ND (0.17)	ND (0.17)
Isopropyl Alcohol	ppbv	0.7	0.3	0.8	1.3	3.7	1	2.1	0.87	1.2
Methylene chloride	ppbv	1.2	0.63	0.8	0.65	1	0.86	ND (0.22)	0.86	ND (0.11)
Methyl ethyl ketone	ppbv	1	1.1	1.2	5.7	1.5	4.4	2.6	1.7	2.5
Methyl Isobutyl Ketone	ppbv	ND (0.036)	ND (0.036)	0.41	1.2	0.29	ND (0.14)	ND (0.29)	ND (0.14)	ND (0.14)
Methyl Tert Butyl Ether	ppbv	ND (0.027)	ND (0.027)	ND (0.027)	ND (0.027)	ND (0.11)	ND (0.22)	ND (0.11)	ND (0.11)	ND (0.11)
Methylmethacrylate	ppbv	ND (0.043)	ND (0.043)	ND (0.043)	ND (0.043)	ND (0.17)	ND (0.34)	ND (0.17)	ND (0.17)	1.8
Propylene	ppbv	1.1	1.6	1.6	2.1	ND (0.070)	1.6 J	ND (0.56)	ND (0.28)	7.8
Styrene	ppbv	ND (0.027)	0.12 J	0.13 J	0.14 J	0.24	ND (0.11)	ND (0.22)	ND (0.11)	0.40 J
1,1,1-Trichloroethane	ppbv	ND (0.022)	0.39	ND (0.022)	ND (0.022)	ND (0.088)	2.7	252	42.4	ND (0.088)
1,1,2,2-Tetrachloroethane	ppbv	ND (0.030)	ND (0.030)	ND (0.030)	ND (0.030)	ND (0.12)	ND (0.24)	ND (0.12)	ND (0.12)	ND (0.12)
1,1,2-Trichloroethane	ppbv	ND (0.030)	ND (0.030)	ND (0.030)	ND (0.030)	ND (0.12)	ND (0.24)	ND (0.12)	ND (0.12)	ND (0.12)
1,2,4-Trichlorobenzene	ppbv	ND (0.051)	ND (0.051)	ND (0.051)	ND (0.051)	ND (0.20)	ND (0.41)	ND (0.20)	ND (0.20)	ND (0.20)
1,2,4-Trimethylbenzene	ppbv	0.5	0.29	2.5	1.7	0.69	4	47.7	75.4	10.5
1,3,5-Trimethylbenzene	ppbv	0.26	0.11 J	0.92	0.49	0.2	1.2	13	20.6	3.2
2,2,4-Trimethylpentane	ppbv	0.35	0.18 J	0.19 J	0.43	0.35	0.97	8	3.2	ND (0.11)
Tertiary Butyl Alcohol	ppbv	ND (0.032)	ND (0.032)	0.48	ND (0.032)	ND (0.13)	3	ND (0.13)	1.4	ND (0.13)
Tetrachloroethylene	ppbv	0.46	0.61	1.1	1	0.085	4.1	25.4	66.8	88.5
Tetrahydrofuran	ppbv	ND (0.047)	ND (0.047)	ND (0.047)	ND (0.047)	ND (0.19)	2.8	1.9	ND (0.19)	1.4
Toluene	ppbv	1.8	1	2.7	3.8	3.2	43.6	283	414	4.5
Trichloroethylene	ppbv	0.069	0.15	0.096	0.13	0.061	0.2	ND (0.26)	0.87	ND (0.13)
Trichlorofluoromethane	ppbv	0.28	0.32	0.34	0.33	0.23	ND (0.17)	ND (0.34)	0.52 J	0.45 J
Vinyl chloride	ppbv	ND (0.032)	ND (0.032)	ND (0.032)	ND (0.032)	ND (0.13)	ND (0.26)	ND (0.13)	ND (0.13)	ND (0.13)
Vinyl Acetate	ppbv	ND (0.057)	ND (0.057)	ND (0.057)	ND (0.057)	ND (0.23)	ND (0.45)	ND (0.23)	ND (0.23)	ND (0.23)
m,p-Xylene	ppbv	0.73	0.59	2.1	2.7	20.4	168	2.76	6.4	7.6
o-Xylene	ppbv	0.27	0.23	0.93	0.86	0.37	5.1	53.7	63.4	2.5
Xylenes (total)	ppbv	1	0.83	3	3.6	1.5	25.4	222	345	9

**Notes**  
All results given in micrograms per cubic meter (ug/m<sup>3</sup>)  
Samples analyzed for VOCs using EPA Compendium Method TO-15.  
Detected compounds are highlighted in Blue  
ND = Not Detected  
NS = No Standard  
qualitative, reporting detection limit (RDL) but greater than the quantitative, method detection limit (MDL). Therefore, the result is



**Table 2**  
**Semi Volatile Organic Compounds in Soil**

Rockrose Development, Fleet Site  
Jackson Avenue, Long Island City, New York

Client Sample ID:	NY SCO - Commercial	SB-1(0-2)	SB-1(6-8)	SB-2 ALT(0-2)	SB-2 ALT(6-8)	SB-3(0-2)	SB-3(12-14)	SB-4(0-2)	SB-4(6-8)
Lab Sample ID:	w/CP-51 (10/10)	JB13726-1	JB13726-2	JB13726-3	JB13726-4	JB13726-5	JB13726-6	JB13726-7	JB13726-8
Date Sampled:	(6 NYCRR 375-6)	8/8/2012	8/8/2012	8/7/2012	8/7/2012	8/13/2012	8/13/2012	8/6/2012	8/6/2012
Matrix:	(12/06)	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
<b>GC/MS Semi-volatiles (SW846)</b>									
2-Chlorophenol	ug/kg	ND (34)	ND (31)	ND (32)	ND (36)	ND (32)	ND (32)	ND (34)	ND (34)
4-Chloro-3-methyl phenol	ug/kg	-	ND (34)	ND (31)	ND (32)	ND (36)	ND (31)	ND (32)	ND (34)
2,4-Dichlorophenol	ug/kg	ND (55)	ND (50)	ND (52)	ND (58)	ND (51)	ND (51)	ND (54)	ND (55)
2,4-Dimethylphenol	ug/kg	-	ND (57)	ND (52)	ND (54)	ND (60)	ND (53)	ND (54)	ND (57)
2,4-Dinitrophenol	ug/kg	-	ND (42)	ND (38)	ND (39)	ND (44)	ND (38)	ND (39)	ND (41)
4,6-Dinitro-o-cresol	ug/kg	-	ND (42)	ND (38)	ND (39)	ND (44)	ND (38)	ND (39)	ND (41)
2-Methylphenol	ug/kg	500000	ND (39)	ND (35)	ND (37)	ND (41)	ND (36)	ND (36)	ND (39)
3,4-Methylphenol	ug/kg	-	ND (43)	ND (29)	ND (30)	ND (46)	ND (40)	ND (43)	ND (43)
2-Nitrophenol	ug/kg	-	ND (36)	ND (33)	ND (34)	ND (38)	ND (33)	ND (34)	ND (36)
4-Nitrophenol	ug/kg	-	ND (58)	ND (52)	ND (54)	ND (61)	ND (53)	ND (54)	ND (57)
Pentachlorophenol	ug/kg	6700	ND (58)	ND (53)	ND (55)	ND (61)	ND (54)	ND (55)	ND (58)
Phenol	ug/kg	500000	ND (36)	ND (32)	ND (34)	ND (38)	ND (33)	ND (33)	ND (35)
2,3,4,6-Tetrachlorophenol	ug/kg	-	ND (35)	ND (32)	ND (33)	ND (37)	ND (32)	ND (33)	ND (35)
2,4,5-Trichlorophenol	ug/kg	-	ND (39)	ND (36)	ND (37)	ND (42)	ND (36)	ND (37)	ND (39)
2,4,6-Trichlorophenol	ug/kg	-	ND (32)	ND (29)	ND (30)	ND (46)	ND (30)	ND (30)	ND (32)
Acenaphthene	ug/kg	500000	320	ND (8.9)	ND (9.3)	ND (10)	213	61.2	ND (9.7)
Acenaphthylene	ug/kg	500000	43.5	ND (9.9)	ND (10)	ND (11)	247	19.6 J	ND (11)
Acetophenone	ug/kg	-	ND (6.0)	ND (5.4)	ND (5.7)	ND (6.3)	ND (5.5)	ND (5.6)	ND (5.9)
Anthracene	ug/kg	500000	877	ND (11)	ND (11)	ND (13)	762	165	ND (12)
Atrazine	ug/kg	-	ND (6.7)	ND (6.1)	ND (6.3)	ND (7.1)	ND (6.2)	ND (6.3)	ND (6.6)
Benzo(a)anthracene	ug/kg	5600	1950	ND (10)	ND (10)	ND (12)	2670	449	ND (11)
Benzo(a)pyrene	ug/kg	1000	1648	ND (9.4)	ND (9.8)	ND (11)	2740	386	ND (10)
Benzo(b)fluoranthene	ug/kg	5600	1476	ND (10)	ND (11)	ND (12)	3020	494	ND (11)
Benzo(g,h,i)perylene	ug/kg	500000	1040	ND (11)	ND (12)	ND (13)	1430	234	ND (12)
Benzo(k)fluoranthene	ug/kg	56000	1180	ND (12)	ND (12)	ND (13)	1730	237	ND (13)
4-Bromophenyl phenyl ether	ug/kg	-	ND (12)	ND (11)	ND (12)	ND (13)	ND (11)	ND (12)	ND (12)
Butyl benzyl phthalate	ug/kg	-	65.7 J	ND (18)	ND (19)	ND (21)	ND (18)	ND (18)	ND (20)
1,1'-Biphenyl	ug/kg	-	22.9 J	ND (3.6)	ND (3.7)	ND (4.2)	16.1 J	ND (3.7)	ND (3.9)
Benzaldehyde	ug/kg	-	ND (7.8)	ND (8.1)	ND (8.3)	ND (9.3)	ND (7.2)	ND (7.3)	ND (7.8)
2-Chloronaphthalene	ug/kg	-	ND (11)	ND (9.5)	ND (10)	ND (11)	ND (9.7)	ND (10)	ND (11)
4-Chloroaniline	ug/kg	-	ND (11)	ND (9.9)	ND (10)	ND (11)	ND (10)	ND (10)	ND (11)
Carbazole	ug/kg	-	312	ND (14)	ND (15)	ND (17)	288	66.9	ND (16)
Caprolactam	ug/kg	-	ND (11)	ND (9.7)	ND (10)	ND (11)	ND (9.9)	ND (10)	ND (11)
Chrysene	ug/kg	56000	1980	ND (10)	ND (11)	ND (12)	2700	448	ND (11)
bis(2-Chloroethoxy)methane	ug/kg	-	ND (14)	ND (12)	ND (13)	ND (14)	ND (13)	ND (13)	ND (14)
bis(2-Chloroethyl)ether	ug/kg	-	ND (10)	ND (9.3)	ND (9.7)	ND (11)	ND (9.5)	ND (9.6)	ND (10)
bis(2-Chloroisopropyl)ether	ug/kg	-	ND (10)	ND (9.1)	ND (9.5)	ND (11)	ND (9.3)	ND (9.5)	ND (10)
4-Chlorophenyl phenyl ether	ug/kg	-	ND (10)	ND (9.3)	ND (9.7)	ND (11)	ND (9.5)	ND (9.6)	ND (10)
2,4-Dinitrotoluene	ug/kg	-	ND (15)	ND (13)	ND (14)	ND (16)	ND (14)	ND (14)	ND (15)
2,6-Dinitrotoluene	ug/kg	-	ND (13)	ND (12)	ND (12)	ND (14)	ND (12)	ND (12)	ND (13)
3,3'-Dichlorobenzidine	ug/kg	-	ND (6.6)	ND (7.8)	ND (8.2)	ND (9.1)	ND (6.0)	ND (6.1)	ND (6.5)
Dibenzo(a,h)anthracene	ug/kg	560	403	ND (11)	ND (11)	ND (12)	685	84.4	ND (11)
Dibenzofuran	ug/kg	350000	138	ND (9.1)	ND (9.5)	ND (11)	115	25.9 J	ND (10)
Din-n-butyl phthalate	ug/kg	-	78.2	ND (8.8)	ND (7.1)	ND (8.0)	ND (7.0)	ND (7.1)	ND (7.4)
Din-n-octyl phthalate	ug/kg	-	35.2 J	ND (15)	ND (16)	ND (17)	ND (15)	ND (16)	ND (17)
Diethyl phthalate	ug/kg	-	ND (12)	ND (11)	ND (11)	ND (12)	ND (11)	ND (11)	ND (12)
Dimethyl phthalate	ug/kg	-	ND (12)	34.3 J	ND (11)	ND (13)	ND (11)	ND (11)	ND (12)
bis(2-Ethylhexyl)phthalate	ug/kg	-	321	ND (27)	112	37.8 J	32.7 J	477	36.2 J
Fluoranthene	ug/kg	500000	4860	ND (14)	ND (14)	ND (16)	7400	1020	ND (15)
Fluorene	ug/kg	500000	301	ND (10)	ND (11)	ND (12)	220	59	ND (11)
Hexachlorobenzene	ug/kg	8000	ND (11)	ND (10)	ND (10)	ND (12)	ND (10)	ND (10)	ND (11)
Hexachlorobutadiene	ug/kg	-	ND (9.5)	ND (8.6)	ND (8.9)	ND (10)	ND (8.7)	ND (8.9)	ND (9.3)
Hexachlorocyclopentadiene	ug/kg	-	ND (35)	ND (31)	ND (33)	ND (37)	ND (32)	ND (33)	ND (35)
Hexachloroethane	ug/kg	-	ND (9.5)	ND (8.6)	ND (8.9)	ND (10)	ND (8.7)	ND (8.9)	ND (9.4)
Indeno(1,2,3-cd)pyrene	ug/kg	5600	947	ND (11)	ND (11)	ND (12)	1420	212	ND (12)
Isophorone	ug/kg	-	ND (9.2)	ND (8.3)	ND (8.6)	ND (9.7)	ND (8.5)	ND (8.6)	ND (9.0)
2-Methylnaphthalene	ug/kg	-	47.7 J	ND (17)	ND (18)	ND (20)	42.7 J	61.2 J	ND (19)
2-Nitroaniline	ug/kg	-	ND (15)	ND (14)	ND (14)	ND (16)	ND (14)	ND (14)	ND (15)
3-Nitroaniline	ug/kg	-	ND (14)	ND (12)	ND (13)	ND (14)	ND (13)	ND (13)	ND (14)
4-Nitroaniline	ug/kg	-	ND (13)	ND (12)	ND (13)	ND (14)	ND (12)	ND (12)	ND (13)
Naphthalene	ug/kg	500000	60.7	ND (8.4)	ND (8.8)	ND (9.8)	73	29.9 J	ND (9.2)
Nitrobenzene	ug/kg	69000	ND (9.8)	ND (8.9)	ND (9.3)	ND (10)	ND (9.1)	ND (9.2)	ND (9.7)
N-Nitroso-di-n-propylamine	ug/kg	-	ND (8.3)	ND (7.5)	ND (7.8)	ND (8.8)	ND (7.7)	ND (7.8)	ND (8.2)
N-Nitrosodiphenylamine	ug/kg	-	ND (20)	ND (18)	ND (19)	ND (21)	ND (19)	ND (19)	ND (20)
Phenanthrene	ug/kg	500000	4850	ND (14)	ND (15)	ND (16)	4520	717	ND (15)
Pyrene	ug/kg	500000	4473	ND (12)	ND (13)	ND (14)	5810	639	ND (13)
1,2,4,5-Tetrachlorobenzene	ug/kg	-	ND (10)	ND (9.5)	ND (9.9)	ND (11)	ND (9.7)	ND (9.8)	ND (10)

**Notes**

All results given in micrograms per kilogram (ug/kg)

Samples analyzed for SVOCs using EPA Method 8270.

Results Compared to New York State Department of Environmental Conservation - Division of Environmental Remediation 6 NYCRR PART 375 Restricted Use Soil Cleanup Objectives, Protection of public health - Commercial Use.

