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65% Design

Interim Remedial Measure Air Sparge/Soil Vapor Extraction System

Former Majestic Garment Cleaners

740 Pine Street

Brooklyn, New York

Site # 2-24-035

Work Assignment # D-004439-22

August 2012

ARCADIS

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1. Introduction

The New York State Department of Environmental Conservation (NYSDEC) tasked Malcolm Pirnie, Inc. (Malcolm Pirnie) to prepare a 65% Design of an Interim Remedial Measure Air Sparge / Soil Vapor Extraction System for the Former Majestic Garment Cleaners Site (#2-24-035), in Brooklyn, Kings County, New York (Figure 1). The 65% Design has been prepared under the NYSDEC State Superfund Standby Contract No. D004439-22. The objective of this report is to provide the scope of work necessary to facilitate the installation of an Interim Remedial Measure (IRM) air sparge (AS)/soil vapor extraction (SVE) system to address the presence of volatile organic compounds (VOCs) in soil and groundwater at the site (Figure 2). The area to be remediated includes the western half of the site as delineated by previous investigations and is shown on Figure 3.

1.1 Background and Site History

The Former Majestic Garment Cleaners site is located at 740 Pine Street at the intersection with Loring Avenue, Brooklyn, New York (Figure 2). The parcel is approximately 24,000 square feet and formerly operated as an industrial laundry and dry cleaning facility. The site formerly contained a large one-story brick building constructed in 1926 with a smaller attached one-story cinder block building on its north side built at a later date. The facility operated from 1926 through 2004. The site buildings were demolished in approximately 2007. Significant demolition debris remains on the site. Three underground storage tanks (USTs) were reportedly present and abandoned in-place within the footprint of the former masonry block building addition and potentially in the rear portion of the main building near the former loading dock (Anson, 2004). Additionally, it was reported that a UST under the south side of the former building may have contained tetrachloroethene (PCE) (Anson, 2004).

A Phase I Environmental Site Assessment (ESA) was conducted at the site in February 1998 by Middleton, Kontoska, Associates, Ltd. (MKA), followed by a focused subsurface site investigation in May 1998 by ATC Associates, Inc. (ATC) which identified petroleum and chlorinated VOCs in both soil and groundwater. Petroleum-saturated soil was present in one boring in the area of the three USTs. Additional investigation activities were conducted by URS Corporation Group Consultants (URS) on behalf of the NYSDEC in late 2001 which identified several locations with VOC and semi-volatile organic compound (SVOC) groundwater concentrations greater than the corresponding NYSDEC Class GA Standards.

2. Remedial Investigation

Malcolm Pirnie conducted investigatory activities for the site as part of a Remedial Investigation/Feasibility Study (RI/FS). The RI/FS was designed to further characterize the magnitude and extent of contaminants (i.e., chlorinated and petroleum-based VOCs and SVOCs) associated with the former laundry and dry cleaning operations, the potential for offsite migration of contaminants, and the potential for vapor intrusion. RI/FS activities included the installation and sampling of soil, groundwater and vapor points, as well as the sampling of existing monitoring locations. Additionally, monitoring and injection/extraction locations were installed for an AS/SVE pilot test to evaluate the potential effectiveness of AS/SVE technologies to remediate VOCs present in soils and groundwater at the site.

The site subsurface consists of primarily fine to medium sand with trace amounts of angular gravel. Fill materials consisting of concrete, brick, and asphalt were encountered in some soil borings, generally in the upper 5 to 10 feet below ground surface (bgs). Subsurface soil and groundwater contain PCE and other VOCs at concentrations exceeding the applicable Unrestricted Use Soil Cleanup Objectives (SCOs) and Class GA Groundwater Standards.

As depicted on Figure 3, the direction of overburden groundwater flow across the site is generally toward the south. The average depth to water measured in the monitoring well network is approximately 10 feet bgs. A summary of groundwater elevations at the site is shown in Table 1.

The site land surface consists of sand and remnants of the former building concrete slabs. Numerous debris piles of concrete, brick, and wood from building demolition are present on the site. The site is generally flat and is surrounded by a perimeter fence. Waste consisting of paper, plastic, glass, metal, lumber, and concrete, is also present on the ground surface throughout the site.

Source areas for soil (with concentrations greater than 6 NYCRR Part 375 Unrestricted Use SCOs) and groundwater (with concentrations greater than Class GA Groundwater Standards) contamination appear to be the former parking and loading dock areas. CVOC-impacted groundwater appears to have migrated laterally from the site in the immediate down-gradient vicinity and also migrated vertically downwards.

Soil, groundwater, and vapor analytical data generated during RI/FS activities are summarized in Tables 2, 3 and 4, respectively.

3. Air Sparge/Soil Vapor Extraction Pilot Test Summary

Air sparge (AS)/soil vapor extraction (SVE) technology was identified as a potential remedial approach for addressing source and residual VOC impacts in the soil and groundwater at the site. An AS/SVE pilot test was conducted by Malcolm Pirnie in the area downgradient from the former loading dock area on June 26, 2012 to evaluate the potential feasibility of using AS/SVE remedial technologies to reduce the concentration of sorbed, vapor phase and dissolved phase VOCs present in the soil and groundwater. Site-specific design parameters to be obtained from the pilot test data included pneumatic conductivity and air sparge zone of influence. Pilot test results also allow basis for equipment selection and sizing as part of implementation of a full-scale remedial system.

3.1 Pilot Test Well Construction Details

The pilot test included the installation of one air sparge well, AS-1, and one soil vapor extraction well, SVE-1. Additionally, six AS/SVE monitoring points were installed varying distances between 4 and 24 feet from AS-1 and SVE-1. The six monitoring points are located such that there are two rows of three points on either side of the sparge and extraction wells. The locations of the sparge well, soil vapor extraction well, and associated monitoring points are depicted on Figure 2.

Air sparge well AS-1 was screened from a depth of 28 to 30 feet bgs. Soil vapor extraction well SVE-1 was screened completely above the water table from a depth of 3 to 8 feet bgs. The six AS/SVE monitoring points were screened across the water table from depths of 5 to 15 feet bgs. Well construction details for the pilot test well locations are provided as Appendix A.

3.2 Pilot Test Equipment

SVE equipment consisted of a trailer-mounted, 19 horsepower (hp) regenerative blower capable of 600 cubic feet per minute (cfm) with an applied vacuum of 50 inches of water column (in.W.C.). Extracted soil vapor handling/treatment components included conveyance hose, an air/water separator (i.e., 55-gallon drum), and vapor phase granular activated carbon (VPGAC) media. A dilution valve located on the suction side of the blower allowed for manual adjustment of the applied vacuum at the soil vapor extraction point.

AS equipment consisted of a skid-mounted, 2 hp, dry rotary vane vacuum/pump compressor rated for maximum air flow and applied pressure of 24 cfm and 14 pounds

per square inch (psi), respectively. The compressor skid was equipped with a volumetric flow meter gauge as well as an applied pressure gauge.

3.3 Methodology

The AS/SVE pilot test consisted of two phases: an SVE-only test followed by a combined AS/SVE test. Prior to the commencement of the SVE-only test, baseline measurements were conducted from the AS/SVE monitoring points including water levels, well pressures, dissolved oxygen (DO) in groundwater, and air quality parameters in wells (VOCs, lower explosive limit, carbon dioxide and oxygen).

3.3.1 SVE Test

The duration of the SVE-only test was approximately two hours. It consisted of the adjustment of applied vacuum at SVE-1 several times and subsequent collection of field parameter measurements for each applied vacuum. Field parameters measured at the AS/SVE monitoring points during the SVE-only test included induced vacuum, water levels, VOCs using a photoionization detector (PID), and lower explosive limit (LEL). Soil vapor extraction rates were measured using a hand-held anemometer. Two vapor samples were collected during the SVE-only test.

3.3.2 AS/SVE Test

The combined AS/SVE test was conducted immediately following the SVE-only test. The AS/SVE test lasted for approximately three hours, and consisted of the operation of the air compressor in conjunction with the SVE blower at varying AS and SVE rates. In addition to the field parameters described for the SVE-only test, in-well DO measurements were also obtained during the combined AS/SVE test. Two vapor samples were collected during the combined AS/SVE test.

3.4 Pilot Test Field Parameter Results

Field parameters collected during the pilot test are discussed below. Field parameters for the SVE and combined AS/SVE tests are provided in Tables 5 and 6, respectively.

3.4.1 SVE Test

Applied vacuum at the soil vapor extraction point (SVE-1) during the SVE-only test ranged from 18 to 72 in.W.C. The corresponding soil vapor extraction rates ranged from

approximately 23 cfm to greater than 70 cfm. It should be noted that applied vacuums in excess of 55 to 60 in.W.C. resulted in the accumulation of groundwater in the air/water separator. The presence of moisture in the air stream during these conditions limited the accuracy of soil vapor extraction rate measurements.

Vacuum influence was observed at each of the six AS/SVE monitoring points. The following table shows induced vacuums observed at monitoring points while the maximum vacuum of 63 in.W.C. was applied at SVE-1. Radial distances from SVE-1 for each of the monitoring points are also shown:

Monitoring Point	Distance From SVE-1 (ft)	Induced Vacuum With Applied Vacuum of 63 in.W.C. (in.W.C.)
AS/SVE-2	4.5	0.287
AS/SVE-5	5	1.4
AS/SVE-6	13	0.181
AS/SVE-3	14	0.018
AS/SVE-7	19	0.209
AS/SVE-4	24	0.106

Within both rows of monitoring points (AS/SVE-2, AS/SVE-3, AS/SVE-4; and AS/SVE-5, AS/SVE-6, AS/SVE-7), induced vacuum was generally observed to decrease as distance from the extraction point increased, with the exception of AS/SVE-3. An induced vacuum of an order-of-magnitude less than that observed at other monitoring points indicates a lack of pneumatic conductivity in the immediate vicinity of AS/SVE-3, potentially as a result of geologic heterogeneity relative to the other pilot test points.

Minor rises in water levels (less than 0.1 feet) were observed at the five closest monitoring points to SVE-1, confirming the creation of a negative pressure gradient across the formation toward the extraction well screened interval.

PID readings measured from the soil vapor extraction conveyance hose prior to dilution or VPGAC treatment ranged from 189 to 375 parts per million (ppm).

3.4.2 AS/SVE Test

Applied vacuum at SVE-1 during the combined AS/SVE test ranged from 10 to 62 in.W.C., corresponding to soil vapor extraction rates of between 24 and 60 cfm. The air sparge rate during the combined AS/SVE test ranged from 4 to 15 cfm.

Pressure responses and water level increases as a result of air sparging were observed at each of the six AS/SVE monitoring points. Maximum water level increases at each monitoring point ranged from 0.29 feet (AS/SVE-3) to 1.18 feet (AS/SVE-6).

PID and LEL measurements from the soil vapor extraction conveyance hose prior to dilution or VPGAC treatment ranged from 110 to 786 ppm, and 0 to 17 percent, respectively. The following table depicts the maximum in-well PID and LEL readings measured during the combined AS/SVE test:

Monitoring Location	Maximum PID (ppm)	Maximum LEL (%)
AS/SVE-2	923	21
AS/SVE-3	132	100
AS/SVE-4	591	27
AS/SVE-5	460	80
AS/SVE-6	212	100
AS/SVE-7	64	100

Increases in DO concentrations in three of the six monitoring wells were observed. The following table shows baseline DO readings, DO readings measured one hour into the combined AS/SVE test, and radial distances from the air sparge well:

Monitoring Location	Distance From AS-1 (ft)	Baseline DO (mg/L)	DO at 1-Hour Time, AS/SVE Test (mg/L)
AS/SVE-2	3.5	4.19	6.41
AS/SVE-5	5	1.92	5.99
AS/SVE-6	12.5	1.51	7.15
AS/SVE-3	13	6.08	5.89
AS/SVE-7	18.5	-	6.23
AS/SVE-4	24	6.46	5.95

3.5 Pilot Test Laboratory Analytical Results

As described in the methodology section, two vapor samples each were collected during the SVE-only and AS/SVE tests. The samples were analyzed for VOCs using United States Environmental Protection Agency (USEPA) Method TO-15. Concentrations of cis-1,2-dichloroethene (DCE), tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride in samples collected during the pilot test are shown in the table below:

Compound	VOC Concentrations							
	SVE (5 minutes)		SVE (2 hours)		AS/SVE (1.5 hours)		AS/SVE (3 hours)	
	ppbv	µg/m^3	ppbv	µg/m^3	ppbv	µg/m^3	ppbv	µg/m^3
cis-1,2-DCE	88,000	350,000	19,000	77,000	26,000	100,000	32,000	130,000
PCE	120,000	830,000	41,000	280,000	57,000	390,000	67,000	460,000
TCE	7,500	40,000	2,600	14,000	3,500	19,000	4,100	22,000
Vinyl Chloride	28,000	71,000	5,000	13,000	6,900	18,000	7,400	19,000

A full summary of the vapor analytical results has been provided in Table 7. Laboratory analytical results are provided in Appendix B.

3.6 Conclusions and Recommendations

The results of the pilot test indicate that the AS/SVE remedial technology is a viable approach to remediate VOCs in groundwater and soil. Site-specific conclusions and design data generated from the AS/SVE pilot test include the following:

- AS/SVE technology was effective at removing VOC mass in the vapor phase;
- Evaluation of SVE field parameters indicates a pneumatic conductivity between 0.00049 centimeters per second (cm/s) and 0.037 cm/s;
- Evaluation of AS field parameters indicates a radial zone of influence for air sparging of 12 to 13 feet;
- Evaluation of SVE field parameters indicates a radius of influence in excess of 20 feet for the vacuum ranges applied during the pilot test;

- Significant induced vacuum influence during the SVE-only test indicates subsurface lateral air flow is being induced by a negative pressure gradient, thus enhancing the potential for aerobic biodegradation in the unsaturated zone of the low-level benzene concentrations that are present in some areas;

- The addition of air sparging to soil vapor extraction resulted in increased PID readings and VOC concentrations in vapor samples, indicating the effectiveness of air sparging to transfer VOC mass from the dissolved and sorbed phase to the vapor phase; and

- Increases in DO concentrations in groundwater at three of the six AS/SVE monitoring points during air sparging indicates that oxygen is being introduced to the saturated zone, thus enhancing the potential for aerobic biodegradation of the low-level benzene concentrations that are present in some areas.

4. IRM Design

This section presents the IRM system design to address the impacted soil and groundwater at the site. A set of 65% Design Drawings has been provided as Appendix C, and 65% Technical Specifications have been provided as Appendix D. Both the Design Drawings and Technical Specifications will be expanded upon as part of the 100% Design phase.

4.1 Remedial Technology Description

The remedial alternative to recover VOC impacts in the soil and groundwater will consist of a combined AS/SVE system. Air sparging involves the injection of air at controlled flowrates and pressures into the subsurface below the water table to promote the volatilization of VOCs dissolved in groundwater, adsorbed to saturated soils, and trapped in soil pores. SVE, which involves the extraction of soil vapors from the vadose zone via application of vacuum, will capture the VOCs that rise into the vadose zone as a result of air sparging. SVE will also capture VOCs already present in the vadose zone including those sorbed to the soil matrix and those in soil gas.

4.2 Remedial Design Overview

The AS/SVE remedial system will consist of twenty (21) air sparge wells and twelve (13) soil vapor extraction wells. Monitoring wells will also be installed to gauge the AS/SVE system performance. The proposed locations of these wells are shown on Figure 3. The

AS/SVE system equipment (blower, air compressor, air/water separator, VPGAC units, etc.) will be housed in a steel cargo container located in the northwest corner of the site (Drawing G-1, Appendix C).

The locations and spacing of proposed air sparge wells are based on an estimated air sparge radial zone of influence of approximately 12 feet. The locations of proposed SVE wells are based on a design radius of influence of 20 feet. Injection equipment will be sized to allow for as many as half of the air sparge wells to operate at one time, each with design individual injection rates of 10 cfm. Air sparge wells will operate non-continuously (i.e., pulsed) to facilitate groundwater mixing due to air channel formation and subsequent collapse. This will help to both minimize reductions in hydraulic conductivity due to the presence of air channels in the saturated zone, and maximize the overall bulk transfer of contaminant mass from the dissolved to vapor phase. Extraction equipment shall be sized for a soil vapor extraction rate of 15 cfm per SVE well, plus the aggregate of air injection rates.

4.3 Site Survey

A licensed New York State Land Surveyor will identify and record the location of proposed wells, trenching limits, and treatment container extents prior to the initiation of construction activities. A post-construction survey will be conducted to document changes from the proposed plan for the purposes of the as-built design of the treatment system. The horizontal datum will be based on state plane survey system and the vertical datum will be based on the local datum.

4.4 Utility Clearance

Prior to initiating any site related drilling and/or construction activities all municipal and private underground utilities will be identified. Any existing underground utilities will be identified utilizing the following processes:

- Underground Facilities Protective Organization (UFPO);
- Review of available site drawings and facility records; and
- Detailed visual inspection of the site.

In the event that one or more of the processes above cannot be conducted or completed satisfactorily then a private utility contractor shall be utilized to located unmarked utilities utilizing ground-penetrating radar (GPR), air knifing, and/or other related technologies.

4.5 Remedial Wells and Piping Network

4.5.1 Well Construction Details

Each SVE well will be constructed of schedule 40 polyvinyl chloride (PVC), 10-slot, 3-inch diameter, continuous V-wire screen. SVE wells will be screened above the groundwater table, at an interval of 6 to 8 feet bgs. Each AS well will be constructed of 10-slot, 1-inch diameter, schedule 40 PVC screen. AS wells will be screened below the groundwater table, at an interval of 28 to 30 feet bgs.

The proposed locations of SVE wells have been determined based on utilizing the same borehole locations (i.e., nested) as proposed AS wells, when feasible. Based on the proposed AS/SVE system layout, there will be a total of eleven (11) nested AS/SVE locations, ten (10) AS-only locations, and two (2) SVE-only locations.

Performance monitoring wells will be constructed of schedule 40 PVC, 10-slot, 1.5-inch diameter screen. Monitoring wells will be screen across the water table at an interval of 5 to 15 feet bgs.

The annulus around each well screen will be filled with a sand filter pack, and topped with a bentonite seal. Wellheads will be enclosed with steel, traffic-rated, flush-mount, watertight protective covers. Well construction details for nested AS/SVE, AS-only, SVE-only and monitoring wells are shown on Drawing G-2.

4.5.2 Below-Grade Process Piping and Trenching

Extracted soil vapors from SVE wells will be conveyed via 1.25-inch diameter, high-density polyethylene (HDPE) pipe with a standard dimension ratio (SDR) of 11. Each SVE well will have its own individual conveyance pipe running below-grade from the well location to the SVE header/manifold located inside the remedial system container.

Injection air will be conveyed from the remedial system container to the AS wells using 1-inch diameter, SDR-11 HDPE pipe. As with SVE conveyance piping, each AS well will have its own individual injection pipe running below-grade between the AS well location and the air sparge header/manifold located inside the remedial system container.

SVE conveyance piping shall have a minimum depth of 4 feet bgs, while also maintaining a slight downward slope towards the SVE wells to allow for gravity draining of any groundwater or condensate that may be generated. If excavated trench spoils are deemed unsuitable as pipe bedding, then clean sand will be imported for use as bedding. For the remaining backfill of trenches above the pipe bedding layer, trench spoils may be utilized and mechanically compacted in 8-inch lifts. A traceable wire/marking tape shall be installed at a depth of approximately 12 inches bgs in all trenches containing below-grade SVE and AS piping.

Below-grade AS piping may utilize the same trenches as SVE piping. AS piping will also be installed within a pipe bedding material layer, and shall maintain a minimum depth of 2.5 feet bgs.

The proposed AS/SVE system layout, including the location of the remedial system container, and proposed below-grade pipe routes, is depicted on Drawing G-1. A cross-section detail of AS/SVE below-grade piping, as well as associated notes, is shown on Drawing G-2.

4.6 Remedial System Components

A 15 hp regenerative blower capable of pulling 450 actual cubic feet per minute (acfm) at an applied vacuum of 50 in.W.C. will be utilized to extract soil vapors from each SVE location. A variable frequency drive (VFD) will be used to control the rotational speed of the blower motor to provide adjustment of the applied vacuum and soil vapor extraction rate. Additionally, usage of a VFD effects a reduction in energy consumption when compared to operating the blower at full speed and using a dilution valve to adjust applied vacuum. The SVE manifold will include isolation valves for each SVE well, allowing for manual adjustment of applied vacuum to individual locations. An air/water separator (i.e., knockout tank), liquid transfer pump, and storage tank will be installed to manage any groundwater or condensate that may accumulate. Between the knockout tank and blower will be two 1,000-pound (lb) VPGAC vessels used for treatment of VOCs in the air stream. Treated soil vapors will be discharged to the atmosphere at an elevation of four feet above the roof of the treatment system container.

A 20 hp rotary screw air compressor capable of producing an air flowrate of 87 cfm will be used to inject air at each AS well location. The air compressor includes its own internal VFD control to minimize start/stops thereby reducing energy consumption. The AS manifold will divide AS wells into four groups (i.e., zones) based on the physical location of the AS wells onsite, to allow for pulsed sparge injections while still operating at least

one group at a time (e.g., two zones on, two zones off at one time). Each of the four AS well groups will have its own solenoid valve and pressure regulator to allow for automated and remote operation, and pressure control of active air sparging zones, respectively.

A description of general equipment is provided on Drawing M-1, and a diagram of the treatment processes is depicted in Drawing M-2.

4.7 Process Controls and Operation

All major components including the regenerative blower, rotary screw compressor, transfer pump, solenoid valves, and associated monitoring devices (e.g., pressure transmitters, level sensors, etc.) will be interlocked to a programmable logic controller (PLC). These components will be continuously monitored for proper operation and result in critical or non-critical alarms in the event of component failures. These interlocks will prevent the discharge of untreated soil vapors and protect the safety of personnel operating and monitoring equipment at the site. All process equipment motors will have hand-off-auto (HOA) switches located at the main control panel (MCP). Operation of the treatment system components will be dependent upon various pressure/flow transmitters and level switches located throughout the system. Specific alarm conditions and their results to system operation are provided in Drawing M-1.

4.8 Permitting, Inspection, and Access Agreements

Implementation of the selected remedy will require permits in accordance with applicable regulations. The following are municipal permit/inspections that are typically required prior to construction and startup of equipment:

- Building permit; and
- Electrical inspection.

In addition to acquiring all applicable permits and inspections, access agreements with the adjacent property owners to the site will need to be revised and approved prior to commencing remedial construction activities.

Technical approval to construct, as well as a certificate to operate a process, exhaust, or ventilation system will not be required according to Section 201-3 “Exceptions and Trivial Activities” of the NYSDEC Air Resources as the site is considered a trivial source [Section 201-3.3 (item 28)]. However, based on the influent vapor phase concentrations observed

during the pilot test, the effluent vapor stream will be monitored for any of the site-specific constituents of concern (COCs) listed in NYSDEC Division of Air Resources (DAR-1) Tables. Following startup of the full-scale system the operating flowrate and detectable concentrations of COCs found in the vapor stream will be compared to the NYSDEC DAR-1 Tables to determine whether the design vapor treatment is satisfactory or if ongoing vapor treatment will be warranted.

In the event that groundwater is generated, stored groundwater will be handled in accordance with all local, state, and federal regulations.

5. Operation, Maintenance and Monitoring

This section outlines the proposed operation, maintenance and monitoring (OM&M) activities for the AS/SVE system including the startup/shakedown period.

5.1 Remedial System Startup

During the first five weeks of operation (i.e., st), the following AS/SVE system field parameters will be monitored and recorded weekly:

- Soil vapor extraction rates for each SVE well;
- Applied vacuum at each SVE wellhead;
- Induced vacuum at monitoring points;
- Air sparging volumetric rates and pressures;
- Groundwater elevations; and
- General system operation (i.e., blower/compressor operation, alarms, interlocks, etc.).

Additionally, influent sampling of soil vapors from each SVE well including collection and analysis for site-specific VOCs, SVOCs, and permanent gases, will be done during the first, third and fifth weeks of startup. Effluent vapor samples will be collected during the first week of startup and analyzed for site-specific VOCs. These results will be compared to the NYSDEC DAR-1 Tables.

5.2 Remedial System OM&M

Following the completion of the remedial system construction and once the five week startup/shakedown period is completed, a routine OM&M plan will be prepared and implemented. Conceptually, during the first month of remedial system operation, weekly monitoring will be conducted; thereafter, routine OM&M will be conducted on a monthly basis or as needed. The OM&M plan will define the system operation and maintenance in which to demonstrate that the remedial system is operating effectively. The performance monitoring will be performed to demonstrate the effectiveness of the remedial system operation.

Following the implementation and startup of the AS/SVE system, groundwater field parameters and laboratory analytical data will be collected quarterly from site monitoring wells to evaluate the effectiveness of the AS/SVE system.

5.3 Waste Management

The excavated soil from the proposed trenching locations will be field screened with a PID for VOCs and also visually inspected for VOC impacts. If none are detected, then trench spoils will be utilized as backfill if deemed suitable. Each of the well installation soil cuttings will be placed in drums or in a roll-off container, characterized via sampling for site-specific contaminants and disposal parameters required by the selected disposal facility.

Spent VPGAC media generated from remedial system operation will be shipped offsite for regeneration or disposal in accordance with all applicable local, state and federal regulations. Likewise, any groundwater generated during remedial system operation will be disposed of in accordance with applicable regulations.

6. Reporting

Following the conclusion of remedial construction activities, a Remedial Construction Completion Report will be submitted to NYSDEC summarizing the as-built remedial system construction. System performance monitoring and analytical results will be summarized and reported to the NYSDEC on a quarterly basis.

8. References

Anson Environmental, Ltd., 2004, Soil and Groundwater Investigation Work Plan, Former Majestic Garment Cleaners, Brooklyn, New York.

Malcolm Pirnie, Inc., 2010, Executive Summary – Former Majestic Garment Cleaners Site, Brooklyn, New York.

New York State Department of Environmental Conservation, 2010, DER-10 Technical Guidance for Site Investigation and Remediation.

United State Environmental Protection Agency, 2000, A Guide to Developing and Documenting Cost Estimates During the Feasibility Study.

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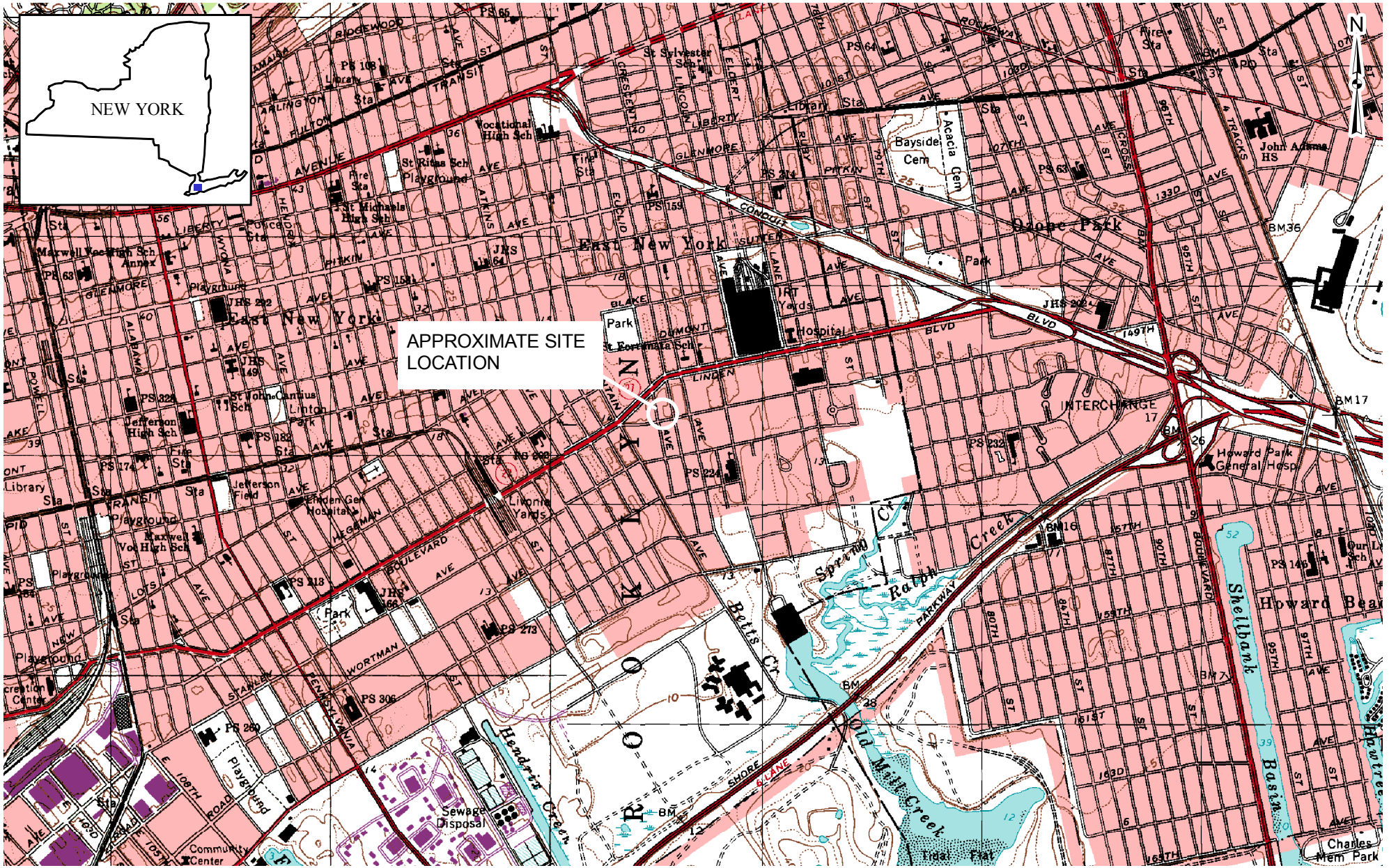
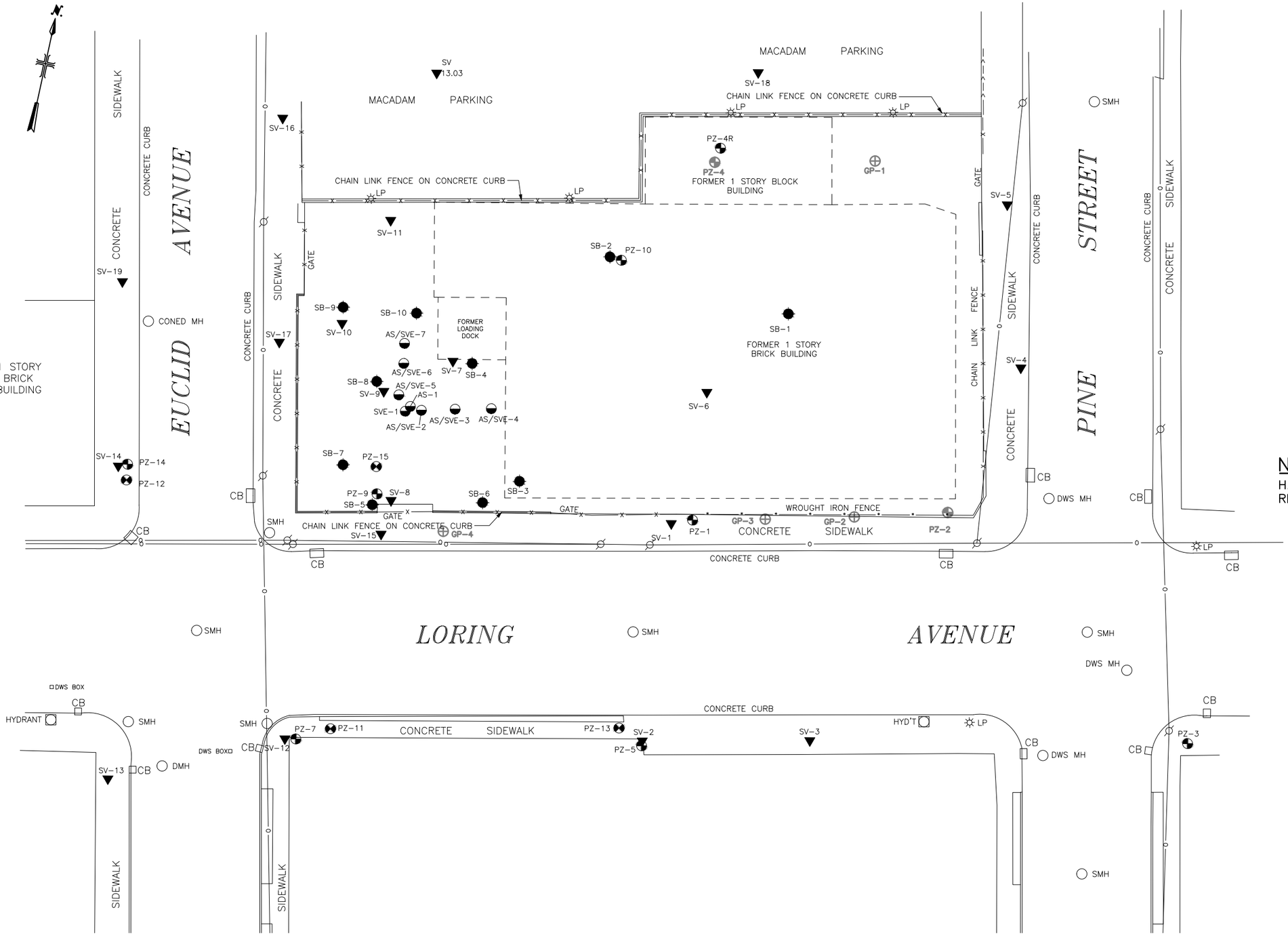
Figures

M:\GISMOD\0266384\Majestic Cleaners Site Map.mxd



ARCADIS MALCOLM PIRNIE	NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION FORMER MAJESTIC CLEANERS SITE (# 2-24-035) BROOKLYN, KINGS COUNTY, NEW YORK	**SITE LOCATION**	MALCOLM PIRNIE, INC. MAY 2012 **FIGURE 1**