**Bold/highlighted values exceeded the NYSDEC Part 375 RSCO - Commercial Use .**

ND = Not Detected

NS = No Standard  
J = Ustia indicates the presence of a compound less than the qualitative, reporting detection limit (RDL) but greater than the quantitative, method detection limit (MDL). Therefore, the result is



**Table 2**  
**Semi Volatile Organic Compounds in Groundwater**

Rockrose Development, Fleet Site  
Jackson Avenue, Long Island City, New York

Client Sample ID:		NY TOGS Class	GW-1	GW-1	GW-2	GW-2	GW-3	GW-3	GW-9	GW-9
Lab Sample ID:		GA GW Standards	JB13738-6	JB13738-6F	JB13738-4	JB13738-4F	JB13738-5	JB13738-5F	JB13738-9	JB13738-9F
Date Sampled:		(NYSDEC 6/2004) <sup>1</sup>	8/10/2012	8/10/2012	8/10/2012	8/10/2012	8/10/2012	8/10/2012	8/14/2012	8/14/2012
Matrix:			Ground Water	Groundwater Filtered						
<b>GC/MS Volatiles (SW846)</b>										
2-Chlorophenol	ug/l	-	ND (1.2)	-	ND (1.0)	-	ND (1.1)	-	ND (1.1)	-
4-Chloro-3-methyl phenol	ug/l	-	ND (2.2)	-	ND (1.9)	-	ND (2.1)	-	ND (2.1)	-
2,4-Dichlorophenol	ug/l	1	ND (1.4)	-	ND (1.2)	-	ND (1.4)	-	ND (1.3)	-
2,4-Dimethylphenol	ug/l	1	ND (1.8)	-	ND (1.6)	-	ND (1.8)	-	ND (1.8)	-
2,4-Dinitrophenol	ug/l	1	ND (20)	-	ND (17)	-	ND (19)	-	ND (19)	-
4,6-Dinitro-o-cresol	ug/l	-	ND (1.2)	-	ND (1.0)	-	ND (1.2)	-	ND (1.2)	-
2-Methylphenol	ug/l	-	ND (1.2)	-	ND (1.1)	-	ND (1.2)	-	ND (1.2)	-
3&4-Methylphenol	ug/l	-	ND (1.1)	-	ND (0.95)	-	ND (1.1)	-	ND (1.1)	-
2-Nitrophenol	ug/l	-	ND (1.8)	-	ND (1.5)	-	ND (1.8)	-	ND (1.8)	-
4-Nitrophenol	ug/l	-	ND (6.2)	-	ND (5.3)	-	ND (6.1)	-	ND (6.1)	-
Pentachlorophenol	ug/l	1	ND (1.7)	-	ND (1.4)	-	ND (1.6)	-	ND (1.6)	-
Phenol	ug/l	1	ND (1.5)	-	ND (1.3)	-	ND (1.5)	-	ND (1.5)	-
2,3,4,6-Tetrachlorophenol	ug/l	-	ND (1.1)	-	ND (0.96)	-	ND (1.1)	-	ND (1.1)	-
2,4,5-Trichlorophenol	ug/l	-	ND (1.9)	-	ND (1.6)	-	ND (1.8)	-	ND (1.8)	-
2,4,6-Trichlorophenol	ug/l	-	ND (1.5)	-	ND (1.3)	-	ND (1.5)	-	ND (1.5)	-
Acenaphthene	ug/l	-	ND (0.31)	-	ND (0.27)	-	ND (0.31)	-	ND (0.31)	-
Acenaphthylene	ug/l	-	ND (0.27)	-	ND (0.23)	-	ND (0.27)	-	ND (0.27)	-
Acetophenone	ug/l	-	ND (0.34)	-	ND (0.29)	-	ND (0.34)	-	ND (0.33)	-
Anthracene	ug/l	-	ND (0.34)	-	ND (0.30)	-	ND (0.34)	-	ND (0.34)	-
Atrazine	ug/l	7.5	ND (0.58)	-	ND (0.50)	-	ND (0.57)	-	ND (0.57)	-
Benzaldehyde	ug/l	-	ND (3.9)	-	ND (3.3)	-	ND (3.8)	-	ND (3.8)	-
Benzo(a)anthracene	ug/l	-	ND (0.27)	-	ND (0.23)	-	ND (0.27)	-	ND (0.26)	-
Benzo(a)pyrene	ug/l	ND	ND (0.27)	-	ND (0.23)	-	ND (0.27)	-	ND (0.26)	-
Benzo(b)fluoranthene	ug/l	-	ND (0.54)	-	ND (0.47)	-	ND (0.54)	-	ND (0.53)	-
Benzo(g,h,i)perylene	ug/l	-	ND (0.38)	-	ND (0.33)	-	ND (0.38)	-	ND (0.38)	-
Benzo(k)fluoranthene	ug/l	-	ND (0.61)	-	ND (0.52)	-	ND (0.60)	-	ND (0.60)	-
4-Bromophenyl phenyl ether	ug/l	-	ND (0.43)	-	ND (0.37)	-	ND (0.42)	-	ND (0.42)	-
Butyl benzyl phthalate	ug/l	-	ND (0.34)	-	ND (0.30)	-	ND (0.34)	-	ND (0.34)	-
1,1'-Biphenyl	ug/l	5	ND (0.36)	-	ND (0.31)	-	ND (0.36)	-	ND (0.35)	-
2-Chloronaphthalene	ug/l	-	ND (0.35)	-	ND (0.30)	-	ND (0.35)	-	ND (0.35)	-
4-Chloroaniline	ug/l	5	ND (0.63)	-	ND (0.54)	-	ND (0.62)	-	ND (0.62)	-
Carbazole	ug/l	-	ND (0.43)	-	ND (0.37)	-	ND (0.42)	-	ND (0.42)	-
Caprolactam	ug/l	-	ND (0.82)	-	ND (0.71)	-	ND (0.81)	-	ND (0.81)	-
Chrysene	ug/l	-	ND (0.34)	-	ND (0.29)	-	ND (0.34)	-	ND (0.34)	-
bis(2-Chloroethoxy)methane	ug/l	5	ND (0.37)	-	ND (0.31)	-	ND (0.36)	-	ND (0.36)	-
bis(2-Chloroethyl)ether	ug/l	1	ND (0.37)	-	ND (0.32)	-	ND (0.36)	-	ND (0.36)	-
bis(2-Chloroisopropyl)ether	ug/l	5	ND (0.54)	-	ND (0.47)	-	ND (0.53)	-	ND (0.53)	-
4-Chlorophenyl phenyl ether	ug/l	-	ND (0.37)	-	ND (0.32)	-	ND (0.37)	-	ND (0.36)	-
2,4-Dinitrotoluene	ug/l	5	ND (0.51)	-	ND (0.44)	-	ND (0.50)	-	ND (0.50)	-
2,6-Dinitrotoluene	ug/l	5	ND (0.55)	-	ND (0.47)	-	ND (0.54)	-	ND (0.54)	-
3,3'-Dichlorobenzidine	ug/l	5	ND (0.43)	-	ND (0.37)	-	ND (0.42)	-	ND (0.42)	-
Dibenzo(a,h)anthracene	ug/l	-	ND (0.45)	-	ND (0.39)	-	ND (0.44)	-	ND (0.44)	-
Dibenzofuran	ug/l	-	ND (0.32)	-	ND (0.27)	-	ND (0.31)	-	ND (0.31)	-
Di-n-butyl phthalate	ug/l	50	ND (0.66)	-	ND (0.57)	-	ND (0.65)	-	ND (0.65)	-
Di-n-octyl phthalate	ug/l	-	ND (0.37)	-	ND (0.32)	-	ND (0.36)	-	ND (0.36)	-
Diethyl phthalate	ug/l	-	ND (0.39)	-	ND (0.34)	-	ND (0.38)	-	ND (0.38)	-
Dimethyl phthalate	ug/l	-	ND (0.34)	-	ND (0.29)	-	ND (0.33)	-	ND (0.33)	-
bis(2-Ethylhexyl)phthalate	ug/l	5	ND (0.70)	-	2.4	-	1.9 J	-	ND (0.69)	-
Fluoranthene	ug/l	-	ND (0.38)	-	ND (0.33)	-	ND (0.37)	-	ND (0.37)	-
Fluorene	ug/l	-	ND (0.33)	-	ND (0.28)	-	ND (0.33)	-	ND (0.32)	-
Hexachlorobenzene	ug/l	0.04	ND (0.40)	-	ND (0.35)	-	ND (0.40)	-	ND (0.40)	-
Hexachlorobutadiene	ug/l	0.5	ND (0.61)	-	ND (0.53)	-	ND (0.60)	-	ND (0.60)	-
Hexachlorocyclopentadiene	ug/l	5	ND (8.5)	-	ND (7.3)	-	ND (8.4)	-	ND (8.3)	-
Hexachloroethane	ug/l	5	ND (0.65)	-	ND (0.56)	-	ND (0.65)	-	ND (0.64)	-
Indeno(1,2,3-cd)pyrene	ug/l	-	ND (0.45)	-	ND (0.38)	-	ND (0.44)	-	ND (0.44)	-
Isophorone	ug/l	-	ND (0.33)	-	ND (0.28)	-	ND (0.32)	-	ND (0.32)	-
2-Methylnaphthalene	ug/l	-	ND (0.46)	-	ND (0.39)	-	ND (0.45)	-	ND (0.45)	-
2-Nitroaniline	ug/l	5	ND (1.3)	-	ND (1.1)	-	ND (1.3)	-	ND (1.3)	-
3-Nitroaniline	ug/l	5	ND (1.5)	-	ND (1.3)	-	ND (1.5)	-	ND (1.5)	-
4-Nitroaniline	ug/l	5	ND (2.0)	-	ND (1.7)	-	ND (1.9)	-	ND (1.9)	-
Naphthalene	ug/l	-	ND (0.31)	-	ND (0.27)	-	ND (0.30)	-	ND (0.30)	-
Nitrobenzene	ug/l	0.4	ND (0.50)	-	ND (0.43)	-	ND (0.49)	-	ND (0.49)	-
N-Nitroso-di-n-propylamine	ug/l	-	ND (0.36)	-	ND (0.31)	-	ND (0.36)	-	ND (0.35)	-
N-Nitrosodiphenylamine	ug/l	-	ND (0.36)	-	ND (0.31)	-	ND (0.36)	-	ND (0.36)	-
Phenanthrene	ug/l	-	ND (0.35)	-	ND (0.30)	-	ND (0.34)	-	ND (0.34)	-
Pyrene	ug/l	-	ND (0.32)	-	ND (0.28)	-	ND (0.32)	-	ND (0.32)	-
1,2,4,5-Tetrachlorobenzene	ug/l	5	ND (0.36)	-	ND (0.31)	-	ND (0.36)	-	ND (0.36)	-

**Notes**

All results given in micrograms per liter (ug/L)

Samples analyzed for SVOCs using EPA Method 8270.



es exceeded the NYSDEC TOGS 1.1.1.

**Table 3  
PCBs / Pesticides in Soil**

Rockrose Development, Fleet Site  
Jackson Avenue, Long Island City, New York

Client Sample ID:		NY SCO - Commercial w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-1(0-2')	SB-1(6-8')	SB-2 ALT(0-2)	SB-2 ALT(6-8)	SB-3(0-2)	SB-3(12-14)	SB-4(0-2)	SB-4(6-8)
Lab Sample ID:			JB13726-1	JB13726-2	JB13726-3	JB13726-4	JB13726-5	JB13726-6	JB13726-7	JB13726-8
Date Sampled:			8/8/2012	8/8/2012	8/7/2012	8/7/2012	8/13/2012	8/13/2012	8/6/2012	8/6/2012
Matrix:			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil

**GC Semi-volatiles (SW846 8081B)**

Aldrin	ug/l	ND	ND (0.0095)	-	ND (0.0096)	-	ND (0.0095)	-	ND (0.0098)	-
alpha-BHC	ug/l	0.01	ND (0.0040)	-	ND (0.0041)	-	ND (0.0040)	-	ND (0.0041)	-
beta-BHC	ug/l	0.04	ND (0.0038)	-	ND (0.0038)	-	ND (0.0038)	-	ND (0.0039)	-
delta-BHC	ug/l	0.04	ND (0.0062)	-	ND (0.0063)	-	ND (0.0062)	-	ND (0.0064)	-
gamma-BHC (Lindane)	ug/l	0.05	ND (0.0041)	-	ND (0.0042)	-	ND (0.0041)	-	ND (0.0043)	-
alpha-Chlordane	ug/l	-	ND (0.0050)	-	ND (0.0051)	-	ND (0.0050)	-	ND (0.0052)	-
gamma-Chlordane	ug/l	-	ND (0.0023)	-	ND (0.0024)	-	ND (0.0023)	-	ND (0.0024)	-
Dieldrin	ug/l	0.004	ND (0.0033)	-	ND (0.0034)	-	ND (0.0033)	-	ND (0.0034)	-
4,4'-DDD	ug/l	0.3	ND (0.0036)	-	ND (0.0037)	-	ND (0.0036)	-	ND (0.0038)	-
4,4'-DDE	ug/l	0.2	ND (0.0030)	-	ND (0.0030)	-	ND (0.0030)	-	ND (0.0031)	-
4,4'-DDT	ug/l	0.2	ND (0.0060)	-	ND (0.0061)	-	ND (0.0060)	-	ND (0.0062)	-
Endrin	ug/l	ND	ND (0.0064)	-	ND (0.0065)	-	ND (0.0064)	-	ND (0.0066)	-
Endosulfan sulfate	ug/l	-	ND (0.0064)	-	ND (0.0066)	-	ND (0.0064)	-	ND (0.0067)	-
Endrin aldehyde	ug/l	5	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0030)	-
Endrin ketone	ug/l	5	ND (0.0041)	-	ND (0.0042)	-	ND (0.0041)	-	ND (0.0043)	-
Endosulfan-I	ug/l	-	ND (0.0030)	-	ND (0.0031)	-	ND (0.0030)	-	ND (0.0032)	-
Endosulfan-II	ug/l	-	ND (0.0028)	-	ND (0.0028)	-	ND (0.0028)	-	ND (0.0029)	-
Heptachlor	ug/l	0.04	ND (0.0084)	-	ND (0.0086)	-	ND (0.0084)	-	ND (0.0087)	-
Heptachlor epoxide	ug/l	0.03	ND (0.0038)	-	ND (0.0039)	-	ND (0.0038)	-	ND (0.0040)	-
Methoxychlor	ug/l	35	ND (0.0082)	-	ND (0.0083)	-	ND (0.0082)	-	ND (0.0085)	-
Toxaphene	ug/l	0.06	ND (0.15)	-						

**GC Semi-volatiles (SW846 8082A)**

Aroclor 1016	ug/l	0.09	ND (0.13)	-						
Aroclor 1221	ug/l	0.09	ND (0.27)	-	ND (0.28)	-	ND (0.27)	-	ND (0.28)	-
Aroclor 1232	ug/l	0.09	ND (0.39)	-	ND (0.39)	-	ND (0.39)	-	ND (0.40)	-
Aroclor 1242	ug/l	0.09	ND (0.086)	-	ND (0.088)	-	ND (0.086)	-	ND (0.090)	-
Aroclor 1248	ug/l	0.09	ND (0.15)	-						
Aroclor 1254	ug/l	0.09	ND (0.14)	-	ND (0.14)	-	ND (0.14)	-	ND (0.15)	-
Aroclor 1260	ug/l	0.09	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.22)	-
Aroclor 1268	ug/l	0.09	ND (0.13)	-	ND (0.13)	-	ND (0.13)	-	ND (0.14)	-
Aroclor 1262	ug/l	0.09	ND (0.060)	-	ND (0.061)	-	ND (0.060)	-	ND (0.063)	-

**Notes**

All results given in micrograms per kilogram (ug/kg)

Samples analyzed for PCBs/Pesticides using EPA Method 8081/8082.

Results Compared to New York State Department of Environmental Conservation, Division of Environmental Remediation 6 NYCRR PART 375 Restricted Use Soil Cleanup Objectives, Protection of public health - Commercial Use.

**Bold/highlighted values exceeded the NYSDEC Part 375 RSCO - Commercial Use .**

ND = Not Detected

NS = No Standard

J = Data indicates the presence of a compound less than the qualitative, reporting detection limit (RDL) but greater than the quantitative, method detection limit (MDL). Therefore, the result is



**Table 3**  
**PCBs / Pesticides in Groundwater**

Rockrose Development, Fleet Site  
Jackson Avenue, Long Island City, New York

Client Sample ID:	NY TOGS Class	GW-1	GW-1	GW-2	GW-2	GW-3	GW-3	GW-9	GW-9
Lab Sample ID:	GA GW Standards	JB13738-6	JB13738-6F	JB13738-4	JB13738-4F	JB13738-5	JB13738-5F	JB13738-9	JB13738-9F
Date Sampled:	(NYSDEC 6/2004)	8/10/2012	8/10/2012	8/10/2012	8/10/2012	8/10/2012	8/10/2012	8/14/2012	8/14/2012
Matrix:		Ground Water	Groundwater Filtered						

**GC Semi-volatiles (SW846 8081B)**

Aldrin	ug/l	ND	ND (0.0095)	-	ND (0.0096)	-	ND (0.0095)	-	ND (0.0098)	-
alpha-BHC	ug/l	0.01	ND (0.0040)	-	ND (0.0041)	-	ND (0.0040)	-	ND (0.0041)	-
beta-BHC	ug/l	0.04	ND (0.0038)	-	ND (0.0038)	-	ND (0.0038)	-	ND (0.0039)	-
delta-BHC	ug/l	0.04	ND (0.0062)	-	ND (0.0063)	-	ND (0.0062)	-	ND (0.0064)	-
gamma-BHC (Lindane)	ug/l	0.05	ND (0.0041)	-	ND (0.0042)	-	ND (0.0041)	-	ND (0.0043)	-
alpha-Chlordane	ug/l	-	ND (0.0050)	-	ND (0.0051)	-	ND (0.0050)	-	ND (0.0052)	-
gamma-Chlordane	ug/l	-	ND (0.0023)	-	ND (0.0024)	-	ND (0.0023)	-	ND (0.0024)	-
Dieldrin	ug/l	0.004	ND (0.0033)	-	ND (0.0034)	-	ND (0.0033)	-	ND (0.0034)	-
4,4'-DDD	ug/l	0.3	ND (0.0036)	-	ND (0.0037)	-	ND (0.0036)	-	ND (0.0038)	-
4,4'-DDE	ug/l	0.2	ND (0.0030)	-	ND (0.0030)	-	ND (0.0030)	-	ND (0.0031)	-
4,4'-DDT	ug/l	0.2	ND (0.0060)	-	ND (0.0061)	-	ND (0.0060)	-	ND (0.0062)	-
Endrin	ug/l	ND	ND (0.0064)	-	ND (0.0065)	-	ND (0.0064)	-	ND (0.0066)	-
Endosulfan sulfate	ug/l	-	ND (0.0064)	-	ND (0.0066)	-	ND (0.0064)	-	ND (0.0067)	-
Endrin aldehyde	ug/l	5	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0030)	-
Endrin ketone	ug/l	5	ND (0.0041)	-	ND (0.0042)	-	ND (0.0041)	-	ND (0.0043)	-
Endosulfan-I	ug/l	-	ND (0.0030)	-	ND (0.0031)	-	ND (0.0030)	-	ND (0.0032)	-
Endosulfan-II	ug/l	-	ND (0.0028)	-	ND (0.0028)	-	ND (0.0028)	-	ND (0.0029)	-
Heptachlor	ug/l	0.04	ND (0.0084)	-	ND (0.0086)	-	ND (0.0084)	-	ND (0.0087)	-
Heptachlor epoxide	ug/l	0.03	ND (0.0038)	-	ND (0.0039)	-	ND (0.0038)	-	ND (0.0040)	-
Methoxychlor	ug/l	35	ND (0.0082)	-	ND (0.0083)	-	ND (0.0082)	-	ND (0.0085)	-
Toxaphene	ug/l	0.06	ND (0.15)	-						

**GC Semi-volatiles (SW846 8082A)**

Aroclor 1016	ug/l	0.09	ND (0.13)	-						
Aroclor 1221	ug/l	0.09	ND (0.27)	-	ND (0.28)	-	ND (0.27)	-	ND (0.28)	-
Aroclor 1232	ug/l	0.09	ND (0.39)	-	ND (0.39)	-	ND (0.39)	-	ND (0.40)	-
Aroclor 1242	ug/l	0.09	ND (0.086)	-	ND (0.088)	-	ND (0.086)	-	ND (0.090)	-
Aroclor 1248	ug/l	0.09	ND (0.15)	-						
Aroclor 1254	ug/l	0.09	ND (0.14)	-	ND (0.14)	-	ND (0.14)	-	ND (0.15)	-
Aroclor 1260	ug/l	0.09	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.22)	-
Aroclor 1268	ug/l	0.09	ND (0.13)	-	ND (0.13)	-	ND (0.13)	-	ND (0.14)	-
Aroclor 1262	ug/l	0.09	ND (0.060)	-	ND (0.061)	-	ND (0.060)	-	ND (0.063)	-

**Notes**

All results given in micrograms per liter (ug/L)

Samples analyzed for PCBs/Pesticides using EPA Method 8081B /8082A

Results Compared to New York State Technical and Operational Series (TOGS) 1.1.1 , Ambient Water Quality Standards Class GA

**Bold/highlighted values exceeded the NYSDEC TOGS 1.1.1.**

ND = Not Detected

NS = No Standard

J = Data indicates the presence of a compound less than the qualitative, reporting detection limit (RDL) but greater than the quantitative, method detection limit (MDL). Therefore, the result is estimated.