SOURCE: 2001/2002, APRIL 2011, AUGUST 2011, JUNE 2012 SURVEY PERFORMED BY YEC INC., VALLEY COTTAGE, NY

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

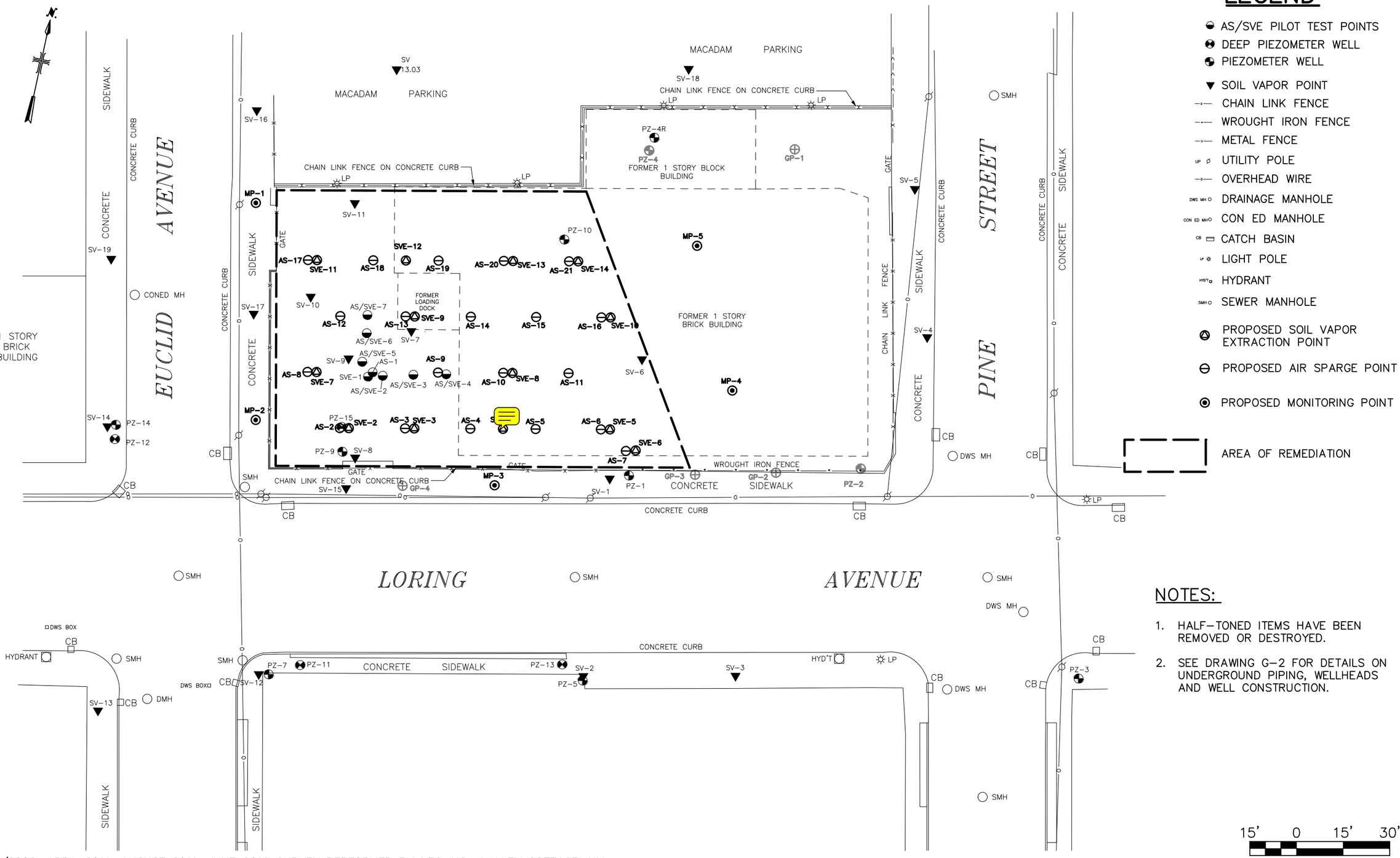
INTERIM REMEDIAL MEASURE
AIR SPARGE/SOIL VAPOR EXTRACTION SYSTEM
FORMER MAJESTIC CLEANERS SITE (#2-24-035) – BROOKLYN, NEW YORK

SITE PLAN

SCALE: AS SHOWN

AUGUST 2012

FIGURE 2



LEGEND

- AS/SVE PILOT TEST POINTS
- DEEP PIEZOMETER WELL
- PIEZOMETER WELL
- SOIL VAPOR POINT
- CHAIN LINK FENCE
- WROUGHT IRON FENCE
- METAL FENCE
- UTILITY POLE
- OVERHEAD WIRE
- DRAINAGE MANHOLE
- CON ED MANHOLE
- CATCH BASIN
- LIGHT POLE
- HYDRANT
- SEWER MANHOLE
- PROPOSED SOIL VAPOR EXTRACTION POINT
- PROPOSED AIR SPARGE POINT
- PROPOSED MONITORING POINT
- AREA OF REMEDIATION

NOTES:

1. HALF-TONED ITEMS HAVE BEEN REMOVED OR DESTROYED.
2. SEE DRAWING G-2 FOR DETAILS ON UNDERGROUND PIPING, WELLHEADS AND WELL CONSTRUCTION.

15' 0 15' 30'

SOURCE: 2001/2002, APRIL 2011, AUGUST 2011, JUNE 2012 SURVEY PERFORMED BY YEC INC., VALLEY COTTAGE, NY

MALCOLM PIRNIE ARCADIS
Infrastructure · Water · Environment · Buildings

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
INTERIM REMEDIAL MEASURE
AIR SPARGE/SOIL VAPOR EXTRACTION SYSTEM
FORMER MAJESTIC CLEANERS SITE (#2-24-035) – BROOKLYN, NEW YORK

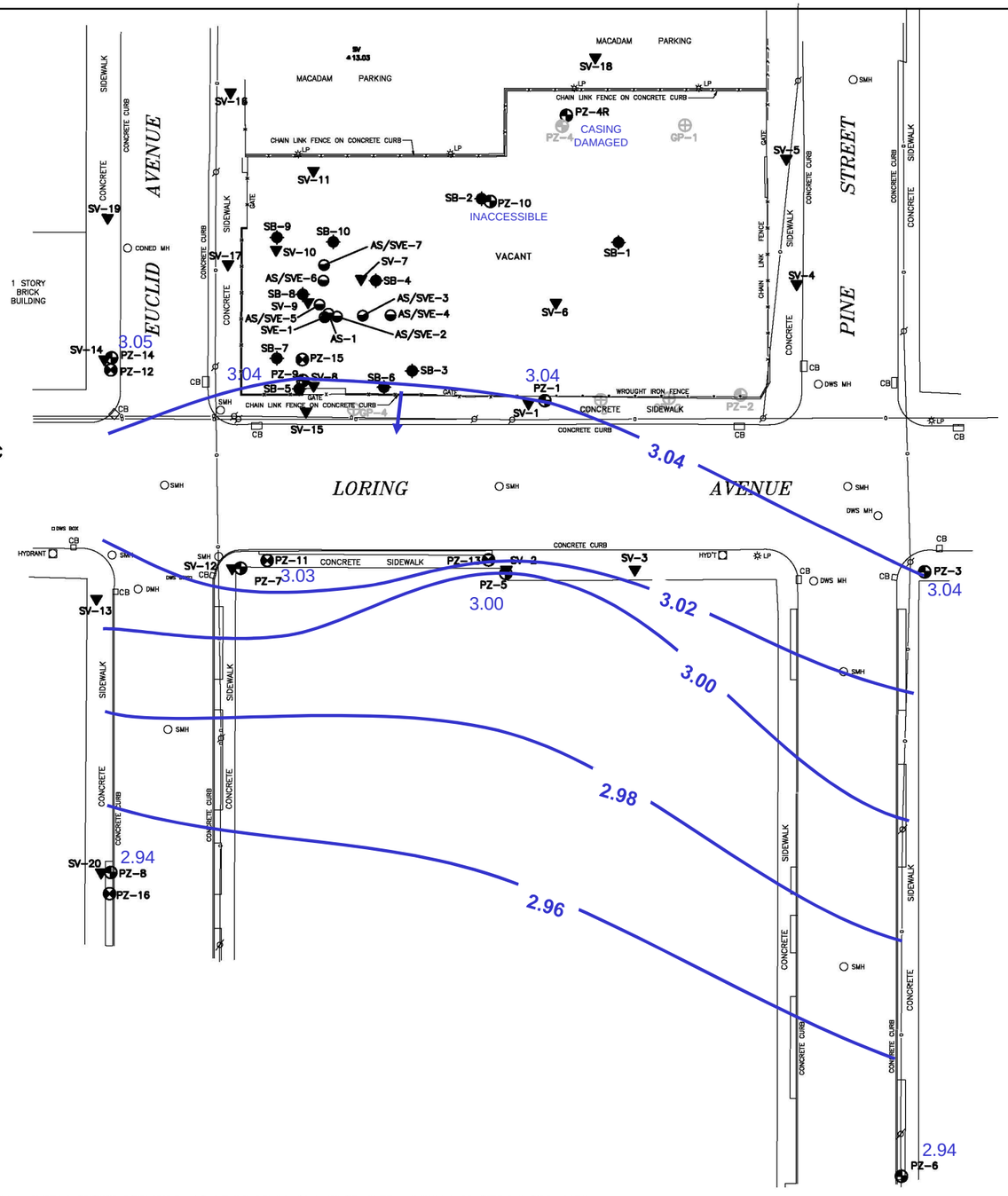
AREA OF REMEDIATION &
PROPOSED AIR SPARGE/SOIL VAPOR EXTRACTION POINTS
SCALE: AS SHOWN

AUGUST 2012
FIGURE 3

N.

WELL ELEVATION TABLE

WELL I.D.	TOP OF CASING	TOP OF PVC
PZ-1	13.30	13.09
PZ-3	14.17	13.98
PZ-4R	14.80	14.52
PZ-5	13.21	12.65
PZ-6	14.05	13.84
PZ-7	13.20	12.85
PZ-8	13.47	12.87
PZ-9	12.96	12.61
PZ-10	14.48	14.18
PZ-11	13.23	12.82
PZ-12	12.81	12.36
PZ-13	13.28	12.92
PZ-14	12.82	12.41
PZ-15	13.19	12.82
PZ-16	13.49	13.24
AS-1	13.35	12.98
SVE-1	13.34	12.95
AS/SVE-2	13.43	13.19
AS/SVE-3	13.41	13.17
AS/SVE-4	13.46	13.26
AS/SVE-5	13.43	13.21
AS/SVE-6	13.55	13.33
AS/SVE-7	13.79	13.55



LEGEND

- AS/SVE PILOT TEST POINTS
- DEEP PIEZOMETER WELL
- PIEZOMETER WELL
- SOIL BORING
- SOIL VAPOR POINT
- CHAIN LINK FENCE
- WROUGHT IRON FENCE
- METAL FENCE
- UTILITY POLE
- OVERHEAD WIRE
- DRAINAGE MANHOLE
- CON ED MANHOLE
- CATCH BASIN
- LIGHT POLE
- HYDRANT
- SEWER MANHOLE

NOTE

HALF-TONED ITEMS HAVE BEEN REMOVED OR DESTROYED.

2.86 Groundwater Elevation (ft. amsl)

Potentiometric Contour

Approximate Groundwater Flow Direction

25 0 25 50

SCALE: 1" = 50'

SOURCE: 2001/2002, APRIL 2011, AUGUST 2011, JUNE 2012 SURVEY PERFORMED BY YEC, INC., VALLEY COTTAGE, NY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORMER MAJESTIC GARMENT CLEANERS SITE (# 2-24-035)
BOUROUGH OF BROOKLYN, KINGS COUNTY, NEW YORK

65% Remedial Design - Interim Remedial Measure

POTENTIOMETRIC CONTOUR MAP (JUNE 26, 2012)

ARCADIS MALCOLM PIRNIE
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Figure **4**

ARCADIS

Tables

TABLE 1
SUMMARY OF GROUNDWATER ELEVATIONS
FORMER MAJESTIC GARMENT CLEANERS (#2-24-035)
740 PINE STREET
BROOKLYN, NEW YORK

Well	Measuring Point Elevation	Ground Elevation (feet)	3/24/2011		8/11/2011		5/31/2012		6/26/2012	
			DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)
PZ-1	13.09	13.30	9.55	3.54	10.16	2.93		13.09	10.05	3.04
PZ-3	13.98	14.17	10.45	3.53	11.08	2.90		13.98	10.94	3.04
PZ-4R	14.52	14.80	11.07	3.45	11.60	2.92		14.52	Damaged	-
PZ-5	12.65	13.21	9.14	3.51	9.80	2.85		12.65	9.65	3.00
PZ-6	13.84	14.05	10.35	3.49	11.03	2.81		13.84	10.90	2.94
PZ-7	12.85	13.70	-	-	9.99	2.86		12.85	9.82	3.03
PZ-8	12.87	13.47	-	-	10.06	2.81		12.87	9.93	2.94
PZ-9	12.61	12.96	-	-	9.71	2.90		12.61	9.57	3.04
PZ-10	14.18	14.48	-	-	11.26	2.92		14.18	Obstructed	-
PZ-11	12.82	13.23	-	-	-	-	10.41	2.41	9.79	3.03
PZ-12	12.36	12.81	-	-	-	-	9.65	2.71	9.30	3.06
PZ-13	12.92	13.28	-	-	-	-	10.22	2.70	9.89	3.03
PZ-14	12.41	12.82	-	-	-	-	9.71	2.70	9.36	3.05
PZ-15	12.82	13.19	-	-	-	-	10.12	2.70	9.79	3.03
PZ-16	13.24	13.49	-	-	-	-	10.69	2.55	10.30	2.94
SVE-1	12.95	13.34	-	-	-	-	-	-	NA	NA
AS-1	12.98	13.35	-	-	-	-	-	-	9.97	3.01
AS/SVE-2	13.19	13.43	-	-	-	-	-	-	10.18	3.01
AS/SVE-3	13.17	13.41	-	-	-	-	-	-	10.15	3.02
AS/SVE-4	13.26	13.46	-	-	-	-	-	-	10.26	3.00
AS/SVE-5	13.21	13.43	-	-	-	-	-	-	10.19	3.02
AS/SVE-6	13.33	13.55	-	-	-	-	-	-	10.30	3.03
AS/SVE-7	13.55	13.79	-	-	-	-	-	-	10.62	2.93

Elevations based on NAVD 88 datum.

Table 2
Summary of Soil Sampling Results (VOCs/SVOCs)
Former Majestic Garment Cleaners
Brooklyn, New York

Boring ID	6 NYCRR Part 375	6 NYCRR Part 375	6 NYCRR Part 375 Restricted-Residential	6 NYCRR Part 375	SB-01	SB-02	SB-03	SB-04	SB-05	SB-06	SB-07	SB-08	SB-09	SB-10
Sample Depth (feet)	Unrestricted Use Soil Cleanup Objective	Residential Soil Cleanup Objective	Soil Cleanup Objective	Commercial Soil Cleanup Objective	12-13	11-12	11-12	11-12	9-10	10-11	10-11	10-11	9-10	10-11
Sampling Date					3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/24/2011	3/24/2011	3/24/2011	3/24/2011
Matrix					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
VOCs														
2-Butanone (MEK)	120	100,000	100,000	500,000	1,500 U	150 U	18 J	3.8 U	4 U	3.9 U	4.3 U	3.1 U	20 J	16 J
4-Methyl-2-pentanone					2,500 U	250 U	3.5 U	3.6 U	3.7 U	3.6 U	4 U	2.9 U	3.7 U	3.6 U
Acetone	50	100,000	100,000	500,000	3,200 U	320 U	58	14 J	3.8 U	3.7 U	31 J	53 J	68	39 J
Benzene	60	2,900	4,800	44,000	370 U	37 U	0.45 U	1.3 J	0.48 U	150 J	0.52 U	0.38 U	0.48 U	0.46 U
Chloromethane					630 U	560 J	1 U	1.1 U	1.1 U	1.1 U	1.2 U	0.87 U	1.1 U	1.1 U
cis-1,2-Dichloroethene	250	59,000	100,000	500,000	410 U	170 J	1.1 U	760 J	8.2 J	1,400 J	1.2 U	22 J	1.1 U	2.2 J
Cyclohexane					640 U	64 U	1.2 U	1.2 U	1.3 U	1 U	1 U	5.1 J	1.3 U	1.2 U
Ethylbenzene	1,000	30,000	41,000	500,000	620 U	1,000	28	390 J	0.79 U	0.77 U	0.85 U	580 JD	0.79 U	0.76 U
Isopropylbenzene					9,500	4,900	110	1,500 J	0.61 U	1 U	1 U	7,800 D	34	620 D
m,p-Xylene	260 (total xylene)	100,000 (total)	100,000 (total)	500,000 (total)	1,100 U	350 J	0.86 U	19	1 U	1 U	1 U	1 UJ	1 U	1 U
Methylcyclohexane					790 U	2,800	13	700 J	1 U	1 U	2 U	2,400 D	3 J	240 JD
Methylene Chloride	50	51,000	100,000	500,000	2,400 J	48 U	1.7 U	1.7 U	1.8 U	1.8 U	2 U	1.4 U	1.8 U	1.7 U
o-Xylene	260 (total xylene)	100,000 (total)	100,000 (total)	500,000 (total)	500 U	560 J	0.81 U	690 J	0.86 U	0.84 U	0.94 U	0.69 UJ	0.86 U	0.83 U
Tetrachloroethene	1,300	5,500	19,000	150,000	320 U	32 U	1.2 U	8,100 DJ	4,400 DJ	6,800 DJ	120	930 D	1.3 U	63 J
Toluene					430 U	43 U	0.76 U	0.78 U	0.81 U	0.79 U	0.88 U	0.65 U	0.81 U	1.7 J
trans-1,2-Dichloroethene	190	100,000	100,000	500,000	480 U	48 U	0.82 U	0.84 U	0.88 U	1.3 J	0.95 U	0.7 U	0.88 U	0.84 U
Trichloroethene	470	10,000	21,000	200,000	330 U	33 U	1 U	520 J	6.1 J	590 J	1.2 U	12 J	1.1 U	1.7 J
SVOCs														
2,4-Dimethylphenol					22 U	500	390 U	400 U	24 U	24 U	26 U	1,400 J	24 U	260 U
2-Methylnaphthalene					1,000	430	10 U	540	11 U	10 U	11 U	210 U	11 U	10 U
Acenaphthene	20,000	100,000	100,000	500,000	11 U	11 U	11 U	310 J	12 U	58 J	13 U	230 U	12 U	11 U
Acenaphthylene	100,000	100,000	100,000	500,000	10 U	10 U	10 U	100 J	11 U	10 U	11 U	210 U	11 U	10 U
Benzo(a)anthracene	1,000	1,000	1,000	5,600	19 U	140 J	19 U	480	20 U	470	71 J	3,100 J	20 U	57 J
Benzo(a)pyrene	1,000	1,000	1,000	1,000	9 U	170 J	9 U	420	9 U	440	77 J	2,600 J	9 U	9 U
Benzo(b)fluoranthene	1,000	1,000	1,000	5,600	13 U	230 J	13 U	520	14 U	590	15 U	3,100 J	14 U	65 J
Benzo(g,h,i)perylene	100,000	100,000	100,000	500,000	16 U	130 J	16 U	270 J	17 U	330 J	58 J	1,600 J	17 U	16 U
Benzo(k)fluoranthene	800	1,000	3,900	56,000	18 U	68 J	19 U	140 J	20 U	190 J	21 U	1,200 J	20 U	19 U
bis(2-Ethylhexyl)phthalate					1,000	670	440	8,800 D	15 U	3,700 D	16 U	1,800 J	74 J	460
Butylbenzylphthalate					19 U	93 J	19 U	140 J	20 U	20 U	22 U	400 U	20 U	19 U
Carbazole					9 U	9 U	9 U	9 U	9 U	92 J	10 U	180 U	9 U	9 U
Chrysene	1,000	1,000	3,900	56,000	18 U	160 J	18 U	530	19 U	460	74 J	3,100 J	19 U	63 J
Dibenzo(a,h)anthracene	330	330	330	560	11 U	11 U	11 U	69 J	12 U	77 J	13 U	240 U	12 U	12 U
Dibenzofuran					15 U	15 U	15 U	140 J	17 U	57 J	18 U	320 U	16 U	16 U
Dimethylphthalate					220 U	370 U	300 U	400 U	390 U	300 U	250 U	220 U	330 U	450 U
Di-n-octylphthalate					47 J	5 U	5 U	350 J	5 U	2,400	5 U	95 U	5 U	5 U
Fluoranthene	100,000	100,000	100,000	500,000	42 J	270 J	54 J	1,300	9 U	1,100	170 J	8,400	9 U	140 J
Fluorene	30,000	100,000	100,000	500,000	71 J	15 U	15 U	370 J	16 U	69 J	17 U	310 U	16 U	15 U
Indeno(1,2,3-cd)pyrene	500	500	500	5,600	13 U	110 J	13 U	240 J	14 U	230 J	15 U	1,300 J	14 U	13 U
Naphthalene	12,000	100,000	100,000	500,000	1,500	990	95 J	1,200	15 U	78 J	16 U	1,400 J	15 U	14 U
Phenanthrene	100,000	100,000	100,000	500,000	140 J	100 J	53 J	1,600	12 U	980	120 J	6,800 J	11 U	81 J
Pyrene	100,000	100,000	100,000	500,000	54 J	250 J	49 J	1,400	10 U	1,000	140 J	6,300 J	10 U	190 J

Notes

Higlighted cells correspond to highest Soil Cleanup Objective exceeded.

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

J - The concentration given is an approximate value.

N - The analysis indicates the presence of an analyte that has been "tentatively identified".

D - Concentration obtained from a dilution.

B - The compound was detected in the associated trip blank.

Table 3
Summary of Groundwater Sampling Results (VOCs/SVOCs)
Former Majestic Garment Cleaners
Brooklyn, New York

Well / Boring ID	NYSDEC Class GA	PZ-1			PZ-3			PZ-4R	PZ-5	PZ-6	PZ-7	PZ-8	PZ-9	
Depth (ft. bgs)		9-24	PZ-X	9-24	9-24	9-24	PZ-X	15-25	15-25	15-25	15-25	15-25	15-25	DUP-081111
Sampling Date	Standard or	10/19/2010	10/19/2010	3/22/2011	10/19/2010	3/23/2011	3/23/2011	3/24/2011	3/24/2011	3/24/2011	8/11/2011	8/11/2011	8/11/2011	8/11/2011
Matrix	Guidance Value	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs														
1,1-Dichloroethene	5	1 U	1 U	0.47 U	1 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	1.6	1 U	3.2 J	3.1 J
1,2,4-Trichlorobenzene	5	1 U	1 U	1.9	1 U	3.1 J	1.2 J	0.2 U	0.2 U	1.2	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	3	1 U	1 U	0.45 U	1 U	0.45 U	0.45 U	1.1	0.45 U	0.45 U	1 U	1 U	1 U	1 U
2-Butanone (Methyl ethyl ketone)	50	5 U	5 U	1.3 U	5 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	5 U	5 U	5 U	5 U
Acetone	50*	5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Benzene	1	1 U	1 U	0.32 U	1 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	1 U	1 U	1 U	1 U
Bromodichloromethane	50*	1 U	1 U	0.36 U	1 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	1 U	1 U	1 U	1 U
Carbon Disulfide		1 U	1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	1 U	1 U
Chloroform	7	1 U	1 U	0.34 U	1 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	1 U	1 U	1 U	1 U
Chloromethane		0.66 J	1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	5	15	16	65	1 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	82	1 U	410 DJ	370 DJ
Ethyl Benzene	5	1 U	1 U	0.2 U	1 U	0.2 U	0.2 U	0.57 J	0.2 U	0.2 U	1 U	1 U	1 U	1 U
Isopropylbenzene	5	1 U	1 U	0.45 U	1 U	0.45 U	0.45 U	25	0.45 U	0.45 U	1 U	1 U	1 U	1 U
Methyl tert-butyl Ether	10	1 U	1 U	0.35 U	1 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	2.4	2.8	1 U	1 U
Methylcyclohexane		1 U	1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	1 U	1 U
o-Xylene	5	1 U	1 U	0.43 U	1 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	1 U	1 U	1 U	1 U
Tetrachloroethene	5	10	9.8	26	1 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	1 U	1 U	160 DJ	260 DJ
Toluene	5	1 U	1 U	0.37 U	1 U	0.37 U	0.37 U	0.72 J	0.7 J	0.37 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	5	0.65 J	0.65 J	1.2	1 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	1 U	1 U	7.7 J	7.7 J
Trichloroethene	5	5.5	5.4	22	1 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	1 U	1 U	65 DJ	72 DJ
Vinyl Chloride	2	1.6	1.6	7.2	1 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	27	1 U	76 J	80 J
SVOCs														
2,4-Dimethylphenol	50*	11 U	11 U	0.85 U	11 U	0.72 U	0.73 U	0.72 U	0.73 U	0.73 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene		11 U	11 U	0.38 U	11 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	10 U	10 U	10 U	10 U
3,3-Dichlorobenzidine	5	11 U	11 U	2.4 U	11 U	2 U	2.1 U	2 U	2.1 U	2.1 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	5	11 U	11 U	0.19 U	11 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	50*	11 U	11 U	0.23 U	11 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	10 U	10 U	10 U	10 U
Dimethylphthalate	50*	11 U	11 U	0.26 U	11 U	0.22 U	0.23 U	0.22 U	0.23 U	0.23 U	10 U	10 U	10 U	10 U
Naphthalene	10*	11 U	11 U	0.14 U	11 U	0.12 U	0.12 U	4.2 J	0.12 U	0.12 U	10 U	10 U	10 U	10 U

Notes:
** - Sum of these analytes cannot exceed 0.4 ug/l
U - Compound was not detected, Reporting Limit is provided.
J- Concentration is an approximate value.
UJ - Compound was not detected, Reporting Limit is estimated.
ND - Not detected.
NS - Not sampled.
Highlighted cells exceed NYSDEC Class GA standard or guidance value.

Table 3
Summary of Groundwater Sampling Results (VOCs/SVOCs)
Former Majestic Garment Cleaners
Brooklyn, New York

Well / Boring ID	NYSDEC Class GA	PZ-10	PZ-11		PZ-12	PZ-13	PZ-14	PZ-15	PZ-16	SB-01	
Depth (ft. bgs)		15-25	40-50	DUP-053112	40-50	40-50	15-25	40-50	40-50	13	25
Sampling Date		8/11/2011	5/31/2012	5/31/2012	5/31/2012	5/31/2012	5/31/2012	6/1/2012	6/1/2012	3/22/2011	3/22/2011
Matrix		WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	Standard or Guidance Value ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs											
1,1-Dichloroethene	5	0.53 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.47 U	0.47 U
1,2,4-Trichlorobenzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U	1.3
1,2-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.1	0.96 J
2-Butanone (Methyl ethyl ketone)	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.3 U	1.3 U
Acetone	50*	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U
Benzene	1	0.55 NJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.73 J	0.32 U
Bromodichloromethane	50*	1 U	1 U	1 U	1 U	0.83 J	1 U	0.85 J	1 U	0.36 U	0.36 U
Carbon Disulfide		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.1	0.2 U
Chloroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U	0.2 U
Chloroform	7	1 U	1 U	1 U	1 U	1.5	1 U	1.6	1 U	0.34 U	0.34 U
Chloromethane		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	5	240 D	0.78 J	0.9 J	1 U	50	1 U	12	1 U	0.35 U	0.35 U
Ethyl Benzene	5	1.2 NJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.1	0.2 U
Isopropylbenzene	5	18	1 U	1 U	1 U	1 U	1 U	1 U	1 U	87	1
Methyl tert-butyl Ether	10	1 U	1.1	1.2	1 U	1 U	0.83 J	1 U	8	0.35 U	0.35 U
Methylcyclohexane		1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	3.6	0.2 U
o-Xylene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.43 U	0.43 U
Tetrachloroethene	5	1 U	1.5	1 U	1.8	79	3.6	98	0.91 J	0.27 U	0.27 U
Toluene	5	1 U	1 U	1.4	1 U	1 U	1 U	1 U	1 U	0.37 U	0.37 U
trans-1,2-Dichloroethene	5	7.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.41 U	0.41 U
Trichloroethene	5	1 U	1 U	1 U	1 U	7.1	1 U	3.5	1 U	0.28 U	0.28 U
Vinyl Chloride	2	150	2.6	2.6	1 U	1 U	1 U	1.7	1 U	0.34 U	0.34 U
SVOCs											
2,4-Dimethylphenol	50*	10 U	10 U	10 U	11 U	11 U	10 U	11 U	11 U	0.77 U	0.86 U
2-Methylnaphthalene		10 U	10 U	10 U	11 U	11 U	10 U	11 U	11 U	9.8 J	0.39 U
3,3-Dichlorobenzidine	5	10 U	10 U	10 U	11 U	11 U	10 U	11 U	11 U	2.2 U	2.4 U
bis(2-Ethylhexyl)phthalate	5	4.1 J	10 U	10 U	11 U	11 U	10 U	11 U	11 U	0.17 U	0.19 U
Butylbenzylphthalate	50*	10 U	10 U	10 U	11 U	11 U	10 U	11 U	11 U	0.21 U	0.23 U
Dimethylphthalate	50*	10 U	10 UJ	10 UJ	11 UJ	11 UJ	10 UJ	11 UJ	11 UJ	2.9 J	0.27 U
Naphthalene	10*	10 U	10 U	10 U	11 U	11 U	10 U	11 U	11 U	0.13 U	0.14 U

Notes:
** - Sum of these analytes cannot exceed 0.4 ug/l
U - Compound was not detected, Reporting Limit is provided.
J- Concentration is an approximate value.
UJ - Compound was not detected, Reporting Limit is estimated.
ND - Not detected.
NS - Not sampled.
Highlighted cells exceed NYSDEC Class GA standard or guidance value.

Table 3
Summary of Groundwater Sampling Results (VOCs/SVOCs)
Former Majestic Garment Cleaners
Brooklyn, New York

Well / Boring ID	NYSDEC Class GA	SB-02			SB-03		SB-04		SB-05		SB-06		SB-07	
Depth (ft. bgs)		13	25	25 (Dup-1)	13	25	13	25	13	25	13	25	13	25
Sampling Date	Standard or	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/24/2011	3/24/2011
Matrix	Guidance Value	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs														
1,1-Dichloroethene	5	9.4 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	4.7 U	0.47 U	0.47 U	0.54 J	0.47 U	0.47 U
1,2,4-Trichlorobenzene	5	4 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	3	9 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	4.5 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
2-Butanone (Methyl ethyl ketone)	50	26 U	1.3 U	1.3 U	1.3 U	1.3 U	2 J	1.3 U	13 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Acetone	50*	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U	0.5 U	15	13
Benzene	1	13 J	0.32 U	0.32 U	0.32 U	1.1	4.1	0.32 U	3.2 U	0.32 U	1.4	1.1	0.32 U	0.32 U
Bromodichloromethane	50*	7.2 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	3.6 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
Carbon Disulfide		4 U	1.7	1.7	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroethane	5	4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.96 J	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroform	7	6.8 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	3.4 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
Chloromethane		4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	5	5,700 DJ	4.3	5.8	1.4	20	8.5	73	110 D	75	16	47	24	11
Ethyl Benzene	5	210	0.88 J	1.1	7.6	0.2 U	0.54 J	0.2 U	2 U	0.2 U	1.1	0.2 U	0.2 U	0.2 U
Isopropylbenzene	5	130	5.4	6.6	130	4.7	31	0.97 J	4.5 U	0.45 U	96	0.54 J	0.45 U	0.45 U
Methyl tert-butyl Ether	10	7 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	3.5 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
Methylcyclohexane		10 J	0.2 U	0.2 U	5.8	0.2 UJ	1.8	0.2 U	2 U	0.2 U	6.2 J	0.2 U	0.2 U	0.2 U
o-Xylene	5	17 J	0.43 U	0.72 J	0.43 U	0.43 U	0.43 U	0.43 U	4.3 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U
Tetrachloroethene	5	5.4 U	2	2.5	0.27 U	0.27 U	4.2	36	670 D	1,300 D	3.5	7.7	69	33
Toluene	5	7.4 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	3.7 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U
trans-1,2-Dichloroethene	5	91	0.66 J	0.74 J	0.41 U	0.41 U	0.41 U	1.8	4.1 U	2.8	0.68 J	0.41 U	0.7 J	0.41 U
Trichloroethene	5	5.6 U	0.28 U	0.28 U	0.51 J	0.28 U	4.1	39	28 D	49	0.28 U	2.3	6.2	3.3
Vinyl Chloride	2	2,500	0.34 U	1.3	0.34 U	5.8	0.34 U	3.1	3.4 U	0.34 U	8.4	30	1.4	0.34 U
SVOCs														
2,4-Dimethylphenol	50*	0.84 U	0.86 U	0.85 U	0.76 U	0.83 U	NS	0.8 U	0.79 U	0.84 U	0.86 U	0.82 U	0.73 U	0.74 U
2-Methylnaphthalene		4.1 J	0.39 U	0.38 U	0.34 U	0.37 U	NS	0.36 U	0.36 U	0.38 U	0.39 U	0.37 U	0.33 U	0.33 U
3,3-Dichlorobenzidine	5	2.4 UJ	2.4 U	2.4 U	2.1 U	2.3 U	NS	2.2 U	2.2 U	2.4 U	2.4 U	2.3 U	2.1 U	2.1 J
bis(2-Ethylhexyl)phthalate	5	5.7 J	0.19 U	0.19 U	2.1 J	0.19 U	NS	0.18 U	0.18 U	0.19 U	0.19 U	0.18 U	0.16 U	0.17 U
Butylbenzylphthalate	50*	2.6 J	0.23 U	0.23 U	0.2 U	0.22 U	NS	0.21 U	0.21 U	0.22 U	0.23 U	0.22 U	0.2 U	0.2 U
Dimethylphthalate	50*	6.3 J	2.2 J	0.26 U	2.3 J	0.26 U	NS	2 J	0.24 U	0.26 U	0.27 U	0.25 U	0.23 U	0.23 U
Naphthalene	10*	19 J	3.2 J	2.5 J	0.13 U	0.14 U	NS	0.13 U	0.13 U	0.14 U	0.14 U	0.14 U	0.12 U	0.12 U

Notes:
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Highlighted cells exceed NYSDEC Class GA standard or guidance value.