**Table 4  
Metals in Soil**

Rockrose Development, Fleet Site  
Jackson Avenue, Long Island City, New York

Client Sample ID:		NY SCO - Commercial w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-1(0-2')	SB-1(6-8')	SB-2 ALT(0-2)	SB-2 ALT(6-8)	SB-3(0-2)	SB-3(12-14)	SB-4(0-2)	SB-4(6-8)
Lab Sample ID:			JB13726-1	JB13726-2	JB13726-3	JB13726-4	JB13726-5	JB13726-6	JB13726-7	JB13726-8
Date Sampled:			8/8/2012	8/8/2012	8/7/2012	8/7/2012	8/13/2012	8/13/2012	8/6/2012	8/6/2012
Matrix:			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
<b>Metals Analysis</b>										
Aluminum	mg/kg		8760	10700	11900	8210	10800	9500	16800	9110
Antimony	mg/kg		<2.4	<2.3	<2.3	<2.0	<2.4	2.4	<2.2	<2.4
Arsenic	mg/kg	16	13.7	<2.3	3.6	<2.0	6.8	7.9	3.1	<2.4
Barium	mg/kg	400	507	33.7	69.5	40	416	626	65.5	51.6
Beryllium	mg/kg	590	0.55	0.5	0.58	0.32	0.4	0.4	0.58	0.38
Cadmium	mg/kg	9.3	2.7	<0.57	<0.56	<0.51	1.1	3.7	<0.56	<0.61
Calcium	mg/kg		4700	878	1700	2360	10500	6670	1290	5840
Chromium	mg/kg	-	41	22	20.6	20.8	24.4	23.3	40.4	28.1
Cobalt	mg/kg		6.7	9.3	9	7.4	6.9	5.9	9.6	7.3
Copper	mg/kg	270	164	18	15.5	15.9	58.9	53.9	20.6	19.5
Iron	mg/kg		26800	15600	12500	14500	18100	23800	23500	16600
Lead	mg/kg	1000	1490	6.2	8.4	3.7	776	2190	7.2	16.2
Magnesium	mg/kg	-	1980	3040	3300	4830	3660	2640	5250	3150
Manganese	mg/kg	10000	310	199	186	299	248	215	331	365
Mercury	mg/kg	2.8	2	<0.034	<0.037	<0.039	0.62	0.42	<0.039	0.08
Nickel	mg/kg	310	25.3	14.1	15.4	17.7	17.4	13.9	21.4	16
Potassium	mg/kg	-	<1200	1400	1850	1610	2180	1710	1910	1350
Selenium	mg/kg	1500	<2.4	<2.3	<2.3	<2.0	<2.4	<2.2	<2.2	<2.4
Silver	mg/kg	1500	2.8	<0.57	<0.56	<0.51	0.59	<0.54	<0.56	<0.61
Sodium	mg/kg	-	<1200	<1100	<1100	<1000	<1200	<1100	<1100	<1200
Thallium	mg/kg		<1.2	<1.1	<1.1	<1.0	<1.2	<1.1	<1.1	<1.2
Vanadium	mg/kg		52.6	31.1	25.8	26.7	32.3	25.1	42	28.5
Zinc	mg/kg	10000	693	30.1	41.7	46.7	546	658	48.9	43.3

**Notes**

All results given in milligrams per kilogram (mg/kg)  
Results Compared to New York State Department of Environmental Conservation, Division of Environmental Remediation 6 NYCRR PART 375 Restricted Use Soil Cleanup Objectives, Protection of public health - Commercial Use.

**Bold/highlighted values exceeded the NYSDEC Part 375 RSCO - Commercial Use .**

ND = Not Detected

NS = No Standard

J = Data indicates the presence of a compound less than the qualitative, reporting detection limit (RDL) but greater than the quantitative, method detection limit (MDL). Therefore, the result is estimated.



**Table 4  
Metals in Groundwater**

Rockrose Development, Fleet Site  
Jackson Avenue, Long Island City, New York

Client Sample ID:		NY TOGS Class GA GW Standards (NYSDEC 6/2004) <sup>1</sup>	GW-1	GW-1	GW-2	GW-2	GW-3
Lab Sample ID:			JB13738-6	JB13738-6F	JB13738-4	JB13738-4F	JB13738-5
Date Sampled:			8/10/2012	8/10/2012	8/10/2012	8/10/2012	8/10/2012
Matrix:			Ground Water	Groundwater Filtered	Ground Water	Groundwater Filtered	Ground Water

**Metals Analysis**

Element	Unit	NY TOGS Class	GW-1	GW-1	GW-2	GW-2	GW-3
Aluminum	ug/l	-	929	928	16000	5190	1260
Antimony	ug/l	3	<6.0	<6.0	<6.0	<6.0	<6.0
Arsenic	ug/l	25	<3.0	<3.0	3	<3.0	<3.0
Barium	ug/l	1000	<200	<200	200	<200	<200
Beryllium	ug/l	-	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	ug/l	5	<3.0	<3.0	<3.0	<3.0	<3.0
Calcium	ug/l	-	180000	183000	183000	182000	180000
Chromium	ug/l	50	<10	<10	34.6	12.9	<10
Cobalt	ug/l	-	<50	<50	<50	<50	<50
Copper	ug/l	200	<10	<10	45.9	19.7	10.6
Iron	ug/l	300	1720	1700	30400	9740	2350
Lead	ug/l	25	<3.0	<3.0	11.9	4.3	<3.0
Magnesium	ug/l	-	80000	81200	83600	82500	80300
Manganese	ug/l	300	7880	7980	9650	8420	8100
Mercury	ug/l	0.7	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel	ug/l	100	19.2	19.4	53.4	30	20.4
Potassium	ug/l	-	<10000	<10000	<10000	<10000	<10000
Selenium	ug/l	10	<10	<10	<10	<10	<10
Silver	ug/l	50	<10	<10	<10	<10	<10
Sodium	ug/l	20000	97600	98300	96600	98000	96100
Thallium	ug/l	-	<2.0	<2.0	<2.0	<2.0	<2.0
Vanadium	ug/l	-	<50	<50	<50	<50	<50
Zinc	ug/l	-	<20	<20	65.6	25.1	<20

**Notes**

All results given in micrograms per liter (ug/L)

Results Compared to New York State Technical and Operational Series (TOGS) 1.1.1 , Ambient Water Quality Standards Class GA

**Bold/highlighted values exceeded the NYSDEC TOGS 1.1.1.**

ND = Not Detected

NS = No Standard

J = Data indicates the presence of a compound less than the qualitative, reporting detection limit (RDL) but greater than the quantitative, method detection limit (MDL). Therefore, the result is estimated.



## Table 4 Metals in Groundwater

Rockrose Development, Fleet Site  
Jackson Avenue, Long Island City, New York

Client Sample ID:		NY TOGS Class GA GW Standards (NYSDEC 6/2004) <sup>1</sup>	GW-3	GW-9	GW-9
Lab Sample ID:			JB13738-5F	JB13738-9	JB13738-9F
Date Sampled:			8/10/2012	8/14/2012	8/14/2012
Matrix:			Groundwater Filtered	Ground Water	Groundwater Filtered

### Metals Analysis

Element	Unit	NY TOGS Class	GW-3	GW-9	GW-9
Aluminum	ug/l	-	1130	321	609
Antimony	ug/l	3	<6.0	<6.0	<6.0
Arsenic	ug/l	25	<3.0	<3.0	<3.0
Barium	ug/l	1000	<200	<200	<200
Beryllium	ug/l	-	<1.0	<1.0	<1.0
Cadmium	ug/l	5	<3.0	<3.0	<3.0
Calcium	ug/l	-	181000	206000	178000
Chromium	ug/l	50	<10	<10	<10
Cobalt	ug/l	-	<50	<50	<50
Copper	ug/l	200	<10	<10	<10
Iron	ug/l	300	<b>2070</b>	<b>623</b>	<b>1160</b>
Lead	ug/l	25	<3.0	<3.0	<3.0
Magnesium	ug/l	-	80100	91200	77800
Manganese	ug/l	300	<b>7760</b>	<b>8610</b>	<b>7410</b>
Mercury	ug/l	0.7	<0.20	<0.20	<0.20
Nickel	ug/l	100	20.4	18.6	17.1
Potassium	ug/l	-	<10000	<10000	<10000
Selenium	ug/l	10	<10	<10	<10
Silver	ug/l	50	<10	<10	<10
Sodium	ug/l	20000	<b>97300</b>	<b>108000</b>	<b>92600</b>
Thallium	ug/l	-	<2.0	<2.0	<2.0
Vanadium	ug/l	-	<50	<50	<50
Zinc	ug/l	-	<20	<20	<20

#### Notes

All results given in micrograms per liter (ug/L)

Results Compared to New York State Technical and Operational Series (TOGS) 1.1.1 , Ambient Water Quality Standards Class GA

**Bold/highlighted values exceeded the NYSDEC TOGS 1.1.1.**

ND = Not Detected

NS = No Standard

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# Attachment B

Environmental Construction Health and Safety Plan

**Fleet Renovation Site**  
**Queens, New York**  
**Block 433, Lot 2, 4, 5, 6, 8, 41**

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**ENVIRONMENTAL CONSTRUCTION  
HEALTH  
AND SAFETY PLAN**

**Prepared For:**  
Hunter GC, L.L.C.  
666 Fifth Avenue, 5<sup>th</sup> Floor  
New York, New York 10103  
**FLS Project Number: 10020-011**

**Submitted to:**  
**New York City Office of Environmental Remediation**  
E-Designation Program  
100 Gold Street, 2<sup>nd</sup> Floor  
New York, New York 10038



*Environmental Management & Consulting*  
*158 West 29th Street, 9th Floor*  
*New York, New York 10001*  
<http://www.flemingleeshue.com>

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**JUNE 2013**

## PROJECT INFORMATION SHEET

PROJECT/SITE NAME: Fleet Renovation Site

SITE ADDRESSES: 26-25 Jackson Avenue  
26-21 Jackson Avenue  
26-19 Jackson Avenue  
26-15 Jackson Avenue  
26-09 and 26-11 Jackson Avenue  
27-10 43<sup>rd</sup> Avenue

PROJECT NO: 10020-011

CLIENT: Hunter GC, L.L.C.

FLS PROJECT MANAGER: Kevin McGuinness

DATE HEALTH AND  
SAFETY PLAN PREPARED: 06/10/2013

DATE(S) OF SITE WORK: Fall 2013

SITE ACCESS: Prior Notification Required

SITE SIZE: 25,000 square feet (sf)

PREVAILING WEATHER: Prevailing weather is characterized by warm to hot summers and cold winters. The work will be completed in the fall season, which is characterized by mild to cold temperatures.

**SITE DESCRIPTION AND HISTORY:** The Site consists of lots along Jackson Ave. and 43rd Ave. located in the Long Island City section of Queens, New York. The property is currently occupied by 1-3 story buildings housing commercial, retail and light industrial businesses, the majority of which are currently vacant. The Site is approximately 25,000-square feet and is bounded by Jackson Avenue to the south, 43rd Avenue to the east, and the Fleet Tower project to the north and west.

**DESCRIPTION OF SPECIFIC TASKS TO BE PERFORMED:** This project involves, sampling and testing soils, groundwater, and soil vapor, and identifying contaminant sources present on the property.

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III	Heat Stress/Cold Stress and Related Illnesses
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V	OSHA Illness and Injury Form 301

## **1.0 INTRODUCTION**

Fleming-Lee Shue, Inc. (FLS) prepared this Environmental Construction Health and Safety Plan (CHASP) on behalf of Hunter GC, L.L.C. for the Fleet Renovation Site, for use and implementation by FLS employees and their representatives during renovation of the site building. The Site is located on along Jackson Ave. and 43rd Ave, in Long Island City, Queens, New York (Figure 1). The legal description of the site is Block 433, Lot 2, 4, 5, 6, 8, and 41 in the borough of Queens.

The purpose of this CHASP is to identify the real and potential hazards associated with environmental activities related to and conducted during the planned construction and to stipulate appropriate health and safety procedures, particularly where hazardous materials are potentially present. The procedures and guidelines contained in this document are intended to minimize exposure to chemical, physical and biological hazards that may be present in the soil, groundwater, or air and to reduce the potential for accidents and injuries.

This CHASP is based on the premise that accidents are preventable and that accident prevention is the responsibility of all individuals on the project team. Usually accidents are the result of dangerous actions, conditions and/or equipment. Therefore, the goal of this CHASP is to prevent all accidents by developing a sense of safety, health awareness, and safe work habits in field and construction personnel, and by ensuring that the safety requirements of this CHASP are fulfilled. Strict adherence to these health and safety guidelines will reduce, but not eliminate, the potential for injury on the sites.

The procedures described in this document were developed in accordance with the provisions of Occupational Safety and Health Administration (OSHA) rule 29 CFR 1910.120 and FLS' experience with similar projects. All Site workers must read and comprehend this generic HASP before entering the construction area. The Health and Safety Officer (HSO) or designee will ensure that personnel have reviewed the HASP and will provide an opportunity to ask health and safety questions during attendance at a pre-construction safety meeting. Field personnel will sign the acknowledgment form (Attachment I) maintained on-site at the construction office by the HSO. The recommended health and safety guidelines in this document may be modified, if warranted, by additional information obtained prior to, or during construction. The HSO will also maintain copies of pertinent health and safety records for all field personnel.

The Occupational Safety and Health Act (1970) requires:

- Employers shall furnish each employee with a place of employment free from recognized hazards that are causing or likely to cause death or serious physical harm.

- Employers must comply with occupational health and safety standards and rules, regulations and orders pursuant to the Act, that are applicable to company business and operations.
- All employees must comply with occupational health and safety standards and regulations under the Act, which are applicable to their actions and situations.
- Employees are encouraged to contact their immediate superior for information that will help them understand their responsibilities under the Act.

### **1.1 Site Development Plan**

The proposed future use of the structures is retail. Each of the buildings will have the interior floors (above the first) removed to create open space. There will be no residential uses.

Development of the Site includes the following construction activities:

- Each of the buildings will have the interior floors (above the first) removed to create open space.
- It is not currently anticipated that any slab penetrations, trenching or soil excavation will be performed as part of the renovations.
- The existing courtyard areas behind the buildings on lots 2, 4 and 5 are expected to remain. Any exposed soil will be covered with an impervious hardened surface. The exact composition of the surface(s) is not yet known.

### **1.2 Site Background and Previous Investigation Results**

The Site consists of 25,000 sq ft of property and is currently occupied by 1-3 story buildings housing commercial, retail and light industrial businesses, the majority of which are currently vacant.

#### **Previous Investigations**

##### ***1.2.1 Limited Soil and Groundwater Sampling***

FLS, on behalf of Hunter GC LLC collected 6 soil samples, 4 groundwater samples, and 5 soil vapor samples FLS submitted a letter report to the New York City Office of Environmental Remediation (OER) in September 2011 to satisfy “e” designation requirements for the site with the following conclusions:

- The elevation of the property ranges from 10.08 to 10.41 feet.

- The depth-to-groundwater ranges from 12.0 to 16.4 feet at the Site.
- The groundwater flow is generally from north to south beneath the Site.
- According to the geotechnical report conducted by RA Consultants LLC, bedrock was encountered at various depths and elevations across the site. Depth-to-bedrock ranged from 24 to 53.5 feet.
- The stratigraphy of the site consists of 4-6 feet of fill material, comprising a mixture of gravel, sand, silt, bricks, concrete fragments and other construction debris, underlain by layers of silty sand, clay, silt, peat and organic soils, glacial till and bedrock.
- None of the soil samples were found to contain volatile organic compounds (VOCs), pesticides, or PCBs at levels above Track 1 SCOs.
- None of the groundwater samples were found to contain VOCs, SVOCs, pesticides, or PCBs at levels exceeding the NYSDEC TOGS 1.1.1 Class GA Ambient Groundwater Quality Standards [GQS]). The analysis of unfiltered groundwater samples for metals identified the presence of several metals at concentrations exceeding GQS standards, including iron, manganese and sodium. The analysis of dissolved (filtered) groundwater samples for metals also identified the presence of the afore-mentioned analytes, at similar levels.
- The soil vapor and indoor air analytical results were compared to values presented in the NYSDOH Final Guidance on Soil Vapor Intrusion (October 2006). The soil vapor sample analyses identified the presence of trichloroethylene (TCE) and tetrachloroethylene (PCE) at levels exceeding the NYSDOH guidance values. The analysis of the indoor air samples did not identify any VOCs at concentrations exceeding NYSDOH standards.