Table 3
Summary of Groundwater Sampling Results (VOCs/SVOCs)
Former Majestic Garment Cleaners
Brooklyn, New York

Well / Boring ID	NYSDEC Class GA	SB-08		SB-09		SB-10	
Depth (ft. bgs)		13	25	13	25	13	25
Sampling Date		3/24/2011	3/24/2011	3/24/2011	3/24/2011	3/24/2011	3/24/2011
Matrix		WATER	WATER	WATER	WATER	WATER	WATER
Units	Standard or Guidance Value ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs							
1,1-Dichloroethene	5	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
1,2,4-Trichlorobenzene	5	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	3	0.62 J	0.45 U	0.45 U	0.45 U	0.73 J	0.45 U
2-Butanone (Methyl ethyl ketone)	50	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Acetone	50*	8.7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	1	1.8	0.32 U	0.32 U	0.32 U	3.3	0.32 U
Bromodichloromethane	50*	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
Carbon Disulfide		0.96 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroethane	5	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroform	7	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
Chloromethane		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	5	5.3	9	8.1	0.58 J	1	4.2
Ethyl Benzene	5	1	0.2 U	0.2 U	0.2 U	1.3	0.2 U
Isopropylbenzene	5	13	0.45 U	6.6	0.45 U	170 D	0.45 U
Methyl tert-butyl Ether	10	0.35 U	0.35 U	0.35 U	0.92 J	0.35 U	0.52 J
Methylcyclohexane		5.1	0.2 U	0.2 U	0.2 U	8.7	0.2 U
o-Xylene	5	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U
Tetrachloroethene	5	11	32	25	0.27 U	0.27 UJ	0.27 UJ
Toluene	5	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U
trans-1,2-Dichloroethene	5	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
Trichloroethene	5	0.28 U	4.1	6.4	0.28 U	0.28 U	0.28 U
Vinyl Chloride	2	1.6	2.1	2	0.34 U	0.34 U	1.7
SVOCs							
2,4-Dimethylphenol	50*	0.72 U	0.73 U	0.72 U	0.74 U	2 J	0.72 U
2-Methylnaphthalene		0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
3,3-Dichlorobenzidine	5	2 U	2.1 U	2 U	2.1 U	2.1 U	2 U
bis(2-Ethylhexyl)phthalate	5	0.16 U	0.16 U	0.16 U	0.17 U	1.8 J	0.16 U
Butylbenzylphthalate	50*	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.19 U
Dimethylphthalate	50*	0.22 U	0.23 U	0.22 U	0.23 U	0.23 U	0.22 U
Naphthalene	10*	1.6 J	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U

Notes:
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TABLE 4
SUMMARY OF AIR SAMPLING RESULTS
FORMER MAJESTIC CLEANERS
BROOKLYN, NEW YORK

Sample ID	AA-1	SV-1	SV-2	SV-X	SV-3	SV-4	SV-5	SV-6	SV-7	SV-8	SV-9	SV-10	SV-11	AA-2	SV-12	SV-13	SV-A
Sample Type	Ambient Air	Soil Vapor	Soil Vapor	SV-2 Dup	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Ambient Air	Soil Vapor	Soil Vapor	SV-13 Dup
Date	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	3/22/2011	8/10/2011	8/10/2011	8/10/2011	8/10/2011
Units	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3
VOCs																	
1,1,1-Trichloroethane	0.19 UJ	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	5.5 U	11 U	5.5 U	5.5 U	5.5 U	0.19 U	5.5 U	5.5 U	5.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.54 UJ	0.77 U	0.77 U	0.77 U	**0.78**	0.77 U	0.77 U	0.77 U	7.7 U	15 U	7.7 U	7.7 U	7.7 U	0.49	7.7 U	7.7 U	7.7 U
1,1,2-Trichloroethane	0.19 UJ	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	5.5 U	11 U	5.5 U	5.5 U	5.5 U	0.19 U	5.5 U	5.5 U	5.5 U
1,1-Dichloroethane	0.014 UJ	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	4 U	8.1 U	4 U	4 U	4 U	0.14 U	4 U	4 U	4 U
1,1-Dichloroethene	0.14 UJ	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	**2,000**	**8.2**	**110**	4 **U**	**23**	0.14 U	4 U	4 U	4 U
1,2,4-Trimethylbenzene	**0.27** J	0.49 U	3.8 J	0.49 UJ	**5**	0.49 U	**1.2**	**4.7**	**240** NJ	**20**	**8.5 NJ**	9.6 U	**12**	**0.73**	**11**	**14**	**15**
1,3,5-Trimethylbenzene	0.17 UJ	0.49 U	**0.98** J	0.49 UJ	**1.2**	0.49 U	0.49 U	**1.2**	190 U	9.8 U	4.9 U	**11**	4.9 U	0.21	4.9 U	4.9 U	4.9 U
1,4-Dioxane																	
2-Butanone (Methyl Ethyl Ketone)	**2.2** J	**1.5**	**4.1** J	**0.51** J	**3.4**	**1.5**	**4.5**	**5.5**	**19**	**21**	**3.5**	**3.7**	2.9 U	4.1 U	120 U	120 U	120 U
2-Hexanone (MBK)	**0.29** J	0.41 U	0.41 UJ	0.41 UJ	0.41 UJ	0.41 UJ	0.41 UJ	0.77 UJ	4.1 U	8.2 UJ	4.1 U	4.1 U	4.1 U	0.32	4.1 U	4.1 U	4.1 U
4-Ethyltoluene	0.17 UJ	0.49 U	**0.8** J	0.49 UJ	2.1 U	0.49 U	0.49 U	**1.1**	88 U	9.8 U	4.9 U	**6.3**	4.9 U	0.21	4.9 U	4.9 U	4.9 U
Acetone	**14** J	**8.4**	49 U	30 U	2.4 U	**16**	51 U	**80** J	110 U	**210**	68 U	**31**	24 U	25	95 U	95 U	95 U
Benzene	**0.85** J	0.32 U	**2.6** J	0.32 UJ	**5.8**	0.32 U	**0.73**	**3.7**	**980**	**75**	**560**	**21**	**260**	**0.9**	3.2 U	3.2 U	3.2 U
Carbon Disulfide	0.11 UJ	0.31 U	**1.8**	**1.5**	**1.7**	**0.62**	**0.54**	**0.8**	**82**	**7**	**17**	**7.5**	3.1 U	1.1 U	31 U	31 U	31 U
Carbon Tetrachloride	**0.39** J	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	6.3 U	13 U	6.3 U	6.3 U	6.3 U	0.41	6.3 U	6.3 U	6.3 U
Chloroethane	0.093 UJ	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	**450**	5.3 U	6.2	2.6 U	2.6 U	0.093 U	2.6 U	2.6 U	2.6 U
Chloroform	0.17 UJ	**2.1**	0.49 U	0.49 U	**1.8**	**1.5**	**0.76**	**0.88**	4.9 U	**70**	**55**	4.9 U	**7**	0.17 U	4.9 U	4.9 U	4.9 U
Chloromethane	**0.96** J	0.21 U	0.27 U	0.22 U	0.21 U	**0.48**	**0.39**	0.77 U	2.1 U	4.1 U	2.1 U	2.1 U	2.1 U	**0.92**	2.1 U	2.1 U	2.1 U
cis-1,2-Dichloroethene	0.14 UJ	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	**1.1**	**440,000**	**5,900**	**85,000**	**42**	**10,000**	0.14 U	4 U	4 U	4 U
Cyclohexane	0.12 UJ	0.34 U	**8.6** J	**1.4** J	**29**	0.34 U	**1.8**	**4.2**	**330**	6.9 U	**9.7**	3.4 U	**10** NJ	0.12 U	3.4 U	3.4 U	3.4 U
Dichlorodifluoromethane (Freon 12)	**2.3** J	**2.1**	**2.9**	**2.8**	**2.7**	2.2	**1.8**	**2**	4.9 U	9.9 U	4.9 U	4.9 U	4.9 U	1.6	4.9 U	4.9 U	4.9 U
Ethanol	**6.3** J	**4.3**	**4.1**	**3.8**	**8.4**	8.3	**16**	**5.7**	19 UJ	**55**	19 UJ	19 UJ	19 UJ	10	75 U	75 U	75 U
Ethyl Acetate	0.13 UJ	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	3.6 U	7.2 U	3.6 U	3.6 U	3.6 U	0.13 U	3.6 U	3.6 U	3.6 U
Ethylbenzene	0.15 UJ	0.43 U	**1.1**	0.43 U	**2.7** U	0.43 U	**1.4**	**1.9**	**82** NJ	**19**	**4.8 NJ**	5.4 U	**19**	**0.59**	4.3 U	**5.5**	**5.7**
Heptane	**0.19** J	0.41 U	**8.8**	0.41 U	**1.4** NJ	0.41 U	**2.5**	**6.1**	**150**	**140**	**16**	**45**	**43**	**0.48**	4.1 U	4.1 U	4.1 U
Hexane	**0.64** J	0.35 U	**54** J	**1.7** J	**16**	**0.42**	5.3 U	**36**	330 U	**59**	19 U	**6.6 NJ**	3.9 U	4.9 U	140 U	140 U	140 U
Isopropanol	**1.3** J	**0.66**	0.25 U	0.25 U	**2.4**	**2.5**	**6.7**	0.25 U	**3.2**	5.8 U	2.5 U	2.5 U	2.5 U	3.4 U	98 U	98 U	98 U
m,p-Xylene	**0.43** J	0.87 U	**4** J	0.87 UJ	**5.8**	0.87 U	**3.2**	**6.7**	**310** NJ	**58**	**14**	8.7 U	**110**	**1.9**	**15**	**25**	**26**
Methylene Chloride	**1.8** J	1.3 U	2.6 U	**2.5**	**3.4**	**2.6**	**8.9**	**17**	**12**	14 U	**9.2**	6.9 U	**11**	**2.5**	35 U	35 U	35 U
Naphthalene																	
o-Xylene	**0.17** J	0.43 U	**1.6** J	0.43 UJ	**4.6** NJ	0.43 U	**1**	**2.6**	**360**	**24**	**5.5** NJ	4.3 U	**39**	**0.71**	**4.7**	**6.9**	**7.4**
Styrene	0.15 UJ	0.43 UJ	0.43 UJ	0.43 UJ	**0.64** NJ	0.43 UJ	0.43 UJ	0.43 UJ	4.3 U	**19** J	4.3 U	4.3 U	**24**	**0.17**	4.3 U	4.3 U	4.3 U
Tetrachloroethene	**0.53** J	**1,600**	**8.5** J	0.68 UJ	**15**	**14**	**32**	**260**	**79,000**	**180,000**	**640,000**	**8,300**	**16,000**	**1**	**400**	**50**	**50**
Toluene	**1.7** J	**0.54**	4.7 J	0.38 UJ	**9.2**	**0.41**	**36**	**11**	**180**	**860**	**72**	**25**	**480**	**3.5**	**12**	**14**	**14**
trans-1,2-Dichloroethene	0.14 UJ	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	**4,800**	**470**	**1,600**	4 U	**9.1**	0.14 U	4 U	4 U	4 U
Trichloroethene	0.19 UJ	**2.9**	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	**8**	**24,000**	**4,100**	**25,000**	**110**	**2,400**	0 U	5 U	5 U	5 U
Trichlorofluoromethane (Freon 11)	**1.2** J	**0.91**	**1.8**	**1.4**	**1.7**	**0.93**	**0.63**	**2.1**	5.6 U	11 U	5.6 U	5.6 U	5.6 U	1.3	**5.6**	5.6 U	5.6 U
Vinyl Chloride	0.09 UJ	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	**0.57**	**330,000**	5.1 U	**810**	2.6 U	**9.4**	0.09 U	2.6 U	2.6 U	2.6 U

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

J - Estimated value.

NJ - Tentative in identification and estimated in value.

R - Value rejected.

TABLE 4
SUMMARY OF AIR SAMPLING RESULTS
FORMER MAJESTIC CLEANERS
BROOKLYN, NEW YORK

Sample ID	**SV-14**	**SV-15**	**SV-16**	**SV-17**	**SV-18**	**SV-19**	**SV-20**	**SVE-1035**	**SVE-1230**	**AS/SVE-1400**	**AS/SVE-1540**
Sample Type	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Pilot Test Effluent	Pilot Test Effluent	Pilot Test Effluent	Pilot Test Effluent
Date	8/10/2011	8/10/2011	8/10/2011	8/10/2011	8/10/2011	8/10/2011	8/10/2011	6/26/2012	6/26/2012	6/26/2012	6/26/2012
Units	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3
VOCs											
1,1,1-Trichloroethane	5.5 U	5.5 U	5.5 U	5.5 U	230	5.5 U	**290**	55 U	55 U	55 U	55 U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	7.7 U	7.7 U	7.7 U	7.7 U	77 U	7.7 U	7.7 U	77 U	77 U	77 U	77 U
1,1,2-Trichloroethane	5.5 U	5.5 U	5.5 U	5.5 U	55 U	5.5 U	5.5 U	**200**	55 U	200	55 U
1,1-Dichloroethane	4 U	4 U	4 U	4 U	**40**	4 U	4 U	40 U	40 U	40 U	40 U
1,1-Dichloroethene	4 U	4 U	4 U	4 U	40 U	4 U	4 U	**780**	**88**	**130**	**150**
1,2,4-Trimethylbenzene	**19**	**19**	**16**	4.9 U	**370**	**18**	**28**	**110**	**83**	**170**	**170**
1,3,5-Trimethylbenzene	5.6 NJ	6.1	<4.9	4.9 U	120 NJ	4.9 U	8.6 NJ	**53**	49 U	**67**	**61**
1,4-Dioxane								36 U	**63**	36 U	36 U
2-Butanone (Methyl Ethyl Ketone)	120 U	120 U	120 U	120 U	1200 U	120 U	120 U	1,200 U	1,200 U	1,200 U	1,200 U
2-Hexanone (MBK)	4.1 U	4.1 U	4.1 U	4.1 U	41 U	4.1 U	4.1 U	41 U	41 U	41 U	41 U
4-Ethyltoluene	8.8	4.9 U	5.1	4.9 U	110 NJ	10 U	8.6	49 U	49 U	49 U	49 U
Acetone	95 U	95 U	150	95 U	950 U	1800	160	**2,500**	**2,300**	**2,600**	**2,700**
Benzene	**340**	**17**	**140**	3.2 U	**77**	**50**	**5.6**	**420**	**120**	**200**	**300**
Carbon Disulfide	31 U	31 U	31 U	31 U	310 U	31 U	31 U	310 U	310 U	310 U	**330**
Carbon Tetrachloride	6.3 U	6.3 U	6.3 U	6.3 U	63 U	6.3 U	6.3 U	63 U	63 U	63 U	63 U
Chloroethane	2.6 U	2.6 U	2.6 U	2.6 U	26 U	2.6 U	2.6 U	26 U	26 U	26 U	26 U
Chloroform	4.9 U	**110**	4.9 U	**21**	**59**	**31**	4.9 U	49 U	49 U	49 U	49 U
Chloromethane	2.1 U	2.1 U	2.9	2.1 U	21 U	2.1 U	2.1 U	21 U	21 U	21 U	21 U
cis-1,2-Dichloroethene	4 U	**1,300**	4 U	**1,000**	**730**	**130**	4 U	**350,000**	**77,000**	**100,000**	**130,000**
Cyclohexane	**1,300**	3.4 U	**37**	3.4 U	**2,800**	3.4 U	3.4 U	**300**	**100**	**460**	**1,000**
Dichlorodifluoromethane (Freon 12)	**28**	4.9 U	4.9 U	4.9 U	49 U	**170**	**13**	49 U	49 U	49 U	49 U
Ethanol	75 U	75 U	75 U	75 U	750 U	75 U	75 U	750 U	750 U	750 U	750 U
Ethyl Acetate	3.6 U	3.6 U	3.6 U	3.6 U	36 U	3.6 U	3.6 U	36 U	**2,000**	**2,200**	**2,400**
Ethylbenzene	**54**	4.3 U	**12**	4.3 U	580 U	**23**	**19**	**64**	**49**	**230**	**290**
Heptane	**1,200**	4.1 U	**50**	4.1 U	**270**	**9.8**	**6.1**	**270**	**140**	**550**	**1200**
Hexane	7400	140 U	**150**	140 U	1,400 U	140 U	140 U	1,400 U	1,400 U	1,400 U	1,400 U
Isopropanol	98 U	98 U	98 U	98 U	980 U	98 U	98 U	980 U	980 U	980 U	980 U
m,p-Xylene	**180**	8.7 U	**38**	8.7 U	660 U	**66**	**67**	87 U	87 U	87 U	**95**
Methylene Chloride	35 U	35 U	35 U	35 U	**380**	35 U	35 U	**870**	**610**	**790**	**930**
Naphthalene								**170**	**170**	**150**	**130**
o-Xylene	**35**	**4.7**	**14**	**<4.3**	140 U	**37**	**22**	43 U	43 U	**53**	**58**
Styrene	4.3 U	4.3 U	4.3 U	4.3 U	750 U	4.3 U	**6.4**	43 U	43 U	43 U	43 U
Tetrachloroethene	**9,400**	**310,000**	**190**	**56,000**	**1,600** NJ	**20,000**	**85**	**830,000**	**280,000**	**390,000**	**460,000**
Toluene	**720**	**3.9**	**99**	3.8 U	**620** NJ	**150**	**39**	**290**	**240**	**270**	**310**
trans-1,2-Dichloroethene	4 U	**34**	4 U	**11**	40 U	4 U	4 U	**1700**	**360**	**530**	**670**
Trichloroethene	**56**	**7,000**	5 U	**950**	**1,200**	**690**	5 U	**40,000**	**14,000**	**19,000**	**22,000**
Trichlorofluoromethane (Freon 11)	5.6 U	5.6 U	5.6 U	5.6 U	56 U	15	12	56 U	56 U	56 U	56 U
Vinyl Chloride	2.6 U	2.6 U	2.6 U	2.6 U	**140**	2.6 U	2.6 U	**71,000**	**13,000**	**18,000**	**19,000**

Notes:
U - The compound was not detected at the indicated concentration.
J - Estimated value.
NJ - Tentative in identification and estimated in valu
R - Value rejected.

Table 5. Former Majestic Garment Cleaners Site (#2-24-035)
Brooklyn, New York
AS/SVE Pilot Test Field Data - SVE

TEST #1. SOIL VAPOR EXTRACTION

Test Start

Time	SVE Flow Rate M.P.			Wellhead Measurements										
	Flow (cfm/fpm)	Vacuum/ Pressure (in H_2O)	Temp (F)	Parameters	SVE-1	AS/SVE-2	AS/SVE-3	AS/SVE-4	AS/SVE-5	AS/SVE-6	AS/SVE-7	PZ-15	PZ-9	PZ-4R
9:40 (base-line)	-	-	-	Vac/Press.(in.W.C.)	NR	0	NR	-.01 to + .016	0	0 to +.009	0 to +.007	-	-	-
				PID (ppm)	122	198	215	14.5	197	170	148	-	-	-
				LEL (%)	7	7.4	27	0	7	11	25	-	-	-
				ORP (mV)	-	8	8	-4	8	2	12	-	-	-
				CO (ppm)	11	28	23	0	12	11	18	-	-	-
				O_2 (%)	20.1	17.3	19.2	20.8	19.2	16.5	18.2	-	-	-
				DO (mg/L)	5.48	4.19	6.08	6.46	1.92	1.51	-	-	-	-
				DTW (ft b.m.p)	7.85	10.18	10.15	10.26	10.19	10.30	10.62	9.79	9.57	11.54
10:28	Begin SVE-only test.													
10:33	Collect vapor sample "SVE-1035"													
10:33-10:50	23	-27.2	75.6	Vac/Press.(in.W.C.)	-27.2	-0.161	-0.009	-0.085	-0.995	-0.14	-0.22	-	-	-
				PID (ppm)[1]	-	0	2.2	3.9	0.01	3.5	4.1	-	-	-
				LEL (%)	-	0	0	0	0	0	0	-	-	-
				DTW (ft b.m.p)	-	10.21	10.16	10.27	10.21	10.34	10.57	9.81	9.58	-
11:00	23	-18	70.5	Vac/Press.(in.W.C.)	-18	0.107	0	-0.033	-0.63	-0.095	-0.17	-	-	-
				PID (ppm)	375	0	0	0	13.4	7.4	0	-	-	-
				LEL (%)	11	0	0	0	0	0	0	-	-	-
				DTW (ft b.m.p)	-	10.19	10.16	10.26	10.32	10.19	10.52	-	-	-
11:22	Increase SVE flowrate to 50 cfm. Induced vacuum slowly increases at SVE-1. Began pulling moisture at ~-60 in.W.C. Flowrate readings may not be reliable due to moisture in air stream.													
11:25	~50 / NM	-72	75	Vac/Press.(in.W.C.)	-72	-	-	-	-	-	-	-	-	-
				DTW (ft b.m.p)	-	10.23	10.16	10.26	-	-	-	-	-	-
11:37	Decreased SVE flowrate down to 50 cfm.													
11:37-11:45	50	-53	75.8	Vac/Press.(in.W.C.)	-52	-0.281	-0.005	-0.095	-1.205	-0.217	-0.061	-	-	-
				PID (ppm)	189	0	0	0	0	0	0	-	-	-
				LEL (%)	7	0	0	0	0	0	0	-	-	-
				DTW (ft b.m.p)	-	10.2	10.16	10.26	10.19	10.31	10.56	-	-	-
12:10	Measured DTW of 9.96 at AS-1.													
12:10	> 68	-63	NR	Vac/Press.(in.W.C.)	-63	-0.287	-0.018	-0.106	-1.4	-0.181	-0.209	-	-	-
				PID (ppm)	213	2.3	37	2.8	0	0	0	-	-	-
				LEL (%)	6	0	0	0	0	0	0	-	-	-
				DTW (ft b.m.p)	-	10.2	10.15	10.26	10.19	10.32	10.55	-	9.58	-
12:33	Collect vapor sample "SVE-1230"													

Notes:

1) Note that PID/LEL measured at monitoring points were collected by simply putting meter probe into wellhead (i.e., they didn't use a pump that would assist in overcoming vacuum in vadose zone. This could explain some of the low PID readings at monitoring points. SVE-1 location, however, DID use pump.

Table 6. Former Majestic Garment Cleaners Site (#2-24-035)
Brooklyn, New York
AS/SVE Pilot Test Field Data - AS/SVE

TEST #2. AIR SPARGE / SOIL VAPOR EXTRACTION

Test Start

Time	From Flow Rate M.P.				Wellhead Measurements											
	Location	Flow (cfm/fpm)	Vacuum/ Pressure (in H_2O)	Temp (F)	Parameters	AS-1	SVE-1	AS/SVE-2	AS/SVE-3	AS/SVE-4	AS/SVE-5	AS/SVE-6	AS/SVE-7	PZ-9	PZ-15	PZ-4R
See baseline row in SVE data table for baseline ORP, DO, LEL, etc.																
13:05	Turned on Air Sparge (no stoppage of SVE). Break pressure of 9 psi. Steadies at 10 cfm and 9 psi. CD observes water mounding at AS/SVE-2 and AS/SVE-3.															
13:15	Air Sparge	10	9 psi	79	Vac/Pres. (in.W.C.)	9 psi	-60	-3.18	-0.02	-0.071	-0.393	-0.136	-0.15	-	-	-
					PID (ppm)	-	158.4	923	132	149	146	31	64	-	-	-
					LEL (%)	-	4	21	1	0	0	0	0	-	-	-
	SVE	60	-60.2	80	DTW (ft b.m.p)	-	-	9.22	9.86	10.11	9.22	9.61	10.12	9.49	9.76	-
13:40	Turned air sparge flowrate up from 10 cfm to 15 cfm.															
13:45	Air Sparge	15	7.5 psi	-	Vac/Pres. (in.W.C.)	7.5 psi	-60	-	-	-	-	-	-	-	-	-
					PID (ppm)	-	157	-	-	-	-	-	-	-	-	-
					LEL (%)	-	4	-	-	-	-	-	-	-	-	-
	SVE	60	-62	75	DTW (ft b.m.p)	-	-	10.23	10.05	10.15	9.83	9.91	10.3	9.42	9.72	-
14:00	Collect vapor sample "AS/SVE-1400"															
14:10	Air Sparge	14	7.5 psi	-	Vac/Pres. (in.W.C.)	7.5 psi	-60	-0.47	+.2	-0.076	-0.5	-0.09	-0.161	-	-	-
					PID (ppm)	-	227	-	-	-	-	-	-	-	-	-
					LEL (%)	-	0	-	-	-	-	-	-	-	-	-
	SVE	60	-60	85	DTW (ft b.m.p)	-	-	9.59	9.89	10.04	9.41	9.56	10	9.41	9.73	-
14:15	Turned SVE flowrate down from 60 cfm to 21 cfm.															
14:16-14:25	Air Sparge	14	7.2	-	Vac/Pres. (in.W.C.)	7.2 psi		-	-	-	-	-	-	-	-	-
					PID (ppm)	-	110	-	-	-	-	-	-	-	-	-
					LEL (%)	-	6	-	-	-	-	-	-	-	-	-
	SVE	21	-16.5	78	DO (mg/L)	-	-	6.41	5.89	5.95	5.99	7.15	6.23	-	-	-
14:47	Air Sparge	14	7.6	-	Vac/Pres. (in.W.C.)	7.6 psi	-	+0.234	+0.123	+0.03	+2.235	+0.239	+0.841	-	-	-
					PID (ppm)	-	381	800	90	470	460	212	58	-	-	-
					LEL (%)	-	0	10	100	23	16	45	100	-	-	-
	SVE	24-37	-11	84	DTW (ft b.m.p)	-	9.78	9.99	10.08	9.61	9.71	9.14		-	-	-
15:18	Turned air sparge flowrate down from 14 cfm to 5 cfm.															
15:30	Air Sparge	4-5	8	-	Vac/Pres. (in.W.C.)	8 psi	-10.5	+.985	+.03	+.029	+.034	+.387	+1.431	-	-	-
					PID (ppm)	-	273	-	-	-	-	-	-	-	-	-
					LEL (%)	-	17	-	-	-	-	-	-	-	-	-
	SVE	25	-10.5	78.4	DTW (ft b.m.p)	-	-	10.58	10.4	10.38	10.4	10.49	10.66	9.71	9.87	-
					DO (mg/L)	-	-	4.84	5.6	4.6	3.62	2.79	1.37	-	-	-
15:40	Air Sparge	-	-	-	PID (ppm)	-	786	90	225	591	410	60	-	-	-	-
	SVE	-	-	-	LEL (%)	-	8	0	53	27	80	100	-	-	-	-
15:43	Collect vapor sample "AS/SVE-1540"															
16:06	Turn off both air sparge and SVE. DTW at SVE-1 of 7.09.															
16:16	-	-	-	-	DTW (ft b.m.p)	10.09 [1]	7.51	10.76	10.54	10.48	10.86	10.91	11.07	9.68	9.86	-
					ORP	-	-	13	12	23	74	43	87	-	-	-

Notes:

1) AS-1 had a threaded bushing glued on for test. New measuring point is roughly 0.16' higher than old. However this reading is from old measuring point.

- AS/SVE-2 location has strong odor.

Table 7. Former Majestic Garment Cleaners Site (#2-24-035)

Brooklyn, New York

AS/SVE Pilot Test Laboratory Data

Sample ID	SVE-1035		SVE-1230		AS/SVE-1400		AS/SVE-1540	
Sample Description	SVE-Only (5 Minutes)		SVE-Only (2 Hours)		AS/SVE (1.5 Hours)		AS/SVE (3 Hours)	
Compound	Concentration		Concentration		Concentration		Concentration	
	ppbv	µg/m^3	ppbv	µg/m^3	ppbv	µg/m^3	ppbv	µg/m^3
Acetone	**1,100**	**2,500**	**980**	**2,300**	**1,100**	**2,600**	**1,100**	**2,700**
Benzene	**130**	**420**	**39**	**120**	**61**	**200**	**93**	**300**
Benzyl chloride	< 10	< 52	< 10	< 52	< 10	< 52	< 10	< 52
Bromodichloromethane	< 10	< 67	< 10	< 67	< 10	< 67	< 10	< 67
Bromoform	< 10	< 100	< 10	< 100	< 10	< 100	< 10	< 100
Bromomethane	< 10	< 39	< 10	< 39	< 10	< 39	< 10	< 39
1,3-Butadiene	< 10	< 22	< 10	< 22	< 10	< 22	< 10	< 22
2-Butanone (MEK)	< 400	< 1,200	< 400	< 1,200	< 400	< 1,200	< 400	< 1,200
Carbon Disulfide	< 100	< 310	< 100	< 310	< 100	< 310	< 100	< 310
Carbon Tetrachloride	< 10	< 63	< 10	< 63	< 10	< 63	< 10	< 63
Chlorobenzene	< 10	< 46	< 10	< 46	< 10	< 46	< 10	< 46
Chloroethane	< 10	< 26	< 10	< 26	< 10	< 26	< 10	< 26
Chloroform	< 10	< 49	< 10	< 49	< 10	< 49	< 10	< 49
Chloromethane	< 10	< 21	< 10	< 21	< 10	< 21	< 10	< 21
Cyclohexane	**88**	**300**	**30**	**100**	**130**	**460**	**300**	**1,000**
Dibromochloromethane	< 10	< 85	< 10	< 85	< 10	< 85	< 10	< 85
1,2-Dibromoethane (EDB)	< 10	< 77	< 10	< 77	< 10	< 77	< 10	< 77
1,2-Dichlorobenzene	< 10	< 60	< 10	< 60	< 10	< 60	< 10	< 60
1,3-Dichlorobenzene	< 10	< 60	< 10	< 60	< 10	< 60	< 10	< 60
1,4-Dichlorobenzene	< 10	< 60	< 10	< 60	< 10	< 60	< 10	< 60
Dichlorodifluoromethane (Freon 12)	< 10	< 49	< 10	< 49	< 10	< 49	< 10	< 49
1,1-Dichloroethane	< 10	< 40	< 10	< 40	< 10	< 40	< 10	< 40
1,2-Dichloroethane	< 10	< 40	< 10	< 40	< 10	< 40	< 10	< 40
1,1-Dichloroethylene	**200**	**780**	**22**	**88**	**33**	**130**	**37**	**150**
cis-1,2-Dichloroethylene	**88,000**	**350,000**	**19,000**	**77,000**	**26,000**	**100,000**	**32,000**	**130,000**
trans-1,2-Dichloroethylene	**430**	**1,700**	**91**	**360**	**130**	**530**	**170**	**670**
1,2-Dichloropropane	< 10	< 46	< 10	< 46	< 10	< 46	< 10	< 46
cis-1,3-Dichloropropene	< 10	< 45	< 10	< 45	< 10	< 45	< 10	< 45
trans-1,3-Dichloropropene	< 10	< 45	< 10	< 45	< 10	< 45	< 10	< 45
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	< 10	< 70	< 10	< 70	< 10	< 70	< 10	< 70
1,4-Dioxane	< 10	< 36	**17**	**63**	< 10	< 36	< 10	< 36
Ethanol	< 400	< 750	< 400	< 750	< 400	< 750	< 400	< 750
Ethyl Acetate	< 10	< 36	**560**	**2,000**	**600**	**2,200**	**670**	**2,400**
Ethylbenzene	**15**	**64**	**11**	**49**	**52**	**230**	**67**	**290**
4-Ethyltoluene	< 10	< 49	< 10	< 49	< 10	< 49	< 10	< 49
Heptane	**65**	**270**	**33**	**140**	**130**	**550**	**290**	**1,200**
Hexachlorobutadiene	< 10	< 110	< 10	< 110	< 10	< 110	< 10	< 110
Hexane	< 400	< 1,400	< 400	< 1,400	< 400	< 1400	< 400	< 1,400
2-Hexanone (MBK)	< 10	< 41	< 10	< 41	< 10	< 41	< 10	< 41
Isopropanol	< 400	< 980	< 400	< 980	< 400	< 980	< 400	< 980
Methyl tert-Butyl Ether (MTBE)	< 10	< 36	< 10	< 36	< 10	< 36	< 10	< 36
Methylene Chloride	**250**	**870**	**170**	**610**	**230**	**790**	**270**	**930**
4-Methyl-2-pentanone (MIBK)	< 10	< 41	< 10	< 41	< 10	< 41	< 10	< 41
Naphthalene	**33**	**170**	**32**	**170**	**29**	**150**	**26**	**130**
Propene	< 400	< 690	< 400	< 690	< 400	< 690	< 400	< 690
Styrene	< 10	< 43	< 10	< 43	< 10	< 43	< 10	< 43
1,1,2,2-Tetrachloroethane	< 10	< 69	< 10	< 69	< 10	< 69	< 10	< 69
Tetrachloroethylene	**120,000**	**830,000**	**41,000**	**280,000**	**57,000**	**390,000**	**67,000**	**460,000**
Tetrahydrofuran	< 10	< 29	< 10	< 29	< 10	< 29	< 10	< 29
Toluene	**78**	**290**	**65**	**240**	**73**	**270**	**82**	**310**
1,2,4-Trichlorobenzene	< 20	< 150	< 20	< 150	< 20	< 150	< 20	< 150
1,1,1-Trichloroethane	< 10	< 55	< 10	< 55	< 10	< 55	< 10	< 55
1,1,2-Trichloroethane	**36**	**200**	< 10	< 55	**37**	**200**	< 10	< 55
Trichloroethylene	**7,500**	**40,000**	**2,600**	**14,000**	**3,500**	**19,000**	**4,100**	**22,000**
Trichlorofluoromethane (Freon 11)	< 10	< 56	< 10	< 56	< 10	< 56	< 10	< 56
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	< 10	< 77	< 10	< 77	< 10	< 77	< 10	< 77
1,2,4-Trimethylbenzene	**21**	**110**	**17**	**83**	**34**	**170**	**35**	**170**
1,3,5-Trimethylbenzene	**11**	**53**	< 10	< 49	**14**	**67**	**12**	**61**
Vinyl Acetate	< 20	< 70	< 20	< 70	< 20	< 70	< 20	< 70
Vinyl Chloride	**28,000**	**71,000**	**5,000**	**13,000**	**6,900**	**18,000**	**7,400**	**19,000**
m&p-Xylene	< 20	< 87	< 20	< 87	< 20	< 87	**22**	**95**
o-Xylene	< 10	< 43	< 10	< 43	**12**	**53**	**13**	**58**

Notes:

1) AS/SVE Pilot Test conducted on June 26, 2012.