## **2.0 POTENTIAL CHEMICAL AND PHYSICAL HAZARDS**

### **2.1 Potential Chemical Hazards**

This HASP focuses on the following chemicals of concern:

Chlorinated Volatile Organic Compounds

Attachment II lists the symptoms of exposure to the chemicals known to be present at the site. The chemical hazards will be minimized by limiting exposure of personnel to hazardous conditions and by the use of personnel protective equipment (PPE).

### **2.2 Physical Hazards**

Physical hazards potentially present at the site include, but are not limited to, the following:

- Slip, trip and fall (uneven terrain and slippery surfaces) hazards;
- Environmental (heat/cold) stress;
- Noise hazards; and
- Use of heavy equipment.

Physical hazards associated with lockout/tag-out, scaffolds, confined spaces and other construction equipment are addressed in Sections 3.9 and 4 of this HASP. A discussion of heat stress and cold stress and related illnesses is provided in Attachment III.

### **2.3 Biological Hazards**

General biological hazards present at the site include, but are not limited to, the following:

- Bites or stings from insects (particularly ticks) resulting in skin inflammation, disease, or allergic response; and
- Allergens and toxins from plants and animals, producing dermatitis, rhinitis, or asthma.

## **3.0 HEALTH AND SAFETY PROTOCOL**

### **3.1 Site/Work Hazard Evaluation**

Upon review of contaminant levels, physical and biological hazards, exposure routes and the nature of the construction tasks, it has been determined that Level D protection will be

used during construction activities. Protection levels are described in more detail in Section 3.6 and air monitoring is discussed in Section 5.

### **3.2 Project Team Organization**

All personnel who participate in field activities will be required to attend a Health and Safety meeting prior to the commencement of field activities. The project team organization is shown on Table 1, and the roles are described below.

#### **Health and Safety Officer (HSO)**

- Administers all aspects of the occupational health and safety program;
- Develops programs and technical guidance to identify and remove physical, chemical, and biological hazards from facilities, operations, and sites;
- Assists management and supervisors in the health and safety training of employees;
- Conducts inspections to identify unhealthy or unsafe conditions or work practices;
- Investigates all accidents and takes action to eliminate accident causes;
- Monitors to determine the degree of hazard;
- Determines the protection levels and equipment required to ensure the safety of personnel;
- Evaluates on-site conditions (i.e., weather and chemical hazard information) and recommending to the project manager and/or the field coordinator, modifications to the work plan and personnel protection levels;
- Monitors performance of all personnel to ensure compliance with the required safety procedures;
- Ensures that all personnel have been trained in proper site-safety procedures including the use of PPE, and have read and signed the Acknowledgment Form (Attachment I);
- Conducts daily briefings as necessary;
- Halts work if necessary;
- Ensures strict adherence to the Site HASP; and
- Reviews personnel medical monitoring participation.

**Project Manager**

- Familiar with health and safety regulations related to area of responsibility.
- Directs and coordinates health and safety activities within area of responsibility.
- Ensures arrangements for prompt medical attention in case of serious injury
- Requires all employees supervised to use individual protective equipment and safety devices.
- Ensures that safety equipment is available, maintained, used and stored correctly.
- Instructs and trains all persons within area of responsibility in health and safety requirements.
- Conducts frequent and regular health and safety inspections of work area. Directs correction of unsafe conditions.
- Conducts weekly safety briefings with all supervisors and/or workers.
- Requires all subcontractors and subcontractor personnel to comply with health and safety regulations.

**All Employees**

The minimum personnel qualifications for each individual participating in field activities are:

- OSHA-specific medicals including, but not limited to, audiometric testing under the hearing conservation program and medical approval for the use of respirators;
- Participation in the FLS Occupational Health Monitoring Program;
- Successful completion of the 40-hour OSHA health and safety training for hazardous material sites (29 CFR 1910.120[e][3][i]) and valid/up-to-date 8-hour refresher training (29 CFR 1910.120[e][4]);
- Additionally, it is strongly recommended that all field personnel be trained in first aid and Cardio-Pulmonary Resuscitation (CPR);
- Be familiar with and comply with proper health and safety practices;
- Use the required safety devices and proper personnel protective safety equipment; and

- Notify HSO/supervisor immediately of unsafe conditions/acts, accidents, and injuries.

### **3.3 Training**

Knowledge of the safety rules supplemented by compliance is essential to safety. New employees will be provided orientation training and will be furnished information and literature covering the company health and safety policies, rules, and procedures. This orientation training must be provided prior to the employee's visit to the Site.

All employees will have successfully completed the 40-hour OSHA health and safety training for hazardous material sites (29 CFR 1910.120[e] [3] [i]) and valid/up-to-date 8-hour refresher training (29 CFR 1910.120[e][4]).

Employees must read the HASP and project-specific Work Plan, which contains the applicable regulations/standards for their job.

Prior to beginning work on-Site, and weekly thereafter, the HSO will lead safety training sessions and/or "tailgate" training meetings. These meetings will be conducted to provide information and training on new equipment, new procedures, new chemicals, refresher/remedial training in specific areas, or meet annual requirements. Such training may be held in conjunction with the safety briefings/meetings addressed elsewhere in this program.

If necessary, the HSO will ensure that employees are scheduled and provided specialized training as required. Examples of specified training include (but are not limited to):

- Safe handling/use of flammables, poisons, or toxics;
- Confined space entry;
- Respirator care/use;
- Hazard communication (hazardous chemicals);
- Slip, trip and fall hazards and fall protection;
- Lockout/tagout procedures;
- Scaffold use, and erection/dismantling; and
- Blood-borne Pathogens (Non-Medical).

Specialized training will be documented in the employees' personnel records and/or in a master training record.

### **3.4 Subcontractor Compliance**

All FLS contracts and subcontracts require that state laws concerning health and safety will be observed by the subcontractor. The provisions of these health and safety responsibilities apply to subcontractors and their employees working for FLS. Failure to fulfill this requirement is a failure to meet the conditions of the contract.

### **3.5 Personal Hygiene**

Eating, drinking and the use of tobacco products in the work area are prohibited. The use of alcohol or other non-prescription drugs by personnel that could impair the ability to function at the work site is prohibited. The use of some prescription drugs may impair the ability to function and can create safety problems on-site. Field personnel taking prescription medication should alert the HSO in case of an emergency. Beards or facial hair that could interfere with the use of a respirator are not permitted. Dermal contact with groundwater should be avoided. This includes avoiding walking through puddles, pools, and mud, sitting or leaning on or against drums, equipment, or on the ground. Field personnel should wash their hands before eating, smoking, using the toilet, etc. Field personnel should wash their hands and face and shower (daily) as soon as possible after leaving the site.

### **3.6 Levels of Personnel Protection**

Personnel protective equipment (PPE) must be worn as required for each job in all operations where there is an exposure to hazardous conditions.

#### ***3.6.1 Level D***

Level D applies to work in areas where the possibility of contact with potentially contaminated groundwater and soil exists. The protective equipment required for Level D includes, but is not limited to, the following:

- Work clothes or coveralls;
- Safety boots, with steel toe;
- Safety glasses;
- Hard hat;
- Reflective vest;
- Disposable latex gloves;
- Hearing protection, to be used as needed

### **3.6.2 Level C**

Level C is selected only when the type of material and the concentration are known, and pose a moderate level of respiratory risk to the site worker. Level C is required when PID readings indicate a consistent level of 5 ppm or above of total volatile organics in the worker breathing zone. Level C protection will include, but is not limited to, the following:

- Protective clothing and other equipment required for Level D;
- Full-face air purifying respirator (APR) with high efficiency particulate/organic vapor cartridges (ultra-twin with GMCH cartridges);
- Saranex-coated disposable coveralls with hoods; and
- Boot covers.

### **3.7 General Workplace Safety Rules**

- Report unsafe conditions, accidents, injuries, or incidents to the HSO and Project Manager.
- Use eye and/or face protection where there is danger from flying objects or particles, (such as when grinding, chipping, burning and welding, etc.) or from hazardous chemical splashes.
- Dress properly. Loose clothing and jewelry shall not be worn.
- Keep all equipment in safe working condition. Never use defective tools or equipment.
- Report any defective tools or equipment to immediate supervisor.
- Properly care for and be responsible for all PPE.
- Do not leave materials in aisles, walkways, stairways, work areas, roadways, or other points of egress.
- Practice good housekeeping at all times.
- Training on equipment is required prior to unsupervised operation.
- During work, pause every few minutes and assess surrounding conditions.
- Crossing highways and major roadways is not recommended. Expect movement of cars and buses at any time along any roadway, regardless of traffic signals, stop signs, yield signs, etc.
- When walking on right-of-ways or road-shoulders, keep a sharp lookout in both directions.

- For personal safety, be cognizant of your surroundings and ensure that equipment is properly secured.

### **3.8 Housekeeping**

- Proper housekeeping is the foundation for a safe work environment. It definitely helps prevent accidents and fires, as well as creating a professional appearance in the work area.
- Material will be piled or stored in a stable manner so that it will not be subject to falling.
- Combustible scrap, debris, and garbage shall be removed from the work area at frequent and regular intervals.
- Stairways, walkways, exit doors, in front of electrical panels, or access to fire fighting equipment will be kept clear of materials, supplies, trash, and debris.

### **3.9 Fire Prevention**

- All firefighting equipment shall be conspicuously located, accessible, inspected periodically, and maintained in operating condition. An annual service check and monthly visual inspections are required for fire extinguisher.
- All employees must know the location of fire fighting equipment in the work area and have knowledge of its use and application.

### **3.10 Industrial Hygiene and Occupational Health**

- Toilet facilities shall be provided as required for the number of workers.
- A first aid kit and portable eyewash station shall be kept on site.
- An adequate supply of potable water shall be provided.
- The use of a common drinking cup is prohibited.
- When no medical facility is reasonably accessible (time and distance) to the worksite, a person who has a valid certificate of first aid training will be available at the worksite to render first aid.
- Employees must be protected against exposure to hazardous noise levels by controlling exposure or by use of proper PPE.
- Any demolition work will be assessed for lead exposure (particularly if drywall or any painted surfaces or abrasive blasting/grinding is involved) and/or asbestos exposure.

### **3.11 Construction Equipment Safety Rules**

A discussion of health and safety issues related FLS employees performing work in the vicinity of common construction elements, such as electrical; compressed gas cylinders; ladders; aerial lifts; cranes; welding and brazing; tools; safety railings and other fall protection; scaffolds; excavations and trenches; motor vehicles and mechanized equipment, is provided in Attachment IV.

#### **4.0 INDIVIDUAL SAFETY AND HEALTH PROGRAMS LISTING**

OSHA standards specify various individual programs that may be applicable to work performed on construction sites. Highlights of these programs are provided below, and specific written programs or procedures may be included into this written program, attached, or developed separately.

##### **4.1 Hazard Communication Program**

If employees are exposed to or work with hazardous chemicals at the job site, this program is required. Important elements of the written program are required to include a master listing of chemicals; maintaining material safety data sheets on each chemical; and training of employees on the program, the chemicals exposed to, and material safety data sheets.

##### **4.2 Confined Space Entry Program**

If employees enter a confined space that contains or has the potential to contain an atmospheric or physical hazard, this program is required. Either the ANSI Z117.1-1989 Safety Requirements for Confined Spaces program or the OSHA General Industry Permit Require Confined Spaces program must be used as guidance to develop the company's program. Primary elements of the program are identification of applicable confined spaces, testing/ monitoring, control or elimination of hazards, protective equipment, entry authorization, attendants, training, and rescue. No FLS employee is authorized to enter a confined space without the above training and notification to the project manager or HSO.

##### **4.3 Respiratory Protection Program**

If employees are exposed to hazardous/toxic chemical, paint or other gases, vapors, fumes, dusts, or mists above the permissible exposure limit, and/or employees wear respirators, this program is required. Program elements are written program for the selection, maintenance, care, and use of respirators; fit testing, training, and employee evaluation for use.

##### **4.4 Occupational Noise Exposure / Hearing Conservation Program**

If employees are exposed to noise levels above the permissible noise exposures, protection against the effects of noise and an effective hearing conservation program are required. Such a program would include elements such as written program, noise monitoring, hearing evaluations and follow-on testing, personnel protective equipment (hearing protection), and maintenance of medical records.

#### **4.5 Lockout/Tagout Program**

If employees deactivate or de-energize electrical controls, equipment, or circuits and thus exposed to electrical energy, this program is required. Program elements include lockout when possible, tagout when lockout not possible, and employer providing and controlling lockouts.

#### **4.6 Assured Equipment Grounding Conductor Program**

If the employer uses assured equipment grounding verses ground fault circuit interrupters to provide employee electrical grounding protection, this program is required. Program elements include the inclusion of all cord sets, receptacles, and cord/plug connected equipment and tools; a written program; quarterly testing; recording of each test by logging, color coding, or other equally effective means; and designation of a competent person to run the program.

#### **4.7 Fire Protection and Prevention**

A fire protection and prevention program must be developed and followed throughout all phases of the construction and demolition work. Program elements include providing the specified firefighting equipment, periodic inspections of the same, providing fire alarm devices/system, and establishment and adherence to fire prevention practices.

#### **4.8 Emergency Response Plan**

If employees are engaged in emergency response to a hazardous substance/chemical release, an emergency response plan must be developed and implemented to handle anticipated emergencies. Program elements include a written response plan, identification and training of responding employees, medical surveillance and consultation, and post response operations.

#### **4.9 Asbestos Control Program**

If employees are exposed to asbestos fibers in the workplace, then an initial monitoring for asbestos exposure must be made. If the monitoring results are above the permissible exposure limit (PEL), this program is required. Program elements include regulated areas, exposure monitoring, medical surveillance and records maintenance, engineering controls, personnel protective equipment, and training.

#### **4.10 Lead Exposure Program**

If employees are exposed to lead in the workplace, then an initial monitoring for lead exposure must be made. If the monitoring results are above the permissible exposure limit (PEL), this program is required. Program elements include regulated areas, exposure

monitoring, medical surveillance and records maintenance, engineering controls, personnel protective equipment, and training.

#### **4.11 Dust Suppression Plan**

The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

1. Applying water on haul roads.
2. Wetting equipment and excavation faces.
3. Spraying water on buckets during excavation and dumping.
4. Hauling materials in properly sealed or watertight containers.
5. Restricting vehicle speeds to 10 mph.
6. Covering excavated areas and material after excavation activity ceases.
7. Reducing the excavation size and/or number of excavations.
8. Applying a dust suppressant, such as calcium chloride, in high vehicle traffic areas.

To evaluate the effectiveness of the dust suppression measures, air monitoring utilizing real-time dust-monitoring equipment will be performed. The requirements for air monitoring during post-remediation soil disturbance activities are presented in Section 5.

## **5.0 WORK AREA AIR MONITORING**

In addition to the worker breathing zone air monitoring described in Section 3.1, air quality at the work area will also be monitored. A particulate monitor will be used to measure worker breathing zone ambient on-site concentrations during on-site activities. The equipment will be calibrated daily and the results noted in the project field book. A background level will be established, at a minimum, on a daily basis, and recorded in the field book.

### **5.1 Particulate Monitoring**

During soil excavation, particulate monitoring will be performed using a real-time particulate monitor that will monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

Object to be measured: Dust, Mists, Aerosols

Size range: <0.1 to 10 microns

Sensitivity: 0.001 mg/m<sup>3</sup>

Range: 0.001 to 10 mg/m<sup>3</sup>

Overall Accuracy: ±10% as compared to gravimetric analysis of stearic acid or reference dust.

Particulate levels will be monitored immediately downwind at the working site and integrated over a period not to exceed 15 minutes. The action level will be established at 150 ug/m<sup>3</sup> over the integrated period not to exceed 15 minutes.

## **6.0 DECONTAMINATION**

### **6.1 Site/Work Area Organization**

A typical site work area will consist of an exclusion zone where the actual field activity will take place; a decontamination zone; and a command post located outside the decontamination area and exclusion zones.

Levels of personnel protection in the exclusion zone will vary depending on air monitoring data, and will be specified by the Site HSO.

### **6.2 Personnel Decontamination**

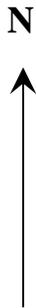
Decontamination (decon) of personnel consists of physically removing soil or contaminants using the correct procedures for washing and removal of PPE. Decon will take place in the designated decontamination zone using the following steps, if applicable:

- Soap and potable water wash and potable water rinse of gloves;
- Tyvek removal;
- Glove removal; and
- Field wash of hands and face.

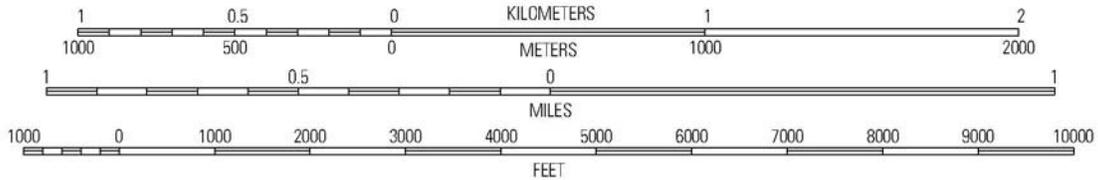
## **7.0 EMERGENCY AND CONTINGENCY PLAN**

### **7.1 Emergency/Contingency Plan**

Emergency/Contingency plans will be maintained during all on-site field activities. It is the responsibility of the HSO/Field Team Leader to anticipate and mitigate emergencies as they occur onsite. In the event of a medical or any other emergency, the HSO or field team lead will take the immediate and proper steps to mitigate the emergency. In the event of a medical, police, or fire emergency, the HSO/Field Team Leader will use the NYC 911 system. In the event that an ambulance cannot be summoned or for minor medical injuries, the emergency route to the hospital is depicted on Figure 2. A first aid kit will be available on-site at all times for any minor on-site injuries. After contacting the necessary emergency management personnel, the HSO/Field Team leader will contact the project team. Emergency contacts and their phone numbers are presented in Table 1.



SCALE 1:24 000



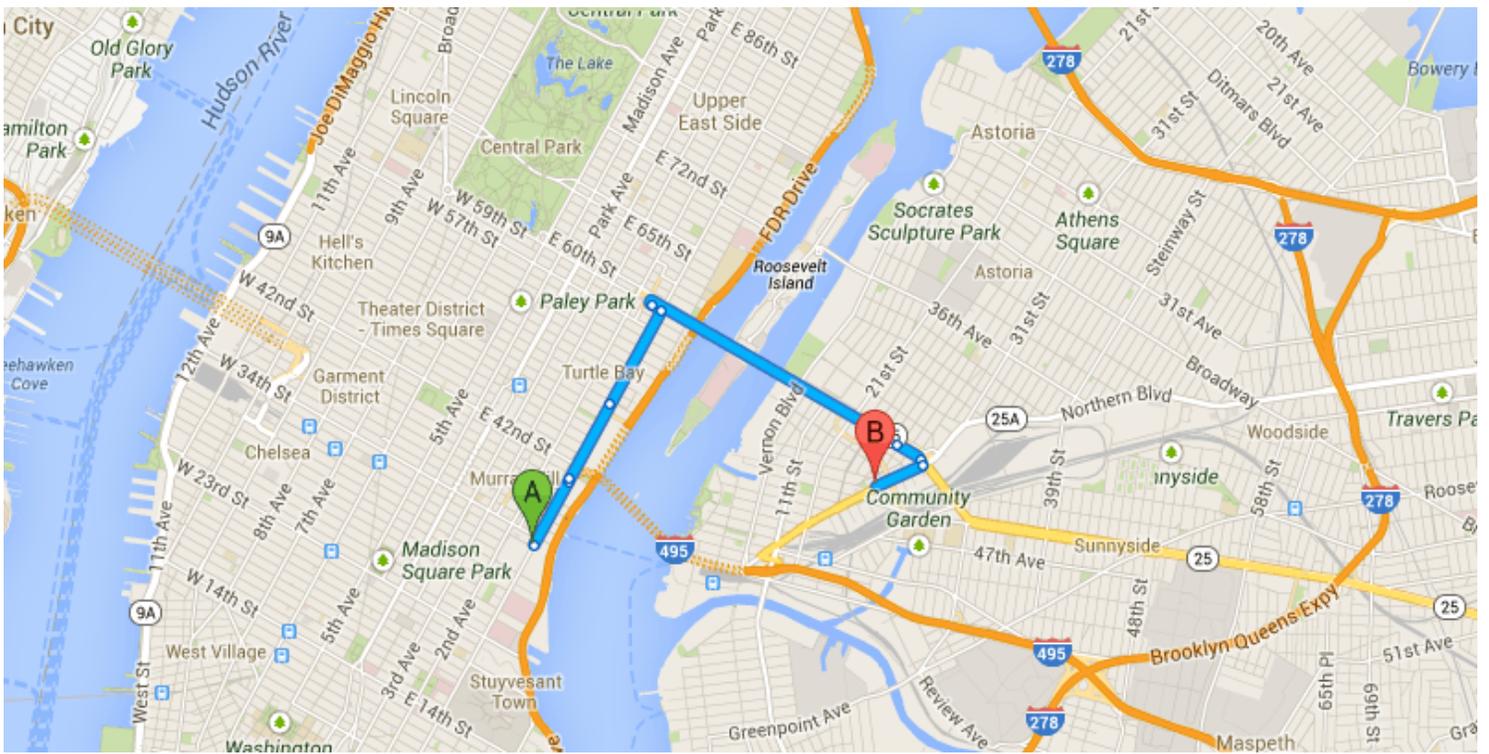
## FIGURE 1: SITE LOCATION

*Fleming  
Lee Shue*

SITE: Fleet Renovation Project  
Block 433, Lots: 2, 4, 5, 6, 8, 41  
Long Island City, New York

CLIENT: Hunter GC, LLC

*Environmental Management & Consulting, 158 West 29th Street, New York, NY 10001*



Drive 3.2 mi, 9 min

NYU Langone Medical Center  
550 First Ave, New York, NY 10016

Follow 1st Avenue, 1st Avenue Tunnel and 1st Avenue to E 59th St

1.3 mi/3 min

Take Ed Koch Queensboro Bridge to Queens Plaza S in Queens

1.5 mi/3 min

Follow Queens Plaza S to Jackson Ave

7. Continue onto Queens Plaza S

0.1 mi

8. Slight right to stay on Queens Plaza S

157 ft

9. Turn right onto Jackson Ave  
Destination will be on the right

0.2 mi

26-11 Jackson Ave  
Queens, NY 11101

# CONSTRUCTION HEALTH AND SAFETY PLAN

250 West Street Site, New York, New York

**TABLE 1**  
**Emergency Contacts and Phone Numbers**

<b>Company</b>	<b>Title</b>	<b>Contact Number</b>
<b>FLS</b> 158 West 29th Street New York, NY 10001 Arnold Fleming, P.E.	Project Director	(212) 675-3225  (917) 885-1475 (cell)
Kevin McGuinness	Project Manager/HSO	(914) 318-2145 (cell)
 <b>EL-AD 250 West, LLC</b> <b>c/o EL-AD US Holdings, LLC</b> <b>575 Madison Avenue, 22nd Floor</b> <b>New York, NY 10022</b>		
Judy Lee	Project Manager	?
<b>EMERGENCY</b>		911
 <b>HOSPITAL</b> NYU Langone Medical Center Emergency Department 550 First Ave New York, NY 10016		
<b>EMERGENCY SPILL RESPONSE:</b> New York State Department of Environmental Conservation (NYSDEC) NYSDEC Hotline Oil or Abandoned Chemicals Releases from Underground Petroleum Storage Tanks Hazardous Waste		1-800-457-7362



# Material Safety Data Sheet

## PAH Contaminated Soil

ACC# 17974

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** PAH Contaminated Soil

**Catalog Numbers:** SRS103100

**Synonyms:** API separator sludge

**Company Identification:**

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

**For information, call:** 201-796-7100

**Emergency Number:** 201-796-7100

**For CHEMTREC assistance, call:** 800-424-9300

**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
Not available	Soil	78-99	unlisted
120-12-7	Anthracene	0-2	204-371-1
129-00-0	Pyrene	0-2	204-927-3
132-64-9	Dibenzofuran	0-2	205-071-3
205-99-2	Benzo(b)fluoranthene	0-2	205-911-9
206-44-0	Fluoranthene	0-2	205-912-4
208-96-8	Acenaphthylene	0-2	205-917-1
218-01-9	1,2-benzphenanthrene	0-2	205-923-4
50-32-8	Benzo(a)pyrene	0-2	200-028-5
56-55-3	1,2-Benzanthracene	0-2	200-280-6
83-32-9	Acenaphthene	0-2	201-469-6
85-01-8	Phenanthrene	0-2	201-581-5
86-73-7	Fluorene	0-2	201-695-5
87-86-5	Pentachlorophenol	0-2	201-778-6
91-20-3	Naphthalene	0-2	202-049-5
91-57-6	2-methylnaphthalene	0-2	202-078-3

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: not available solid.

**Warning!** May cause allergic skin reaction. Causes eye and skin irritation. May cause cancer based on animal studies.

**Target Organs:** Eyes, skin.

## Potential Health Effects

**Eye:** May cause eye irritation.

**Skin:** May cause skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.

**Ingestion:** May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Naphthalene can cause cataracts, optical neuritis, and cornea injuries. Ingestion of large quantities may cause severe hemolytic anemia and

**Inhalation:** Causes respiratory tract irritation. May cause effects similar to those described for ingestion.

**Chronic:** May cause cancer according to animal studies. Prolonged exposure to respirable crystalline quartz may cause delayed lung injury/fibrosis (silicosis).

## Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.

**Ingestion:** If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam.

**Flash Point:** Not applicable.

**Autoignition Temperature:** Not applicable.

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** Not published.

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions.

## Section 7 - Handling and Storage

**Handling:** Avoid generating dusty conditions. Use with adequate ventilation. Avoid contact with skin

and eyes. Keep container tightly closed. Avoid ingestion and inhalation.

**Storage:** Store in a cool, dry place.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate ventilation to keep airborne concentrations low.

**Exposure Limits**

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Soil	none listed	none listed	none listed
Anthracene	0.2 mg/m <sup>3</sup> TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m <sup>3</sup> TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m <sup>3</sup> IDLH (listed under Coal tar pitches).	0.2 mg/m <sup>3</sup> TWA (benzene soluble fraction) (listed under Coal tar pitches).
Pyrene	0.2 mg/m <sup>3</sup> TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m <sup>3</sup> TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m <sup>3</sup> IDLH (listed under Coal tar pitches).	0.2 mg/m <sup>3</sup> TWA (benzene soluble fraction) (listed under Coal tar pitches).
Dibenzofuran	none listed	none listed	none listed
Benzo(b)fluoranthene	none listed	none listed	none listed
Fluoranthene	none listed	none listed	none listed
Acenaphthylene	none listed	none listed	none listed
1,2-benzphenanthrene	0.2 mg/m <sup>3</sup> TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m <sup>3</sup> TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m <sup>3</sup> IDLH (listed under Coal tar pitches).	0.2 mg/m <sup>3</sup> TWA (benzene soluble fraction) (listed under Coal tar pitches).
Benzo(a)pyrene	0.2 mg/m <sup>3</sup> TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m <sup>3</sup> TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m <sup>3</sup> IDLH (listed under Coal tar pitches).	0.2 mg/m <sup>3</sup> TWA (benzene soluble fraction) (listed under Coal tar pitches).
1,2-Benzanthracene	none listed	none listed	none listed
Acenaphthene	none listed	none listed	none listed
Phenanthrene	0.2 mg/m <sup>3</sup> TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m <sup>3</sup> TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m <sup>3</sup> IDLH (listed under Coal tar pitches).	0.2 mg/m <sup>3</sup> TWA (benzene soluble fraction) (listed under Coal tar pitches).
Fluorene	none listed	none listed	none listed
Pentachlorophenol	0.5 mg/m <sup>3</sup> TWA; Skin - potential significant contribution to overall exposure by the cutaneous route	0.5 mg/m <sup>3</sup> TWA 2.5 mg/m <sup>3</sup> IDLH	0.5 mg/m <sup>3</sup> TWA
Naphthalene	10 ppm TWA; 15 ppm STEL; Skin - potential significant contribution to overall exposure by the cutaneous route	10 ppm TWA; 50 mg/m <sup>3</sup> TWA 250 ppm IDLH	10 ppm TWA; 50 mg/m <sup>3</sup> TWA

2-methylnaphthalene	0.5 ppm TWA; Skin - potential significant contribution to overall exposure by the cutaneous route	none listed	none listed
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**OSHA Vacated PELs:** Soil: No OSHA Vacated PELs are listed for this chemical. Anthracene: No OSHA Vacated PELs are listed for this chemical. Pyrene: No OSHA Vacated PELs are listed for this chemical. Dibenzofuran: No OSHA Vacated PELs are listed for this chemical. Benzo(b)fluoranthene: No OSHA Vacated PELs are listed for this chemical. Fluoranthene: No OSHA Vacated PELs are listed for this chemical. Acenaphthylene: No OSHA Vacated PELs are listed for this chemical. 1,2-benzphenanthrene: No OSHA Vacated PELs are listed for this chemical. Benzo(a)pyrene: No OSHA Vacated PELs are listed for this chemical. 1,2-Benzanthracene: No OSHA Vacated PELs are listed for this chemical. Acenaphthene: No OSHA Vacated PELs are listed for this chemical. Phenanthrene: No OSHA Vacated PELs are listed for this chemical. Fluorene: No OSHA Vacated PELs are listed for this chemical. Pentachlorophenol: 0.5 mg/m<sup>3</sup> TWA Naphthalene: 10 ppm TWA; 50 mg/m<sup>3</sup> TWA 2-methylnaphthalene: No OSHA Vacated PELs are listed for this chemical.

#### **Personal Protective Equipment**

**Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin:** Wear appropriate gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

## Section 9 - Physical and Chemical Properties

**Physical State:** Solid

**Appearance:** not available

**Odor:** none reported

**pH:** Not available.

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Evaporation Rate:** Not applicable.

**Viscosity:** Not applicable.

**Boiling Point:** Not available.

**Freezing/Melting Point:** Not available.

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble in water.

**Specific Gravity/Density:** Not available.

**Molecular Formula:** Mixture

**Molecular Weight:** Not available.

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** High temperatures.

**Incompatibilities with Other Materials:** None reported.

**Hazardous Decomposition Products:** No data available.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

### **RTECS#:**

**CAS#** 120-12-7: CA9350000

**CAS#** 129-00-0: UR2450000; UR2450100

**CAS#** 132-64-9: HP4430000

**CAS#** 205-99-2: CU1400000

**CAS#** 206-44-0: LL4025000

**CAS#** 208-96-8: AB1254000; AB1254200

**CAS#** 218-01-9: GC0700000

**CAS#** 50-32-8: DJ3675000

**CAS#** 56-55-3: CV9275000

**CAS#** 83-32-9: AB1000000

**CAS#** 85-01-8: SF7175000

**CAS#** 86-73-7: LL5670000

**CAS#** 87-86-5: SM6300000; SM6314000; SM6321000

**CAS#** 91-20-3: QJ0525000

**CAS#** 91-57-6: QJ9635000

### **LD50/LC50:**

CAS# 120-12-7:

Oral, mouse: LD50 = 4900 mg/kg;

.

CAS# 129-00-0:

Draize test, rabbit, skin: 500 mg/24H Mild;

Inhalation, rat: LC50 = 170 mg/m<sup>3</sup>;

Inhalation, rat: LC50 = 170 mg/m<sup>3</sup>;

Oral, mouse: LD50 = 800 mg/kg;

Oral, rat: LD50 = 2700 mg/kg;

.

CAS# 132-64-9:

.

CAS# 205-99-2:

.

CAS# 206-44-0:

Oral, rat: LD50 = 2 gm/kg;

Skin, rabbit: LD50 = 3180 mg/kg;

.

CAS# 208-96-8:

Oral, mouse: LD50 = 1760 mg/kg;

.

CAS# 218-01-9:

.

CAS# 50-32-8:

.

CAS# 56-55-3:

.

CAS# 83-32-9:

.

CAS# 85-01-8:

Oral, mouse: LD50 = 700 mg/kg;

Oral, rat: LD50 = 1.8 gm/kg;

.

CAS# 86-73-7:

.

CAS# 87-86-5:

Draize test, rabbit, eye: 100 uL/24H Mild;

Inhalation, mouse: LC50 = 225 mg/m<sup>3</sup>;

Inhalation, mouse: LC50 = 225 mg/m<sup>3</sup>;

Inhalation, rat: LC50 = 355 mg/m<sup>3</sup>;

Inhalation, rat: LC50 = 200 mg/m<sup>3</sup>;

Inhalation, rat: LC50 = 335 mg/m<sup>3</sup>;

Oral, mouse: LD50 = 36 mg/kg;

Oral, mouse: LD50 = 117 mg/kg;

Oral, mouse: LD50 = 30 mg/kg;

Oral, rabbit: LD50 = 200 mg/kg;

Oral, rat: LD50 = 27 mg/kg;

Oral, rat: LD50 = 27 mg/kg;

Oral, rat: LD50 = 50 mg/kg;

Skin, rat: LD50 = 96

CAS# 91-20-3:

Draize test, rabbit, eye: 100 mg Mild;

Inhalation, rat: LC50 = >340 mg/m<sup>3</sup>/1H;

Oral, mouse: LD50 = 316 mg/kg;

Oral, rat: LD50 = 490 mg/kg;

Skin, rabbit: LD50 = >20 gm/kg;

Skin, rat: LD50 = >2500 mg/kg;

.

CAS# 91-57-6:

Oral, rat: LD50 = 1630 mg/kg;

.

### **Carcinogenicity:**

CAS# 120-12-7:

- **ACGIH:** A1 - Confirmed Human Carcinogen (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 129-00-0:

- **ACGIH:** A1 - Confirmed Human Carcinogen (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 132-64-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

CAS# 205-99-2:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 206-44-0: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

CAS# 208-96-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

CAS# 218-01-9:

- **ACGIH:** A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
- **California:** carcinogen, initial date 1/1/90
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 50-32-8:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 1 carcinogen

CAS# 56-55-3:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 83-32-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

CAS# 85-01-8:

- **ACGIH:** A1 - Confirmed Human Carcinogen (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 86-73-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

CAS# 87-86-5:

- **ACGIH:** A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
- **California:** carcinogen, initial date 1/1/90
- **NTP:** Not listed.
- **IARC:** Group 2B carcinogen

CAS# 91-20-3:

- **ACGIH:** Not listed.
- **California:** carcinogen, initial date 4/19/02
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 91-57-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** No information available.

**Mutagenicity:** No information available.

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 206-44-0: waste number U120.

CAS# 218-01-9: waste number U050.

CAS# 50-32-8: waste number U022.

CAS# 56-55-3: waste number U018.

CAS# 91-20-3: waste

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	Not regulated as a hazardous material	No information available.
<b>Hazard Class:</b>		
<b>UN Number:</b>		
<b>Packing Group:</b>		

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

Soil is not listed on the TSCA inventory. It is for research and development use only.

CAS# 120-12-7 is listed on the TSCA inventory.

CAS# 129-00-0 is listed on the TSCA inventory.

CAS# 132-64-9 is listed on the TSCA inventory.

CAS# 205-99-2 is not listed on the TSCA inventory. It is for research and development use only.

CAS# 206-44-0 is listed on the TSCA inventory.

CAS# 208-96-8 is listed on the TSCA inventory.

CAS# 218-01-9 is listed on the TSCA inventory.

CAS# 50-32-8 is listed on the TSCA inventory.

CAS# 56-55-3 is listed on the TSCA inventory.

CAS# 83-32-9 is listed on the TSCA inventory.

CAS# 85-01-8 is listed on the TSCA inventory.

CAS# 86-73-7 is listed on the TSCA inventory.

CAS# 87-86-5 is listed on the TSCA inventory.

CAS# 91-20-3 is listed on the TSCA inventory.

CAS# 91-57-6 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 129-00-0: Effective 6/1/87, Sunset 6/1/97

CAS# 91-20-3: Effective 6/1/87, Sunset

6/1/97

## **Chemical Test Rules**

CAS# 91-20-3: 40 CFR 799.5115

## **Section 12b**

CAS# 91-20-3: Section 4, 0.1 % de minimus concentration

## **TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

## **CERCLA Hazardous Substances and corresponding RQs**

CAS# 120-12-7: 5000 lb final RQ; 2270 kg final RQ      CAS# 129-00-0: 5000 lb final RQ; 2270 kg final RQ  
CAS# 132-64-9: 100 lb final RQ; 45.4 kg final RQ      CAS# 205-99-2: 1 lb final RQ; 0.454 kg final RQ  
CAS# 206-44-0: 100 lb final RQ; 45.4 kg final RQ      CAS# 208-96-8: 5000 lb final RQ; 2270 kg final RQ  
CAS# 218-01-9: 100 lb final RQ; 45.4 kg final RQ      CAS# 50-32-8: 1 lb final RQ; 0.454 kg final RQ  
CAS# 56-55-3: 10 lb final RQ; 4.54 kg final RQ      CAS# 83-32-9: 100 lb final RQ; 45.4 kg final RQ  
CAS# 85-01-8: 5000 lb final RQ; 2270 kg final RQ      CAS# 86-73-7: 5000 lb final RQ; 2270 kg final RQ  
CAS# 87-86-5: 10 lb final RQ; 4.54 kg final RQ      CAS# 91-20-3: 100 lb final RQ; 45.4 kg final RQ

## **SARA Section 302 Extremely Hazardous Substances**

CAS# 129-00-0: 1000 lb lower threshold TPQ; 10000 lb upper threshold T      PQ

## **SARA Codes**

CAS # 120-12-7: immediate.  
CAS # 129-00-0: immediate, delayed.  
CAS # 206-44-0: immediate.  
CAS # 50-32-8: immediate, delayed.  
CAS # 56-55-3: delayed.  
CAS # 83-32-9: immediate.  
CAS # 85-01-8: immediate.  
CAS # 91-20-3: immediate, delayed, fire.  
CAS # 91-57-6: immediate.

## **Section 313**

This material contains Anthracene (CAS# 120-12-7, 0-2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Dibenzofuran (CAS# 132-64-9, 0-2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Benzo(b)fluoranthene (CAS# 205-99-2, 0-2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Fluoranthene (CAS# 206-44-0, 0-2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains 1,2-benzphenanthrene (CAS# 218-01-9, 0-2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Benzo(a)pyrene (CAS# 50-32-8, 0-2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains 1,2-Benzanthracene (CAS# 56-55-3, 0-2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Phenanthrene (CAS# 85-01-8, 0-2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Pentachlorophenol (CAS# 87-86-5, 0-2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Naphthalene (CAS# 91-20-3, 0-2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

## **Clean Air Act:**

CAS# 132-64-9 is listed as a hazardous air pollutant (HAP).

CAS# 87-86-5 is listed as a hazardous air pollutant (HAP).

CAS# 91-20-3 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

CAS# 87-86-5 is listed as a Hazardous Substance under the CWA. CAS# 91-20-3 is listed as a Hazardous Substance under the CWA. CAS# 120-12-7 is listed as a Priority Pollutant under the Clean Water Act. CAS# 129-00-0 is listed as a Priority Pollutant under the Clean Water Act. CAS# 205-99-2 is listed as a Priority Pollutant under the Clean Water Act. CAS# 206-44-0 is listed as a Priority Pollutant under the Clean Water Act. CAS# 208-96-8 is listed as a Priority Pollutant under the Clean Water Act. CAS# 218-01-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act. CAS# 56-55-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 83-32-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 85-01-8 is listed as a Priority Pollutant under the Clean Water Act. CAS# 86-73-7 is listed as a Priority Pollutant under the Clean Water Act. CAS# 87-86-5 is listed as a Priority Pollutant under the Clean Water Act. CAS# 91-20-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 206-44-0 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 83-32-9 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 87-86-5 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 91-20-3 is listed as a Toxic Pollutant under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 120-12-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 129-00-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 132-64-9 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 205-99-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 206-44-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

CAS# 208-96-8 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 218-01-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 50-32-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 56-55-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 83-32-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

CAS# 85-01-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 86-73-7 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 87-86-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 91-20-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 91-57-6 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

## California Prop 65

WARNING: This product contains Benzo(b)fluoranthene, a chemical known to the state of California to cause cancer. WARNING: This product contains 1,2-benzphenanthrene, a chemical known to the state of California to cause cancer. WARNING: This product contains Benzo(a)pyrene, a chemical known to the state of California to cause cancer. WARNING: This product contains 1,2-Benzanthracene, a chemical known to the state of California to cause cancer. WARNING: This product contains Pentachlorophenol, a chemical known to the state of California to cause cancer. WARNING: This product contains Naphthalene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 205-99-2: 0.096 æg/day NSRL (oral) CAS# 218-01-9: 0.35 æg/day NSRL (oral) CAS# 50-32-8: 0.06 æg/day NSRL CAS# 56-55-3: 0.033 æg/day NSRL (oral) CAS# 87-86-5: 40 æg/day NSRL CAS# 91-20-3: 5.8 æg/day NSRL

## European/International Regulations

### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

Not available.

#### Risk Phrases:

#### Safety Phrases:

### WGK (Water Danger/Protection)

CAS# 120-12-7: 2

CAS# 129-00-0: No information available.

CAS# 132-64-9: No information available.

CAS# 205-99-2: No information available.

CAS# 206-44-0: No information available.

CAS# 208-96-8: No information available.

CAS# 218-01-9: No information available.

CAS# 50-32-8: No information available.

CAS# 56-55-3: No information available.

CAS# 83-32-9: No information available.

CAS# 85-01-8: No information available.

CAS# 86-73-7: No information available.

CAS# 87-86-5: 3

CAS# 91-20-3: 2

CAS# 91-57-6: No information available.

### Canada - DSL/NDSL

CAS# 120-12-7 is listed on Canada's DSL List.

CAS# 129-00-0 is listed on Canada's DSL List.

CAS# 132-64-9 is listed on Canada's DSL List.

CAS# 218-01-9 is listed on Canada's DSL List.

CAS# 50-32-8 is listed on Canada's DSL List.

CAS# 83-32-9 is listed on Canada's DSL List.

CAS# 85-01-8 is listed on Canada's DSL List.

CAS# 86-73-7 is listed on Canada's DSL List.

CAS# 87-86-5 is listed on Canada's DSL List.

CAS# 91-20-3 is listed on Canada's DSL List.

CAS# 91-57-6 is listed on Canada's DSL List.

CAS# 206-44-0 is listed on Canada's NDSL List.

CAS# 208-96-8 is listed on Canada's NDSL List.

CAS# 56-55-3 is listed on Canada's NDSL List.

### Canada - WHMIS

This product has a WHMIS classification of D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

## Canadian Ingredient Disclosure List

CAS# 120-12-7 is listed on the Canadian Ingredient Disclosure List.  
CAS# 129-00-0 is listed on the Canadian Ingredient Disclosure List.  
CAS# 205-99-2 is listed on the Canadian Ingredient Disclosure List.  
CAS# 206-44-0 is listed on the Canadian Ingredient Disclosure List.  
CAS# 208-96-8 is not listed on the Canadian Ingredient Disclosure List.  
CAS# 218-01-9 is listed on the Canadian Ingredient Disclosure List.  
CAS# 50-32-8 is listed on the Canadian Ingredient Disclosure List.  
CAS# 56-55-3 is listed on the Canadian Ingredient Disclosure List.  
CAS# 83-32-9 is listed on the Canadian Ingredient Disclosure List.  
CAS# 85-01-8 is listed on the Canadian Ingredient Disclosure List.  
CAS# 86-73-7 is not listed on the Canadian Ingredient Disclosure List.  
CAS# 87-86-5 is not listed on the Canadian Ingredient Disclosure List.  
CAS# 91-20-3 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 9/02/1997

**Revision #5 Date:** 11/20/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

VOC

# Material Safety Data Sheet

## Tetrachloroethylene

ACC# 22900

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Tetrachloroethylene

**Catalog Numbers:** C182 20, C182 4, C182-20, C182-4, C18220, C1824, O4586 4, O4586-4, O45864

**Synonyms:** Ethylene tetrachloride; Tetrachlorethylene; Perchloroethylene; Perchlorethylene

**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100

**Emergency Number:** 201-796-7100

**For CHEMTREC assistance, call:** 800-424-9300

**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
127-18-4	Tetrachloroethylene	99.0+	204-825-9

**Hazard Symbols:** XN N

**Risk Phrases:** 40 51/53

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Irritant. May cause severe eye and skin irritation with possible burns. May cause central nervous system depression. May cause liver and kidney damage. May cause reproductive and fetal effects. May cause cancer based on animal studies. **Caution!** May cause respiratory tract irritation.

**Target Organs:** Kidneys, central nervous system, liver.

**Potential Health Effects**

**Eye:** Contact with eyes may cause severe irritation, and possible eye burns.

**Skin:** May cause severe irritation and possible burns.

**Ingestion:** May cause central nervous system depression, kidney damage, and liver damage. Symptoms may include: headache, excitement, fatigue, nausea, vomiting, stupor, and coma. May cause gastrointestinal irritation with nausea, vomiting and diarrhea.

**Inhalation:** Inhalation of vapor may cause respiratory tract irritation. May cause central nervous system effects including vertigo, anxiety, depression, muscle incoordination, and emotional instability.

**Chronic:** Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause defatting and dermatitis. May cause respiratory tract cancer. May cause

adverse nervous system effects including muscle tremors and incoordination. May cause liver and kidney damage. May cause reproductive and fetal effects.

## Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Get medical aid if irritation develops or persists. Wash clothing before reuse. Flush skin with plenty of soap and water.

**Ingestion:** If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Containers may explode in the heat of a fire. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** Substance is noncombustible; use agent most appropriate to extinguish surrounding fire. For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after fire is out.

**Flash Point:** Not applicable.

**Autoignition Temperature:** Not applicable.

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 2; Flammability: 0; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Flush down the spill with a large amount of water. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Do not reuse this container. Avoid breathing vapors from heated material. Avoid contact with skin and eyes. Keep container tightly closed. Keep away from flames

and other sources of high temperatures that may cause material to form vapors or mists.  
**Storage:** Keep away from heat and flame. Store in a cool, dry place. Keep containers tightly closed.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Tetrachloroethylene	25 ppm TWA; 100 ppm STEL	150 ppm IDLH	100 ppm TWA; 200 ppm Ceiling

**OSHA Vacated PELs:** Tetrachloroethylene: 25 ppm TWA; 170 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** sweetish odor

**pH:** Not available.

**Vapor Pressure:** 15.8 mm Hg

**Vapor Density:** 5.2

**Evaporation Rate:** 9 (ether=100)

**Viscosity:** 0.89 mPa s 20 deg C

**Boiling Point:** 121 deg C

**Freezing/Melting Point:** -22.3 deg C

**Decomposition Temperature:** 150 deg C

**Solubility:** Nearly insoluble in water.

**Specific Gravity/Density:** 1.623

**Molecular Formula:** C<sub>2</sub>Cl<sub>4</sub>

**Molecular Weight:** 165.812

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials, excess heat.

**Incompatibilities with Other Materials:** Strong bases, metals, liquid oxygen, dinitrogen tetroxide.

**Hazardous Decomposition Products:** Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 127-18-4: KX3850000

**LD50/LC50:**

CAS# 127-18-4:

Draize test, rabbit, eye: 162 mg Mild;

Draize test, rabbit, eye: 500 mg/24H Mild;

Draize test, rabbit, skin: 810 mg/24H Severe;

Draize test, rabbit, skin: 500 mg/24H Mild;

Inhalation, mouse: LC50 = 5200 ppm/4H;

Inhalation, rat: LC50 = 34200 mg/m<sup>3</sup>/8H;

Oral, mouse: LD50 = 8100 mg/kg;

Oral, rat: LD50 = 2629 mg/kg;

**Carcinogenicity:**

CAS# 127-18-4:

**ACGIH:** A3 - Animal Carcinogen

**California:** carcinogen; initial date 4/1/88

**NIOSH:** potential occupational carcinogen

**NTP:** Suspect carcinogen

**OSHA:** Possible Select carcinogen

**IARC:** Group 2A carcinogen

**Epidemiology:** Epidemiologic studies have given inconsistent results. Studies have shown that tetrachloroethylene has not caused cancer in exposed workers. The studies have serious weaknesses such as mixed exposures. In tests with rats and mice, it appeared that tissue destruction or peroxisome proliferation rather than genetic mechanisms were the cause of the observed increases in normally occurring cancers. The oral mouse TDLo that was tumorigenic was 195 gm/kg/50W-I.

**Teratogenicity:** Has caused musculoskeletal abnormalities. Has caused morphological transformation at a dose of 97mg/L in a study using rat embryos.

**Reproductive Effects:** Has caused behavioral, biochemical, and metabolic effects on newborn rats when the mother was exposed to the TCLo of 900 ppm/7H at 7-13 days after conception. A dose of 300 ppm/7H 6-15 days after conception caused post-implantation mortality.

**Neurotoxicity:** No information available.

**Mutagenicity:** Not mutagenic in Escherichia coli. No mutagenic effects were seen in rat liver after exposure at 200 ppm for 10 weeks. No chromosome changes were seen in the bone marrow cells of exposed mice.

**Other Studies:** A case of 'obstructive jaundice' in a 6-week old infant has been attributed to tetrachloroethylene in breast milk.

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Rainbow trout: LC50 = 5.28 mg/L; 96 Hr.; Static Condition, 12 degrees C  
Fathead Minnow: LC50 = 18.4 mg/L; 96 Hr.; Flow-through condition Bluegill/Sunfish: LC50 = 12.9 mg/L; 96 Hr.; Static Condition  
Pia: Phytobacterium phosphoreum: EC50 = 120.0 mg/L; 30 minutes; Microtox test No data available.

**Environmental:** In soil, substance will rapidly evaporate. In water, it will evaporate. In air, it can be expected to exist in the vapor phase.

**Physical:** No information available.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** CAS# 127-18-4: waste number U210.

## Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
<b>Shipping Name:</b>	TETRACHLOROETHYLENE				TETRACHLOROETHYLENE
<b>Hazard Class:</b>	6.1				6.1
<b>UN Number:</b>	UN1897				UN1897
<b>Packing Group:</b>	III				III

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 127-18-4 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 127-18-4: Effective Date: 6/1/87; Sunset Date: 6/1/97

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### SARA

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 127-18-4: 100 lb final RQ; 45.4 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 127-18-4: acute.

#### Section 313

This material contains Tetrachloroethylene (CAS# 127-18-4, 99.0%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

**Clean Air Act:**

CAS# 127-18-4 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depleters. This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 127-18-4 is listed as a Priority Pollutant under the Clean Water Act. CAS# 127-18-4 is listed as a Toxic Pollutant under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 127-18-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:** WARNING: This product contains Tetrachloroethylene, a chemical known to the state of California to cause cancer. California No Significant Risk Level: CAS# 127-18-4: 14 ug/day NSRL

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN N

**Risk Phrases:**

R 40 Limited evidence of a carcinogenic effect.

R 51/53 Toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

S 23 Do not inhale gas/fumes/vapour/spray.

S 36/37 Wear suitable protective clothing and gloves.

S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 127-18-4: 3

**Canada - DSL/NDSL**

CAS# 127-18-4 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1B, D2A.

**Canadian Ingredient Disclosure List**

CAS# 127-18-4 is listed on the Canadian Ingredient Disclosure List.

**Exposure Limits**

CAS# 127-18-4: OEL-ARAB Republic of Egypt:TWA 5 ppm (35 mg/m<sup>3</sup>);Skin OEL-AUSTRALIA:TWA 50 ppm (335 mg/m<sup>3</sup>);STEL 150 ppm;CAR OEL-BELGIUM:TWA 50 ppm (339 mg/m<sup>3</sup>);STEL 200 ppm (1368 mg/m<sup>3</sup>) OEL-CZECHOSLOVAKIA:TWA 250 mg/m<sup>3</sup>;STEL 1250 mg/m<sup>3</sup> OEL-DENMARK:TWA 30 ppm (200 mg/m<sup>3</sup>);Skin OEL-FINLAND:TWA 50 ppm (335 mg/m<sup>3</sup>);STEL 75 ppm (520 mg/m<sup>3</sup>);Skin OEL-FRANCE:TWA 50 ppm (335 mg/m<sup>3</sup>) OEL-GERMANY:TWA 50 ppm (345 mg/m<sup>3</sup>);Carcinogen OEL-HUNGARY:STEL 50 mg/m<sup>3</sup>;Skin;Carcinogen OEL-JAPAN:TWA 50 ppm (340 mg/m<sup>3</sup>) OEL-THE NETHERLANDS:TWA 35 ppm (240 mg/m<sup>3</sup>);Skin OEL-THE PHILIPPINES:TWA 100 ppm (670 mg/m<sup>3</sup>) OEL-POLAND:TWA 60 mg/m<sup>3</sup> OEL-RUSSIA:TWA 50 ppm;STEL 10 mg/m<sup>3</sup> OEL-SWEDEN:TWA 10 ppm (70 mg/m<sup>3</sup>);STEL 25 ppm (170 mg/m<sup>3</sup>) OEL-SWITZERLAND:TWA 50 ppm (345 mg/m<sup>3</sup>);STEL 100 ppm;Skin OEL-THAILAND:TWA 100 ppm;STEL 200 ppm OEL-UNITED KINGDOM:TWA 50 ppm (335 mg/m<sup>3</sup>);STEL 15 ppm OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA

check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

## Section 16 - Additional Information

**MSDS Creation Date:** 6/17/1999

**Revision #3 Date:** 3/18/2003

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

VOC

# Material Safety Data Sheet

## Trichloroethylene

ACC# 23850

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Trichloroethylene

**Catalog Numbers:** S80232, S80327ACS-1, S80327ACS-2, NC932384B, NC9494003, NC9494591, NC9981849, S80237ACS-1, S80237ACS-2, T340-4, T341-20, T341-4, T341-500, T341J4, T403-4, XXT341SK4LIX48

**Synonyms:** Ethylene trichloride; triclene; trichloroethene; benzinol cecolene

**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100

**Emergency Number:** 201-796-7100

**For CHEMTREC assistance, call:** 800-424-9300

**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
79-01-6	Trichloroethylene	99.5	201-167-4

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless liquid.

**Warning!** Causes eye and skin irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause central nervous system depression. May cause cancer based on animal studies. Potential cancer hazard. May cause liver damage.

**Target Organs:** Central nervous system, liver, eyes, skin.

#### Potential Health Effects

**Eye:** Causes moderate eye irritation. May result in corneal injury. Contact produces irritation, tearing, and burning pain.

**Skin:** Causes mild skin irritation. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. May cause peripheral nervous system function impairment including persistent neuritis, and temporary loss of touch. Damage to the liver and other organs has been observed in workers who have been overexposed.

**Ingestion:** Aspiration hazard. May cause irritation of the digestive tract. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

**Inhalation:** Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause respiratory tract irritation. May cause liver abnormalities. May cause peripheral nervous system effects.

**Chronic:** Possible cancer hazard based on tests with laboratory animals. Chronic inhalation may

cause effects similar to those of acute inhalation. Prolonged or repeated skin contact may cause defatting and dermatitis. May cause peripheral nervous system function impairment including persistent neuritis, and temporary loss of touch. Damage to the liver and other organs has been observed in workers who have been overexposed.

## Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**Skin:** Get medical aid if irritation develops or persists. Flush skin with plenty of soap and water.

**Ingestion:** If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Possible aspiration hazard. Get medical aid immediately.

**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Combustion generates toxic fumes. Containers may explode in the heat of a fire.

**Extinguishing Media:** Use water spray to cool fire-exposed containers. Use water spray, dry chemical, carbon dioxide, or chemical foam.

**Flash Point:** Not applicable.

**Autoignition Temperature:** 778 deg F ( 414.44 deg C)

**Explosion Limits, Lower:**12.5

**Upper:** 90.0

**NFPA Rating:** (estimated) Health: 2; Flammability: 1; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Use only in a well-ventilated area. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from sources of ignition. Store in a tightly closed container. Keep from

contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Trichloroethylene	50 ppm TWA; 100 ppm STEL	1000 ppm IDLH	100 ppm TWA; 200 ppm Ceiling

**OSHA Vacated PELs:** Trichloroethylene: 50 ppm TWA; 270 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** sweetish odor - chloroform-like

**pH:** Not available.

**Vapor Pressure:** 58 mm Hg @20C

**Vapor Density:** 4.53

**Evaporation Rate:** 0.69 (CCl<sub>4</sub>=1)

**Viscosity:** 0.0055 poise

**Boiling Point:** 189 deg F

**Freezing/Melting Point:** -121 deg F

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble in water.

**Specific Gravity/Density:** 1.47 (water=1)

**Molecular Formula:** C<sub>2</sub>HCl<sub>3</sub>

**Molecular Weight:** 131.366

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials, ignition sources, oxidizers.

**Incompatibilities with Other Materials:** Alkalis (sodium hydroxide), chemically active metals (aluminum, beryllium, lithium, magnesium), epoxies and oxidants. Can react violently with aluminum, barium, lithium, magnesium, liquid oxygen, ozone, potassium hydroxide, potassium nitrate, sodium, sodium hydroxide, titanium, and nitrogen dioxide. Reacts with water under heat

and pressure to form hydrogen chloride gas.

**Hazardous Decomposition Products:** Hydrogen chloride, carbon dioxide, chloride fumes.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 79-01-6: KX4550000

**LD50/LC50:**

**CAS#** 79-01-6:

- Draize test, rabbit, eye: 20 mg/24H Moderate;
- Draize test, rabbit, skin: 2 mg/24H Severe;
- Inhalation, mouse: LC50 = 8450 ppm/4H;
- Inhalation, mouse: LC50 = 220000 mg/m<sup>3</sup>/20M;
- Inhalation, mouse: LC50 = 262000 mg/m<sup>3</sup>/30M;
- Inhalation, mouse: LC50 = 40000 mg/m<sup>3</sup>/4H;
- Inhalation, rat: LC50 = 140700 mg/m<sup>3</sup>/1H;
- Oral, mouse: LD50 = 2402 mg/kg;
- Oral, mouse: LD50 = 2400 mg/kg;
- Oral, rat: LD50 = 4920 mg/kg;
- Skin, rabbit: LD50 = >20 gm/kg;
- Skin, rabbit: LD50 = 20 mL/kg;

**Carcinogenicity:**

**CAS#** 79-01-6:

- **ACGIH:** Not listed.
- **California:** carcinogen, initial date 4/1/88
- **NTP:** Suspect carcinogen
- **IARC:** Group 2A carcinogen

**Epidemiology:** Suspected carcinogen with experimental carcinogenic, tumorigenic, and teratogenic data.

**Teratogenicity:** No information available.

**Reproductive Effects:** Experimental reproductive effects have been observed.

**Mutagenicity:** Human mutation data has been reported. IARC and the National Toxicology Program (NTP) stated that variability in the mutagenicity test results with trichloroethylene may be due to the presence of various stabilizers used in TCE which are mutagens (e.g. epoxybutane, epichlorohydrin). See actual entry in RTECS for complete information. R68 Mutagen Category 3 (CHIP 2002, UK).

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. Bluegill sunfish, LD50= 44,700 ug/L/96Hr. Fathead minnow, LC50=40.7 mg/L/96Hr.

**Environmental:** In air, substance is photooxidized and is reported to form phosgene, dichloroacetyl chloride, and formyl chloride. In water, it evaporates rapidly.

**Physical:** No information available.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 79-01-6: waste number U228.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	TRICHLOROETHYLENE	TRICHLOROETHYLENE
<b>Hazard Class:</b>	6.1	6.1(9.2)
<b>UN Number:</b>	UN1710	UN1710
<b>Packing Group:</b>	III	III

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 79-01-6 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 79-01-6: 100 lb final RQ; 45.4 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 79-01-6: acute, chronic, reactive.

#### Section 313

This material contains Trichloroethylene (CAS# 79-01-6, 99.5%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

#### Clean Air Act:

CAS# 79-01-6 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

CAS# 79-01-6 is listed as a Hazardous Substance under the CWA. CAS# 79-01-6 is listed as a Priority Pollutant under the Clean Water Act. CAS# 79-01-6 is listed as a Toxic Pollutant under

the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 79-01-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

**The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:**

WARNING: This product contains Trichloroethylene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 79-01-6: 50 æg/day NSRL (oral); 80 æg/day NSRL (inhalation)

**European/International Regulations**

**European Labeling in Accordance with EC Directives**

**Hazard Symbols:**

T

**Risk Phrases:**

R 36/38 Irritating to eyes and skin.

R 45 May cause cancer.

R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R 67 Vapours may cause drowsiness and dizziness.

R 68 Possible risk of irreversible effects.

**Safety Phrases:**

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 53 Avoid exposure - obtain special instructions before use.

S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 79-01-6: 3

**Canada - DSL/NDSL**

CAS# 79-01-6 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1B, D2B.

**Canadian Ingredient Disclosure List**

CAS# 79-01-6 is listed on the Canadian Ingredient Disclosure List.

**Section 16 - Additional Information**

**MSDS Creation Date:** 2/01/1999

**Revision #5 Date:** 5/31/2005

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

## Attachment III – Heat Stress / Cold Stress

### 1.0 HEAT STRESS

Excessive exposure to a hot environment can bring about a variety of heat-induced disorders. The four main types of heat stress related illnesses: heat rash, heat cramps, heat exhaustion, and heat stroke, are discussed below.

#### 1.1 Heat Rash

Heat rash also known as prickly heat, is likely to occur in hot, humid environments where sweat is not readily removed from the surface of the skin by evaporation and the skin remains wet most of the time. The sweat ducts become plugged, and a skin rash soon appears. When the rash is extensive or when it is complicated by an infection, prickly heat can be very uncomfortable and may reduce a worker's performance. The worker can prevent this condition by resting in a cool place part of each day and by regularly bathing and drying the skin.

#### 1.2 Heat Cramps

Heat cramps are painful spasms of the muscles that occur among those who sweat profusely in heat, drink large quantities of water, but do not adequately replace the body's salt loss. Drinking large quantities of water tends to dilute the body's fluids, while the body continues to lose salt. Shortly thereafter, the low salt level in the muscles causes painful cramps. The affected muscles may be part of the arms, legs or abdomen, but tired muscles (those used to perform the work) are usually the ones most susceptible to cramps. Cramps may occur during or after work hours and may be relieved by taking salted liquids by mouth, such as the variety of sports drinks on the market.

**CAUTION SHOULD BE EXERCISED BY PEOPLE WITH HEART PROBLEMS OR THOSE ON LOW SODIUM DIETS WHO WORK IN HOT ENVIRONMENTS. THESE PEOPLE SHOULD CONSULT A PHYSICIAN ABOUT WHAT TO DO UNDER THESE CONDITIONS.**

### 1.3 Heat Exhaustion

Heat exhaustion includes several clinical disorders having symptoms that may resemble the early symptoms of heat stroke. Heat exhaustion is caused by the loss of large amounts of fluid by sweating, sometimes with excessive loss of salt. A worker suffering from this condition still sweats but experiences extreme weakness or fatigue, giddiness, nausea, or headache. In more serious cases, the victim may vomit or lose consciousness. The skin is clammy and moist, the complexion is pale or flushed, and the body temperature is normal or only slightly elevated.

A summary of the key symptoms of heat exhaustion is as follows:

- Clammy skin
- Confusion
- Dizziness
- Fainting
- Fatigue
- Heat Rash
- Light-headedness
- Nausea
- Profuse sweating
- Slurred Speech
- Weak Pulse

In most cases, treatment involves having the victim rest in a cool place and drink plenty of fluids. Victims with mild cases of heat exhaustion usually recover spontaneously with this treatment. Those with severe cases may require extended care for several days. There are no known permanent effects.

**AS WITH HEAT CRAMPS, CERTAIN PERSONS SHOULD CONSULT WITH THEIR PHYSICIAN ABOUT WHAT TO DO UNDER THESE CONDITIONS.**

## 1.4 Heat Stroke

This is the most serious of health problems associated with working in hot environments. It occurs when the body's temperature regulatory system fails and sweating becomes inadequate. The body's only effective means of removing excess heat is compromised with little warning to the victim that a crisis stage has been reached.

A heat stroke victim's skin is hot, usually dry, red or spotted. Body temperature is usually 105°F or higher, and the victim is mentally confused, delirious, perhaps in convulsions, or unconscious. Unless the victim receives quick and appropriate treatment, death can occur.

A summary of the key symptoms of heatstroke is as follows:

- Confusion
- Convulsions
- Incoherent Speech
- Staggering Gait
- Unconsciousness
- Sweating stops
- Hot skin, high temperature (yet extremities may feel chilled)

Any person with signs or symptoms of heat stroke requires immediate hospitalization. However, first aid should be immediately administered. This includes moving the victim to a cool area, thoroughly soaking the clothing with water, and vigorously fanning the body to increase cooling. Further treatment at a medical facility should include continuation of the cooling process and the monitoring of complications that often accompany the heat stroke. Early recognition and treatment of heat stroke are the only means of preventing permanent brain damage or death.

## 1.5 Preparing for the Heat

Humans, to a large extent, are capable of adjusting to heat. This acclimation to heat, under normal circumstances, usually takes about 5 to 7 days, during which time the body will undergo a series of changes that will make continued exposure to heat more tolerable.

On the first day of exposure, body temperature, pulse rate, and general discomfort will be higher. With each succeeding day of exposure, all of these responses will gradually decrease, while the sweat rate will increase. When the body does become acclimated to the heat, the worker will find it possible to perform work with less strain and distress.

A gradual exposure to heat gives the body time to become accustomed to higher temperatures, such as those encountered in chemical protective clothing.

## 1.6 Protecting Against Heat Stress

There are several methods that can be used to reduce heat stress:

- Limit duration of work periods
- Use protective clothing with cooling devices
- Enforce the use of the "Buddy System"
- Consume electrolyte solutions prior to suiting up
- Monitor workers for pulse recovery rates, body fluid loss, body weight loss, and excess fatigue
- Screen for heat stress susceptible candidates in your medical surveillance program
- Have all personnel know the signs and symptoms of heat stress

## 2.0 COLD STRESS

Persons working outdoors in temperatures at or below freezing may be frostbitten. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling, causing death. Areas of the body that have high surface-area-to-volume ratio such as fingers, toes, and ears, are the most susceptible. Two factors influence the development of a cold injury, ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10 degrees Fahrenheit with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at minus 18 degrees Fahrenheit.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked.

### 2.1 Frostbite

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost Nip or Initial Frostbite: characterized by suddenly blanching or whitening of skin.
- Superficial Frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep Frostbite: tissues are cold, pale, and solid; extremely serious injury.

### 2.2 Hypothermia

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages:

- Shivering
- Apathy, listlessness, sleepiness, and (sometimes rapid cooling of the body to less than 95°F)
- Unconsciousness, glassy stage, slow pulse, and slow respiratory rate
- Freezing of the extremities
- Death

Thermal socks, long cotton or thermal underwear, hard hat liners and other cold weather gear can aid in the prevention of hypothermia. Blankets and warm drinks (other than caffeinated coffee) are also recommended.

Measures shall be taken to keep workers from getting wet, such as issuance of rain gear. Workers whose cloths become wet shall be given the opportunity to dry off and change clothes.

## **Attachment IV - Construction Equipment Safety Rules**

### **1.0 ELECTRICAL**

1. Live electrical parts shall be guarded against accidental contact by cabinets, enclosure, location, or guarding. Cabinet covers will be replaced.
2. Working and clear space around electric equipment and distribution boxes will be kept clear and assessable.
3. Circuit breakers, switch boxes, etc. will be legibly marked to indicate their purpose.
4. All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground-fault circuit interrupters for personnel protection. If the prime contractor has not provided this protection with GFCI receptacles at the temporary service drop, employees will ensure portable GFCI protection is provided. (Employers may wish to use assured equipment grounding conductor program in lieu of this GFCI protection.) This requirement is in addition to any other electrical equipment grounding requirement or double insulated protection.
5. All extension cords will be three-wire (grounded) type and designed for hard or extra hard usage (Type S, ST, SO, STO, or SJ, SJO, SJT, SJTO).
6. Ground prongs will not be removed.
7. Cords and strain relief devices/clamps will be in good condition.
8. All lamps for general illumination will have the bulbs protected against breakage.
9. Electrical cords will not suspend temporary lights unless cords and lights are designed for such suspension. Flexible cords used for temporary and portable lights will be designed for hard or extra hard usage.
10. Employees will not work in such close (able to contact) proximity to any part of an electric power circuit unless the circuit is de-energized, grounded, or guarded by insulation.
11. Equipment or circuits that are de-energized will be locked out and tagged out. The tags will plainly identify the equipment or circuits being worked on.

## **2.0 COMPRESSED GAS CYLINDERS**

1. All gas cylinders will have their contents clearly marked on the outside of each cylinder.
2. Cylinders must be transported, stored, and secured in an upright position. They will never be left laying on the ground or floor, nor used as rollers or supports.
3. Cylinder valves must be protected with caps and closed when not in use.
4. All leaking or defective cylinders must be removed from service promptly, tagged as inoperable and placed in an open space removed from the work area.
5. Oxygen cylinders and fittings will be kept away from oil or grease.
6. When cylinders are hoisted, they will be secured in a cradle, sling-board, or pallet. Valve protection caps will not be used for lifting cylinders from one vertical level to another.

## **3.0 LADDERS**

1. A competent person to identify any unsafe conditions will periodically inspect ladders.
2. Those ladders with structural defects will be removed from service, and repaired or replaced.
3. Straight ladders used on other than stable, level, and dry surfaces must be tied off, held, or secured for stability.
4. Portable ladder side rails will extend at least three feet above the upper landing to which the ladder is used to gain access.
5. The top or top step of a stepladder will not be used as a step.

## **4.0 AERIAL LIFTS**

1. Aerial lifts include cherry pickers, extensible boom platforms, aerial ladders, articulating boom platforms, vertical towers, and any combinations of the above.
2. Only authorized and trained persons will operate aerial lifts.
3. Lift controls will be tested each day before use.
4. Safety harness will be worn when elevated in the aerial lift.

5. Lanyards will be attached to the boom or basket.
6. Employees will not belt off to adjacent poles, structures, or equipment while working from an aerial lift.
7. Employees will always stand firmly on the floor of the basket, and will not sit or climb on the edge of the basket.
8. Planks, ladders, or other devices will not be used for work position or additional working height.
9. Brakes will be set and outriggers will be used.
10. The aerial lift truck will not be moved with the boom elevated and employees in the basket, unless the equipment is specifically designed for such.

## **5.0 CRANES**

1. A competent person prior to each use/during use to make sure it is in safe operating condition will inspect all cranes. Also, a certification record of monthly inspections to include date, inspector signature, and crane identifier will be maintained.
2. A thorough annual inspection of hoisting machinery will be made by a competent person, or by a government or private agency, and records maintained.
3. Loads will never be swung over the heads of workers in the area.
4. Employees will never ride hooks, concrete buckets, or other material loads being suspended or moved by cranes.
5. Hand signals to crane operators will be those prescribed by the applicable ANSI standard to the type of crane in use.
6. Tag lines must be used to control loads and keep workers away.
7. Loads, booms, and rigging will be kept at least 10 feet from energized electrical lines rated 50 KV or lower unless the lines are de-energized. For lines rated greater than 50 KV follow OSHA Rules and Regulations, 1926.550(a)(15).
8. Cranes will always be operated on firm, level surfaces, or use mats/pads, particularly for near-capacity lifts.
9. Accessible areas within the swing radius of the rear of the rotating superstructure of the crane, either permanently or temporarily mounted, will be barricaded in such a manner as to prevent employees from being struck or crushed by the crane.

10. If suspended personnel platforms are to be lifted with a crane, reference 1926.550(g) for general and specific requirements.
11. Rigging equipment (chains, slings, wire rope, hooks, other attachments, etc.) will be inspected prior to use on each shift to ensure it is safe. Defective rigging and equipment will be removed from service.
12. Job or shop hooks or other makeshift fasteners using bolts, wire, etc. will not be used.
13. Wire rope shall be taken out of service when one of the following conditions exist:
  - In running ropes, 6 random distributed broken wires in one lay or 3 broken wires in one strand or one lay.
  - Wear of one-third the original diameter of outside individual wires.
  - Kinking, crushing, bird caging, heat damage, or any other damage resulting in distortion of the rope structure.
  - In standing ropes, more than two broken wires in one lay in sections beyond end connections, or more than one broken wire at an end connection.

## **6.0 WELDING and BRAZING**

1. Combustible material will be cleared from the area around cutting or welding operations.
2. Welding helmets and goggles will be worn for eye protection and to prevent flash burns.
3. Eye protection to guard against slag while chipping, grinding and dressing of welds will be worn.
4. Only electrode holders specifically designed for arc welding will be used.
5. All parts subject to electrical current will be fully insulated against the maximum voltage encountered to ground.
6. A ground return cable shall have a safe current carrying capacity equal to, or exceeding, the specified maximum output capacity of the arc-welding unit that it services.
7. Cables, leads, hoses, and connections will be placed so that there are no fire or tripping hazards.

## **7.0 TOOLS**

1. Take special precautions when using power tools.
2. Defective tools will be removed from service.
3. Electric power tools will be the grounded-type or double insulated.
4. Power tools will be turned off and motion stopped before setting tool down.
5. Tools will be disconnected from power source before changing drills, blades or bits, or attempting repair or adjustment. Never leave a running tool unattended.
6. Power saws, table saws, and radial arm saws will have operational blade guards installed and used.
7. Unsafe/defective hand tools will not be used. These include sprung jaws on wrenches, mushroomed head of chisels/punches, and cracked/broken handles of any tool.
8. Portable abrasive grinders will have guards installed covering the upper and back portions of the abrasive wheel. Wheel speed ratings will never be less than the grinder RPM speed.
9. Compressed air will not be used for cleaning purposes except when pressure is reduced to less than 30 psi by regulating or use of a safety nozzle, and then only with effective chip guarding and proper personal protective equipment.
10. Abrasive blasting nozzles will have a valve that must be held open manually.
11. Only trained employees will operate powder-actuated tools.
12. Any employee furnished tools of any nature must meet all OSHA and ANSI requirements.

## **8.0 SAFETY RAILINGS AND OTHER FALL PROTECTION**

1. All open sided floors and platforms six feet or more above adjacent floor/ground level will be guarded by a standard railing (top and mid rail, toeboard if required).
2. A stairway or ladder will be provided at any point of access where there is a break in elevation of 19 inches or more.
3. All stairways of four or more risers or greater than 30 inches high will be guarded by a handrail or stair rails

4. When a floor hole or opening (greater than two inches in its least dimension) is created during a work activity, through which a worker can fall, step into, or material can fall through, a cover or a safety guardrail must be installed immediately.
5. Safety nets will be provided when workplaces are more than 25 feet above the ground, water, or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts, is impractical.
6. Safety harnesses, lanyards, lines, and lifelines may be used in lieu of other fall protection systems to provide the required fall protection.
7. Adjustment of lanyards must provide for not more than a six-foot fall, and all tie off points must be at least waist high.

### **8.1 Scaffolds**

1. Scaffolds will be erected, moved, dismantled, or altered only under the supervision of a competent person qualified in scaffold erection, moving, dismantling, or alteration.
2. Standard guardrails (consisting of top-rail and mid-rail) will be installed on all open sides and ends of scaffold platforms and/or work levels more than ten feet above the ground, floor, or lower level.
3. Scaffolds four to ten feet in height with a minimum horizontal dimension in any direction less than 45 inches will have standard railings installed on all open sides/ends.
4. Platforms at all working levels will be fully planked. Planking will be laid tight with no more than one inch space between them, overlap at least 12 inches, and extend over end supports 6 - 12 inches.
5. The front edge of all platforms will be no more than 14 inches from the face of the work, except plastering/lathing may be 18 inches.
6. Mobile scaffolds will be erected no more than a maximum height of four times their minimum base dimension.
7. Scaffolds will not be overloaded beyond their design loadings.
8. Scaffold components should not be used as tie-off/anchor points for fall protection devices.

9. Portable ladders, hook-on ladders, attachable ladders, integral prefabricated scaffold frames, walkways, or direct access from another scaffold or structure will be used for access when platforms are more than two feet above or below a point of access.
10. Cross braces will not be used as a mean of access to scaffolds.
11. Scaffolds will not be erected, used, dismantled, altered, or moved such that they or any conductive material handled on them might come closer to exposed and energized power lines than the following:
  - Three feet from insulated lines of less than 300 volts;
  - Ten feet plus for any other insulated or un-insulated lines.

## **8.2 *Excavations and Trenches***

1. Any excavation or trench five feet or more in depth will be provided cave-in protection through shoring, sloping, benching, or the use of hydraulic shoring, trench shields, or trench boxes.
2. Trenches less than five feet in depth and showing potential of cave-in will also be provided cave-in protection. Specific requirements of each system are dependent upon the soil classification as determined by a competent person.
3. A competent person will inspect each excavation/trench daily prior to start of work, after every rainstorm or other hazard-increasing occurrence, and as needed throughout the shift.
4. Means of egress will be provided in trenches four feet or more in depth so as to require no more than 25 feet of lateral travel for each employee in the trench.
5. Spoil piles and other equipment will be kept at least two feet from the edge of the trench or excavation.

## **9.0 MOTOR VEHICLES AND MECHANIZED EQUIPMENT**

1. All vehicles and equipment will be checked at the beginning of each shift, and during use, to make sure it is in safe operating condition.
2. All equipment left unattended at night adjacent to highways in normal use shall have lights or reflectors, or barricades with lights or reflectors, to identify the location of the equipment.
3. When equipment is stopped or parked, parking brakes shall be set. Equipment on inclines shall have wheels chocked as well as having parking brakes set.

4. Operators shall not use earth-moving or compaction equipment having an obstructed rear view unless vehicle has an audible reverse signal alarm, or is backed only when observer says it is safe to do so.
5. All vehicles shall have in operable condition:
  - Horn (bi-directional equipment)
  - Seats, firmly secured, for the number of persons carried. Passengers must ride in seats.
  - Seat belts properly installed.
  - Service, parking and emergency brake system.
  - All vehicles with cabs will be equipped with windshields with safety glass.
  - All material handling equipment will equipped with rollover protective structures.

## **10.0 MISCELLANEOUS**

1. All protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the impalement hazard.
2. Enclosed chutes will be used when material, trash, and debris are dropped more than 20 feet outside the exterior walls of a building. A substantial gate will be provided near the discharge end of the chute, and guardrails at the chute openings into which workers drop material.
3. Only trained employees will service large truck wheels. A cage or other restraining device plus an airline assembly consisting of a clip-on chuck, gauge, and length of hose will be used to inflate any large truck tires.
4. Only trained employees will operate forklifts and other industrial trucks.

# OSHA's Form 301

## Injury and Illness Incident Report

**Attention:** This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.



**U.S. Department of Labor**  
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

This *Injury and Illness Incident Report* is one of the first forms you must fill out when a recordable work-related injury or illness has occurred. Together with the *Log of Work-Related Injuries and Illnesses* and the accompanying *Summary*, these forms help the employer and OSHA develop a picture of the extent and severity of work-related incidents.

Within 7 calendar days after you receive information that a recordable work-related injury or illness has occurred, you must fill out this form or an equivalent. Some state workers' compensation, insurance, or other reports may be acceptable substitutes. To be considered an equivalent form, any substitute must contain all the information asked for on this form.

According to Public Law 91-596 and 29 CFR 1904, OSHA's recordkeeping rule, you must keep this form on file for 5 years following the year to which it pertains.

If you need additional copies of this form, you may photocopy and use as many as you need.

### Information about the employee

- 1) Full name \_\_\_\_\_
- 2) Street \_\_\_\_\_
- City \_\_\_\_\_ State \_\_\_\_\_ ZIP \_\_\_\_\_
- 3) Date of birth \_\_\_\_/\_\_\_\_/\_\_\_\_
- 4) Date hired \_\_\_\_/\_\_\_\_/\_\_\_\_
- 5)  Male  
 Female

### Information about the physician or other health care professional

- 6) Name of physician or other health care professional \_\_\_\_\_
- 7) If treatment was given away from the worksite, where was it given?
- Facility \_\_\_\_\_
- Street \_\_\_\_\_
- City \_\_\_\_\_ State \_\_\_\_\_ ZIP \_\_\_\_\_
- 8) Was employee treated in an emergency room?  
 Yes  
 No
- 9) Was employee hospitalized overnight as an in-patient?  
 Yes  
 No

### Information about the case

- 10) Case number from the Log \_\_\_\_\_ (Transfer the case number from the Log after you record the case.)
- 11) Date of injury or illness \_\_\_\_/\_\_\_\_/\_\_\_\_
- 12) Time employee began work \_\_\_\_\_ AM / PM
- 13) Time of event \_\_\_\_\_ AM / PM  Check if time cannot be determined
- 14) **What was the employee doing just before the incident occurred?** Describe the activity, as well as the tools, equipment, or material the employee was using. Be specific. *Examples:* "climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."
- 15) **What happened?** Tell us how the injury occurred. *Examples:* "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."
- 16) **What was the injury or illness?** Tell us the part of the body that was affected and how it was affected; be more specific than "hurt," "pain," or "sore." *Examples:* "strained back"; "chemical burn, hand"; "carpal tunnel syndrome."
- 17) **What object or substance directly harmed the employee?** *Examples:* "concrete floor"; "chlorine"; "radial arm saw." *If this question does not apply to the incident, leave it blank.*
- 18) **If the employee died, when did death occur?** Date of death \_\_\_\_/\_\_\_\_/\_\_\_\_

Completed by \_\_\_\_\_

Title \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_ -- \_\_\_\_\_ Date \_\_\_\_/\_\_\_\_/\_\_\_\_

# Attachment C

SSDS Specifications

# **ATTACHMENT C**

## **SOIL/MATERIALS MANAGEMENT PLAN**

### **1.1 SOIL SCREENING METHODS**

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional and will be reported in the RAR. Soil screening will be performed during invasive work performed during the remedy prior to issuance of the Notice of Completion.

### **1.2 STOCKPILE METHODS**

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

All stockpile activities will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least of 50 feet from the property boundaries, where possible. Hay bales or equivalent will surround soil stockpiles except for areas where access by equipment is required. Silt fencing and hay bales will be used as needed near catch basins, surface waters and other discharge points.

### **1.3 CHARACTERIZATION OF EXCAVATED MATERIALS**

Soil/fill or other excavated media that is transported off-Site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Soils proposed for reuse on-Site will be managed as defined in this plan.

## **1.4 MATERIALS EXCAVATION, LOAD-OUT AND DEPARTURE**

The PE/QEP overseeing the remedial action will:

- oversee remedial work and the excavation and load-out of excavated material;
- ensure that there is a party responsible for the safe execution of invasive and other work performed under this work plan;
- ensure that Site development activities and development-related grading cuts will not interfere with, or otherwise impair or compromise the remedial activities proposed in this RAWP;
- ensure that the presence of utilities and easements on the Site has been investigated and that any identified risks from work proposed under this plan are properly addressed by appropriate parties;
- ensure that all loaded outbound trucks are inspected and cleaned if necessary before leaving the Site;
- ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site remediation.

Locations where vehicles exit the Site shall be inspected daily for evidence of soil tracking off premises. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

Open and uncontrolled mechanical processing of historical fill and contaminated soil on-Site will not be performed without prior OER approval.

## **1.5 OFF-SITE MATERIALS TRANSPORT**

Loaded vehicles leaving the Site will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with applicable laws and regulations, including use of licensed haulers in accordance with 6 NYCRR Part 364. If loads contain wet material capable of causing leakage from trucks, truck liners will be used. Queuing of trucks will be performed on-Site, when possible in order to minimize off Site disturbance. Off-Site queuing will be minimized.

Outbound truck transport routes will be determined by the contractor. This routing takes into account the following factors: (a) limiting transport through residential areas and past sensitive sites; (b) use of mapped truck routes; (c) minimizing off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. To the extent possible, all trucks loaded with Site materials will travel from the Site using these truck routes. Trucks will not stop or idle in the neighborhood after leaving the project Site.

## **1.6 MATERIALS DISPOSAL OFF-SITE**

The following documentation will be established and reported by the PE/QEP for each disposal destination used in this project to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations: (1) a letter from the PE/QEP or Enrollee to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at an environmental remediation Site in Queens, New York under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the RAR.

The Remedial Action Report will include an itemized account of the destination of all material removed from the Site during this remedial action. Documentation associated with disposal of all material will include records and approvals for receipt of the material. This information will be presented in the RAR.

All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations. Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility).

Waste characterization will be performed for off-Site disposal in a manner required by the receiving facility and in conformance with its applicable permits. Waste characterization

sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the RAR. A manifest system for off-Site transportation of exported materials will be employed. Manifest information will be reported in the RAR. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

## **1.7 MATERIALS REUSE ON-SITE**

Soil and fill that is derived from the property that meets the soil cleanup objectives established in this plan may be reused on-Site. The soil cleanup objectives for on-Site reuse are listed in Tables 1-4. 'Reuse on-Site' means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on comparable soil/fill material, and addressed pursuant to the NYC BCP agreement subject to Engineering and Institutional Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this RAWP are followed. The expected location for placement of reused material will be determined by the contractor.

Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing of the Site will not be buried on-Site. Soil or fill excavated from the site for grading or other purposes will not be reused within a cover soil layer or within landscaping berms.

## **1.8 DEMARCATION**

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods: (1) placement of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent material to be placed on the surface of residual soil/fill to provide an observable reference layer. A description or map of the approximate depth of the demarcation layer will be provided in the SMP; or (2) a land survey of the top elevation of residual soil/fill before the placement of cover soils, pavement and associated sub-soils, or other materials or structures or, (3) all materials beneath the approved cover will be considered impacted and subject to site management after the remedy is complete. Demarcation may be established by one or any combination of these three

methods. As appropriate, a map showing the method of demarcation for the Site and all associated documentation will be presented in the RAR.

This demarcation will constitute the top of the site management horizon. Materials within this horizon require adherence to special conditions during future invasive activities as defined in the Site Management Plan.

## **1.9 IMPORT OF BACKFILL SOIL FROM OFF-SITE SOURCES**

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet OER-approved backfill and cover soil quality objectives for this Site.

A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The following potential sources may be used pending attainment of backfill and cover soil quality objectives:

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;
- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC.

All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this RAWP. The RAR will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed.

## **Source Screening and Testing**

Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:

- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Composite samples of imported material will be taken at a minimum frequency of one sample for every 500 cubic yards of material. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the RAR. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility.

RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for, and will not be used as cover material.

### **1.10 FLUIDS MANAGEMENT**

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable laws and regulations. Liquids discharged into the New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as

necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

Discharge of water generated during remedial construction to surface waters (i.e. a stream or river) is prohibited without a SPDES permit issued by New York State Department of Environmental Conservation.

### **1.11 STORM-WATER POLLUTION PREVENTION**

Applicable laws and regulations pertaining to storm-water pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this RAWP (silt fences and barriers, and hay bale checks) will be installed around the entire perimeter of the remedial construction area and inspected once a week and after every storm event to ensure that they are operating appropriately. Discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

### **1.12 CONTINGENCY PLAN**

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to OER's Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings will be included in the daily report. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to OER.

Chemical analytical testing will be performed for TAL metals, TCL volatiles and semi-volatiles, TCL pesticides and PCBs, as appropriate.

### **1.13 ODOR, DUST AND NUISANCE CONTROL**

#### **Odor Control**

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

This odor control plan is capable of controlling emissions of nuisance odors. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. OER will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the PE/QEP's certifying the Remedial Action Report.

#### **Dust Control**

Dust management during invasive on-Site work will include, at a minimum:

- Use of a dedicated water spray methodology for roads, excavation areas and stockpiles.
- Use of properly anchored tarps to cover stockpiles.
- Exercise extra care during dry and high-wind periods.
- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and

corrected. Work will not resume until all nuisance dust emissions have been abated. OER will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEP's responsible for certifying the Remedial Action Report.

### **Other Nuisances**

Noise control will be exercised during the remedial program. All remedial work will conform, at a minimum, to NYC noise control standards.

Rodent control will be provided, during Site clearing and grubbing, and during the remedial program, as necessary, to prevent nuisances.