2) Samples analyzed for VOCs using USEPA Method TO-15.

-**bold** denotes concentrations detected above the reporting limit.

Abbreviations:

AS - air sparge

ppbv - parts per billion by volume

SVE - soil vapor extraction

µg/m^3 - micrograms per cubic meter

ARCADIS

Appendix A

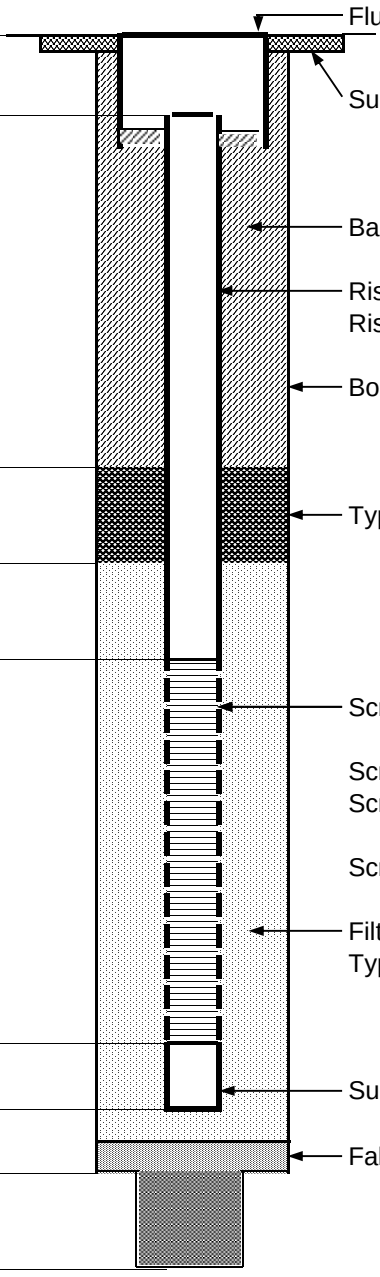
Pilot Test Well Construction Logs

ARCADIS

OVERBURDEN WELL/PIEZOMETER SVE-1

Project:	Former Majestic Garment Cleaners Site #2-24-035	**Job Number:**	00266384.0000
Client:	NYSDEC	**Date:**	6/1/2012
Subcontractor:	LAWES		
Drilling Method:	Hollow stem Auger		
Development Method:	Peristaltic		
Construction Dates:	6/1/2012 to 6/1/2012		
Measuring Point Type:	GROUND SURFACE		
Elevation (ft):	13.34		

Item	Depth, below Measuring Point (ft)	Elevation (ft)
Grade	0.0	13.3
Riser Pipe	0.5	12.8
Top of Seal	1.0	12.3
Top of Filter Pack	2.0	11.3
Top of Screen	3.0	10.3
Base of Screen	8.0	5.3
End Cap	8.0	5.3
Drilled Depth	8.0	5.3
Total Depth	8.0	5.3



Description	
Flushmount Diameter:	6 (in.)
Surface Seal Type:	Concrete
Backfill/Grout Type:	Portland Cement
Riser Pipe Type:	Schedule 40 PVC
Riser Pipe ID:	4 (in.)
Borehole Diameter:	6 1/4 (in.)
Type of Seal:	Bentonite Chips
Screen Type:	Schedule 40 PVC
Screen ID:	4 (in.)
Screen Slot Size:	0.01
Screen Length:	5 (ft)
Filter/Sand Pack Type:	# 2 Sand
Sump:	NA
Fallback/Backfill:	NA

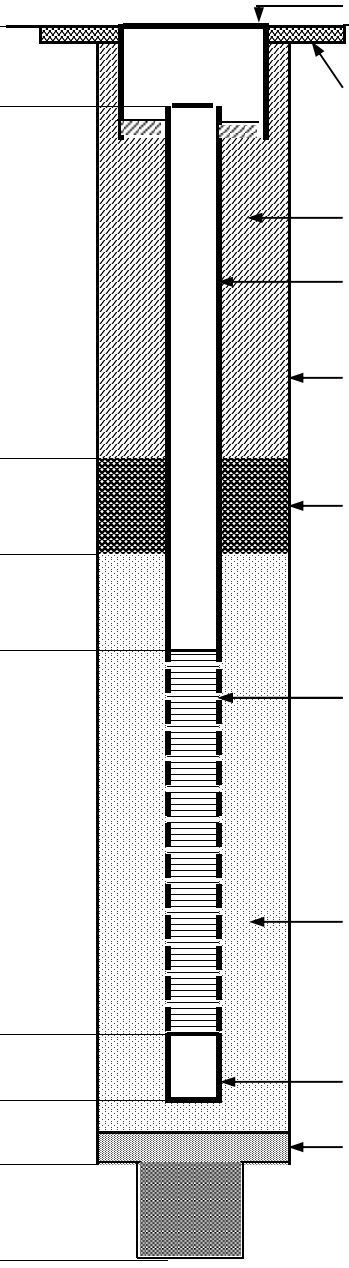
Notes:

ARCADIS

OVERBURDEN WELL/PIEZOMETER AS-1

Project:	Former Majestic Garment Cleaners Site #2-24-035	**Job Number:** 00266384.0000	
Client:	NYSDEC	**Date:** 6/1/2012	**Subcontractor:** LAWES
Drilling Method:	Hollow stem Auger		**Measuring Point Type:** GROUND SURFACE
Development Method:	Peristaltic		
Construction Dates:	6/1/2012 to 6/1/2012		**Elevation (ft):** 13.35

Item	Depth, below Measuring Point (ft)	Elevation (ft)
Grade	0.0	13.4
Riser Pipe	0.5	12.9
Top of Seal	24.0	-10.7
Top of Filter Pack	26.0	-12.7
Top of Screen	28.0	-14.7
Base of Screen	30.0	-16.7
End Cap	30.0	-16.7
Drilled Depth	30.0	-16.7
Total Depth	30.0	-16.7



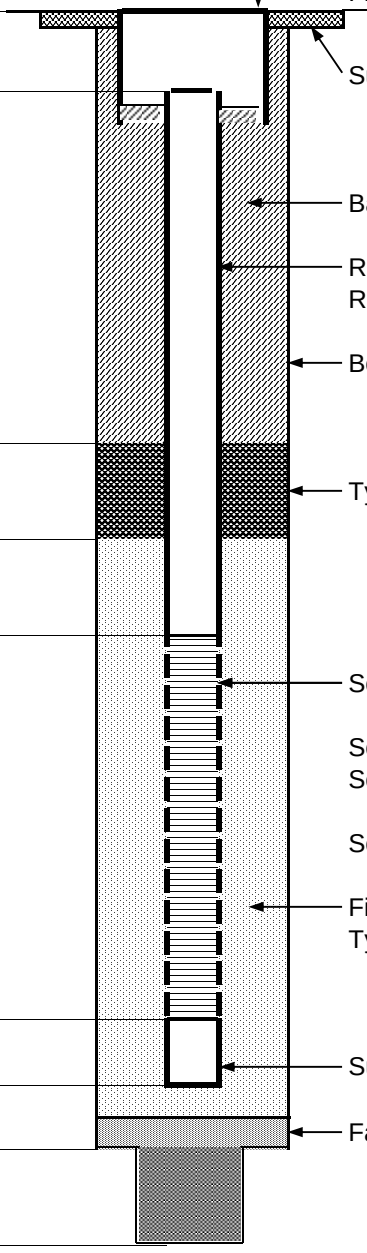
Description	
Flushmount Diameter:	4 (in.)
Surface Seal Type:	Concrete
Backfill/Grout Type:	Cement-bentonite
Riser Pipe Type:	Schedule 40 PVC
Riser Pipe ID:	1.5 (in.)
Borehole Diameter:	6 1/4 (in.)
Type of Seal:	Bentonite Chips
Screen Type:	Schedule 40 PVC
Screen ID:	1.5 (in.)
Screen Slot Size:	0.01
Screen Length:	2 (ft)
Filter/Sand Pack Type:	# 2 Sand
Sump:	NA
Fallback/Backfill:	NA

Notes:

ARCADIS

Project:	Former Majestic Garment Cleaners Site #2-24-035	**Job Number:** 00266384.0000	**OVERBURDEN WELL/PIEZOMETER AS/SVE-2**
Client:	NYSDEC	**Date:** 6/1/2012	**Subcontractor:** LAWES
Drilling Method: Hollow stem Auger			**Measuring Point Type:** GROUND SURFACE
Development Method: Peristaltic			
Construction Dates:	6/1/2012 to 6/1/2012		**Elevation (ft):** 13.43

Item	Depth, below Measuring Point (ft)	Elevation (ft)
Grade	0.0	13.4
Riser Pipe	0.5	12.9
Top of Seal	2.0	11.4
Top of Filter Pack	4.0	9.4
Top of Screen	5.0	8.4
Base of Screen	15.0	-1.6
End Cap	15.0	-1.6
Drilled Depth	15.0	-1.6
Total Depth	15.0	-1.6



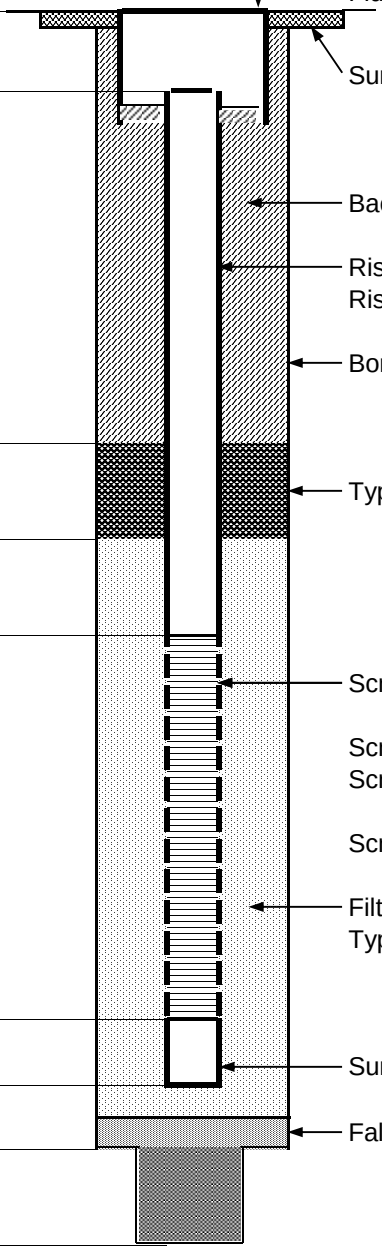
Description	
Flushmount Diameter:	4 (in.)
Surface Seal Type:	Concrete
Backfill/Grout Type:	Portland Cement
Riser Pipe Type:	Schedule 40 PVC
Riser Pipe ID:	1.5 (in.)
Borehole Diameter:	6 1/4 (in.)
Type of Seal:	Bentonite Chips
Screen Type:	Schedule 40 PVC
Screen ID:	1.5 (in.)
Screen Slot Size:	0.01
Screen Length:	10 (ft)
Filter/Sand Pack Type:	# 2 Sand
Sump:	NA
Fallback/Backfill:	NA

Notes:

ARCADIS

Project:	Former Majestic Garment Cleaners Site #2-24-035	**Job Number:** 00266384.0000	**OVERBURDEN WELL/PIEZOMETER AS/SVE-3**
Client:	NYSDEC	**Date:** 6/1/2012	**Subcontractor:** LAWES
Drilling Method: Hollow stem Auger			**Measuring Point Type:** GROUND SURFACE
Development Method: Peristaltic			
Construction Dates:	6/1/2012 to 6/1/2012		**Elevation (ft):** 13.41

Item	Depth, below Measuring Point (ft)	Elevation (ft)
Grade	0.0	13.4
Riser Pipe	0.5	12.9
Top of Seal	2.0	11.4
Top of Filter Pack	4.0	9.4
Top of Screen	5.0	8.4
Base of Screen	15.0	-1.6
End Cap	15.0	-1.6
Drilled Depth	15.0	-1.6
Total Depth	15.0	-1.6



Description	
Flushmount Diameter:	4 (in.)
Surface Seal Type:	Concrete
Backfill/Grout Type:	Portland Cement
Riser Pipe Type:	Schedule 40 PVC
Riser Pipe ID:	1.5 (in.)
Borehole Diameter:	6 1/4 (in.)
Type of Seal:	Bentonite Chips
Screen Type:	Schedule 40 PVC
Screen ID:	1.5 (in.)
Screen Slot Size:	0.01
Screen Length:	10 (ft)
Filter/Sand Pack Type:	# 2 Sand
Sump:	NA
Fallback/Backfill:	NA

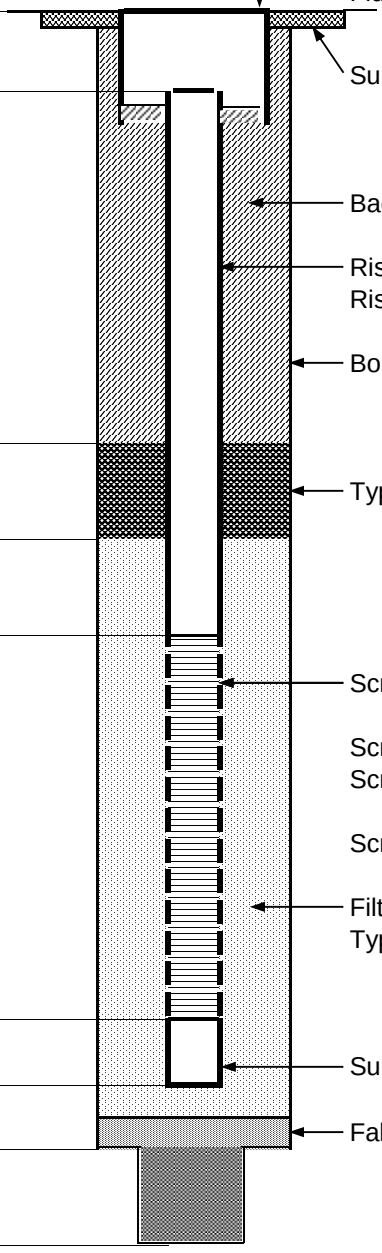
Notes:

ARCADIS

OVERBURDEN WELL/PIEZOMETER AS/SVE-4

Project:	Former Majestic Garment Cleaners Site #2-24-035	**Job Number:**	00266384.0000
Client:	NYSDEC	**Date:**	6/1/2012
Subcontractor:	LAWES		
Drilling Method:	Hollow stem Auger		
Development Method:	Peristaltic	**Measuring Point Type:**	GROUND SURFACE
Construction Dates:	6/1/2012 to 6/1/2012	**Elevation (ft):**	13.46

Item	Depth, below Measuring Point (ft)	Elevation (ft)
Grade	0.0	13.5
Riser Pipe	0.5	13.0
Top of Seal	2.0	11.5
Top of Filter Pack	4.0	9.5
Top of Screen	5.0	8.5
Base of Screen	15.0	-1.5
End Cap	15.0	-1.5
Drilled Depth	15.0	-1.5
Total Depth	15.0	-1.5



Description	
Flushmount Diameter:	4 (in.)
Surface Seal Type:	Concrete
Backfill/Grout Type:	Portland Cement
Riser Pipe Type:	Schedule 40 PVC
Riser Pipe ID:	1.5 (in.)
Borehole Diameter:	6 1/4 (in.)
Type of Seal:	Bentonite Chips
Screen Type:	Schedule 40 PVC
Screen ID:	1.5 (in.)
Screen Slot Size:	0.01
Screen Length:	10 (ft)
Filter/Sand Pack Type:	# 2 Sand
Sump:	NA
Fallback/Backfill:	NA

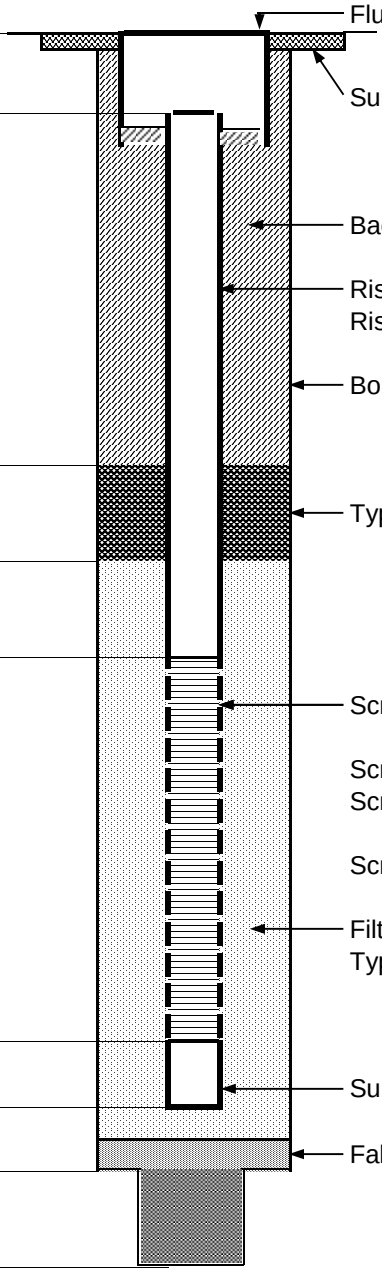
Notes:

ARCADIS

OVERBURDEN WELL/PIEZOMETER AS/SVE-5

Project:	Former Majestic Garment Cleaners Site #2-24-035	**Job Number:**	00266384.0000
Client:	NYSDEC	**Date:**	6/4/2012
Subcontractor:	LAWES		
Drilling Method:	Hollow stem Auger		
Development Method:	Peristaltic		
Measuring Point Type:	GROUND SURFACE		
Construction Dates:	6/4/2012 to 6/4/2012	**Elevation (ft):**	13.43

Item	Depth, below Measuring Point (ft)	Elevation (ft)
Grade	0.0	13.4
Riser Pipe	0.5	12.9
Top of Seal	2.0	11.4
Top of Filter Pack	4.0	9.4
Top of Screen	5.0	8.4
Base of Screen	15.0	-1.6
End Cap	15.0	-1.6
Drilled Depth	15.0	-1.6
Total Depth	15.0	-1.6



Description	
Flushmount Diameter:	4 (in.)
Surface Seal Type:	Concrete
Backfill/Grout Type:	Portland Cement
Riser Pipe Type:	Schedule 40 PVC
Riser Pipe ID:	1.5 (in.)
Borehole Diameter:	6 1/4 (in.)
Type of Seal:	Bentonite Chips
Screen Type:	Schedule 40 PVC
Screen ID:	1.5 (in.)
Screen Slot Size:	0.01
Screen Length:	10 (ft)
Filter/Sand Pack Type:	# 2 Sand
Sump:	NA
Fallback/Backfill:	NA

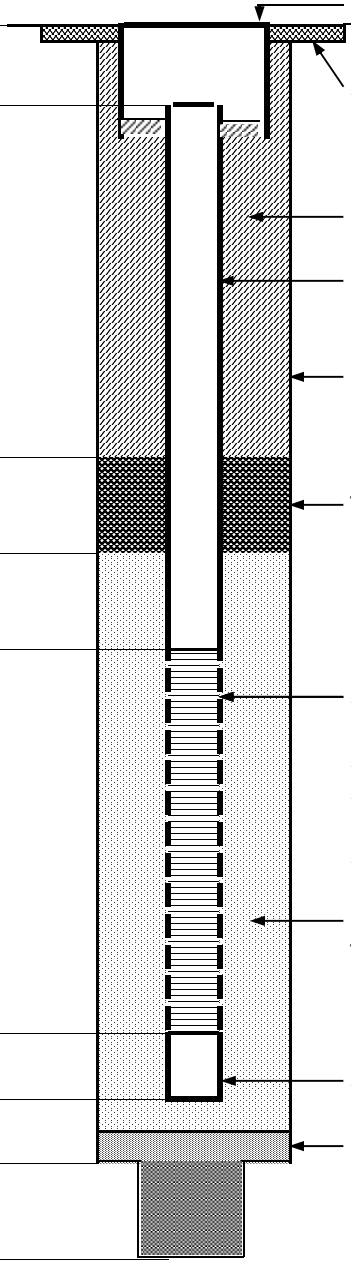
Notes:

ARCADIS

OVERBURDEN WELL/PIEZOMETER AS/SVE-6

Project:	Former Majestic Garment Cleaners Site #2-24-035	**Job Number:**	00266384.0000
Client:	NYSDEC	**Date:**	6/4/2012
Subcontractor:	LAWES		
Drilling Method:	Hollow stem Auger		
Development Method:	Peristaltic	**Measuring Point Type:**	GROUND SURFACE
Construction Dates:	6/4/2012 to 6/4/2012	**Elevation (ft):**	13.55

Item	Depth, below Measuring Point (ft)	Elevation (ft)
Grade	0.0	13.6
Riser Pipe	0.5	13.1
Top of Seal	2.0	11.6
Top of Filter Pack	4.0	9.6
Top of Screen	5.0	8.6
Base of Screen	15.0	-1.5
End Cap	15.0	-1.5
Drilled Depth	15.0	-1.5
Total Depth	15.0	-1.5



Description	
Flushmount Diameter:	4 (in.)
Surface Seal Type:	Concrete
Backfill/Grout Type:	Portland Cement
Riser Pipe Type:	Schedule 40 PVC
Riser Pipe ID:	1.5 (in.)
Borehole Diameter:	6 1/4 (in.)
Type of Seal:	Bentonite Chips
Screen Type:	Schedule 40 PVC
Screen ID:	1.5 (in.)
Screen Slot Size:	0.01
Screen Length:	10 (ft)
Filter/Sand Pack Type:	# 2 Sand
Sump:	NA
Fallback/Backfill:	NA

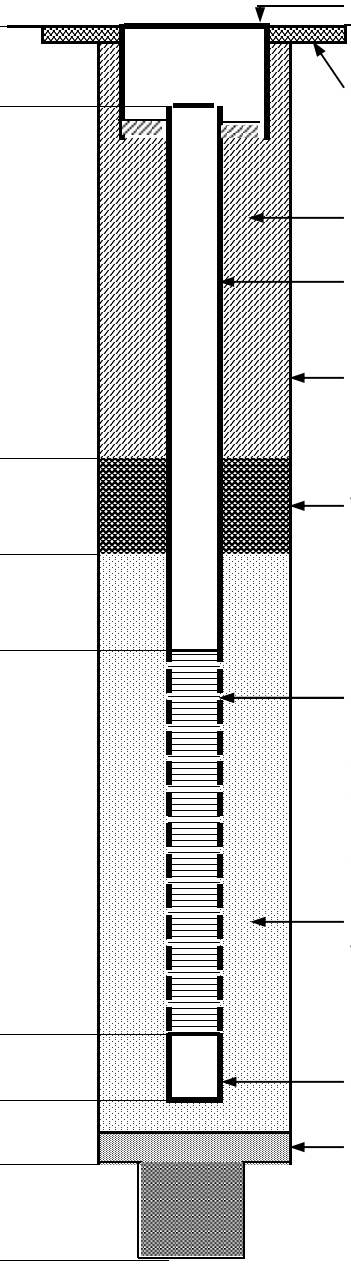
Notes:

ARCADIS

OVERBURDEN WELL/PIEZOMETER AS/SVE-7

Project:	Former Majestic Garment Cleaners Site #2-24-035	**Job Number:**	00266384.0000
Client:	NYSDEC	**Date:**	6/4/2012
Drilling Method:	Hollow stem Auger		
Development Method:	Peristaltic		
Construction Dates:	6/4/2012 to 6/4/2012		
Subcontractor:	LAWES		
Measuring Point Type:	GROUND SURFACE		
Elevation (ft):	13.79		

Item	Depth, below Measuring Point (ft)	Elevation (ft)
Grade	0.0	13.8
Riser Pipe	0.5	13.3
Top of Seal	2.0	11.8
Top of Filter Pack	4.0	9.8
Top of Screen	5.0	8.8
Base of Screen	15.0	-1.2
End Cap	15.0	-1.2
Drilled Depth	15.0	-1.2
Total Depth	15.0	-1.2



Description	
Flushmount Diameter:	4 (in.)
Surface Seal Type:	Concrete
Backfill/Grout Type:	Portland Cement
Riser Pipe Type:	Schedule 40 PVC
Riser Pipe ID:	1.5 (in.)
Borehole Diameter:	6 1/4 (in.)
Type of Seal:	Bentonite Chips
Screen Type:	Schedule 40 PVC
Screen ID:	1.5 (in.)
Screen Slot Size:	0.01
Screen Length:	10 (ft)
Filter/Sand Pack Type:	# 2 Sand
Sump:	NA
Fallback/Backfill:	NA

Notes:

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Appendix B

Pilot Test Laboratory Analytical Data

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

July 11, 2012

Stefan Bagnato
Arcadis US, Inc. - Clifton Park-NY
855 Route 146, Suite 210
Clifton Park, NY 12065

Project Location: Majestic Cleaners Brooklyn, NY
Client Job Number:
Project Number: 00266384.0000
Laboratory Work Order Number: 12G0003

Enclosed are results of analyses for samples received by the laboratory on June 29, 2012. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Charles W. Balicki
Project Manager

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Arcadis US, Inc. - Clifton Park-NY
855 Route 146, Suite 210
Clifton Park, NY 12065
ATTN: Stefan Bagnato

REPORT DATE: 7/11/2012

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 00266384.0000

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 12G0003

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Majestic Cleaners Brooklyn, NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
SVE-1035	12G0003-01	Soil Gas		EPA TO-15	
SVE-1230	12G0003-02	Soil Gas		EPA TO-15	
AS/SVE-1400	12G0003-03	Soil Gas		EPA TO-15	
AS/SVE-1540	12G0003-04	Soil Gas		EPA TO-15	

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Michael A. Erickson
Laboratory Director

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

ANALYTICAL RESULTS

Project Location: Majestic Cleaners Brooklyn, NY
Date Received: 6/29/2012
Field Sample #: SVE-1035
Sample ID: 12G0003-01
Sample Matrix: Soil Gas
Sampled: 6/26/2012 10:35

Sample Description/Location:
Sub Description/Location:
Canister ID: 1119
Canister Size: 6 liter
Flow Controller ID: 4001
Sample Type: grab

Work Order: 12G0003
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -9
Receipt Vacuum(in Hg): -9.5
Flow Controller Type: fixed-orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

EPA TO-15

	ppbv			ug/m3			Date/Time	
Analyte	Results	RL	Flag	Results	RL	Dilution	Analyzed	Analyst
Acetone	1100	400		2500	950	200	7/11/12 1:49	WSD
Benzene	130	10		420	32	200	7/11/12 1:49	WSD
Benzyl chloride	ND	10		ND	52	200	7/11/12 1:49	WSD
Bromodichloromethane	ND	10		ND	67	200	7/11/12 1:49	WSD
Bromoform	ND	10		ND	100	200	7/11/12 1:49	WSD
Bromomethane	ND	10		ND	39	200	7/11/12 1:49	WSD
1,3-Butadiene	ND	10		ND	22	200	7/11/12 1:49	WSD
2-Butanone (MEK)	ND	400		ND	1200	200	7/11/12 1:49	WSD
Carbon Disulfide	ND	100		ND	310	200	7/11/12 1:49	WSD
Carbon Tetrachloride	ND	10		ND	63	200	7/11/12 1:49	WSD
Chlorobenzene	ND	10		ND	46	200	7/11/12 1:49	WSD
Chloroethane	ND	10		ND	26	200	7/11/12 1:49	WSD
Chloroform	ND	10		ND	49	200	7/11/12 1:49	WSD
Chloromethane	ND	10		ND	21	200	7/11/12 1:49	WSD
Cyclohexane	88	10		300	34	200	7/11/12 1:49	WSD
Dibromochloromethane	ND	10		ND	85	200	7/11/12 1:49	WSD
1,2-Dibromoethane (EDB)	ND	10		ND	77	200	7/11/12 1:49	WSD
1,2-Dichlorobenzene	ND	10		ND	60	200	7/11/12 1:49	WSD
1,3-Dichlorobenzene	ND	10		ND	60	200	7/11/12 1:49	WSD
1,4-Dichlorobenzene	ND	10		ND	60	200	7/11/12 1:49	WSD
Dichlorodifluoromethane (Freon 12)	ND	10		ND	49	200	7/11/12 1:49	WSD
1,1-Dichloroethane	ND	10		ND	40	200	7/11/12 1:49	WSD
1,2-Dichloroethane	ND	10		ND	40	200	7/11/12 1:49	WSD
1,1-Dichloroethylene	200	10		780	40	200	7/11/12 1:49	WSD
cis-1,2-Dichloroethylene	88000	200		350000	790	4000	7/11/12 2:26	WSD
trans-1,2-Dichloroethylene	430	10		1700	40	200	7/11/12 1:49	WSD
1,2-Dichloropropane	ND	10		ND	46	200	7/11/12 1:49	WSD
cis-1,3-Dichloropropene	ND	10		ND	45	200	7/11/12 1:49	WSD
trans-1,3-Dichloropropene	ND	10		ND	45	200	7/11/12 1:49	WSD
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	ND	10		ND	70	200	7/11/12 1:49	WSD
1,4-Dioxane	ND	10		ND	36	200	7/11/12 1:49	WSD
Ethanol	ND	400		ND	750	200	7/11/12 1:49	WSD
Ethyl Acetate	ND	10		ND	36	200	7/11/12 1:49	WSD
Ethylbenzene	15	10		64	43	200	7/11/12 1:49	WSD
4-Ethyltoluene	ND	10		ND	49	200	7/11/12 1:49	WSD
Heptane	65	10		270	41	200	7/11/12 1:49	WSD
Hexachlorobutadiene	ND	10		ND	110	200	7/11/12 1:49	WSD

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

ANALYTICAL RESULTS

Project Location: Majestic Cleaners Brooklyn, NY
Date Received: 6/29/2012
Field Sample #: SVE-1035
Sample ID: 12G0003-01
Sample Matrix: Soil Gas
Sampled: 6/26/2012 10:35

Sample Description/Location:
Sub Description/Location:
Canister ID: 1119
Canister Size: 6 liter
Flow Controller ID: 4001
Sample Type: grab

Work Order: 12G0003
Initial Vacuum(in Hg): -30
Final Vacuum(in Hg): -9
Receipt Vacuum(in Hg): -9.5
Flow Controller Type: fixed-orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

EPA TO-15

Analyte	ppbv Results	ppbv RL	Flag	ug/m3 Results	ug/m3 RL	Dilution	Date/Time Analyzed	Analyst
Hexane	ND	400		ND	1400	200	7/11/12 1:49	WSD
2-Hexanone (MBK)	ND	10		ND	41	200	7/11/12 1:49	WSD
Isopropanol	ND	400		ND	980	200	7/11/12 1:49	WSD
Methyl tert-Butyl Ether (MTBE)	ND	10		ND	36	200	7/11/12 1:49	WSD
Methylene Chloride	250	100		870	350	200	7/11/12 1:49	WSD
4-Methyl-2-pentanone (MIBK)	ND	10		ND	41	200	7/11/12 1:49	WSD
Naphthalene	33	10		170	52	200	7/11/12 1:49	WSD
Propene	ND	400		ND	690	200	7/11/12 1:49	WSD
Styrene	ND	10		ND	43	200	7/11/12 1:49	WSD
1,1,2,2-Tetrachloroethane	ND	10		ND	69	200	7/11/12 1:49	WSD
Tetrachloroethylene	120000	200		830000	1400	4000	7/11/12 2:26	WSD
Tetrahydrofuran	ND	10		ND	29	200	7/11/12 1:49	WSD
Toluene	78	10		290	38	200	7/11/12 1:49	WSD
1,2,4-Trichlorobenzene	ND	20		ND	150	200	7/11/12 1:49	WSD
1,1,1-Trichloroethane	ND	10		ND	55	200	7/11/12 1:49	WSD
1,1,2-Trichloroethane	36	10		200	55	200	7/11/12 1:49	WSD
Trichloroethylene	7500	200		40000	1100	4000	7/11/12 2:26	WSD
Trichlorofluoromethane (Freon 11)	ND	10		ND	56	200	7/11/12 1:49	WSD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	10		ND	77	200	7/11/12 1:49	WSD
1,2,4-Trimethylbenzene	21	10		110	49	200	7/11/12 1:49	WSD
1,3,5-Trimethylbenzene	11	10		53	49	200	7/11/12 1:49	WSD
Vinyl Acetate	ND	20		ND	70	200	7/11/12 1:49	WSD
Vinyl Chloride	28000	200		71000	510	4000	7/11/12 2:26	WSD
m&p-Xylene	ND	20		ND	87	200	7/11/12 1:49	WSD
o-Xylene	ND	10		ND	43	200	7/11/12 1:49	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	101	70-130	7/11/12 2:26
4-Bromofluorobenzene (1)	102	70-130	7/11/12 1:49

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ANALYTICAL RESULTS

Project Location: Majestic Cleaners Brooklyn, NY
Date Received: 6/29/2012
Field Sample #: SVE-1230
Sample ID: 12G0003-02
Sample Matrix: Soil Gas
Sampled: 6/26/2012 12:30

Sample Description/Location:
Sub Description/Location:
Canister ID: 1623
Canister Size: 6 liter
Flow Controller ID: 4002
Sample Type: grab

Work Order: 12G0003
Initial Vacuum(in Hg): -28
Final Vacuum(in Hg): -8
Receipt Vacuum(in Hg): -9.2
Flow Controller Type: fixed-orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

EPA TO-15

Analyte	ppbv Results	ppbv RL	Flag	ug/m3 Results	ug/m3 RL	Dilution	Date/Time Analyzed	Analyst
Acetone	980	400		2300	950	200	7/11/12 3:05	WSD
Benzene	39	10		120	32	200	7/11/12 3:05	WSD
Benzyl chloride	ND	10		ND	52	200	7/11/12 3:05	WSD
Bromodichloromethane	ND	10		ND	67	200	7/11/12 3:05	WSD
Bromoform	ND	10		ND	100	200	7/11/12 3:05	WSD
Bromomethane	ND	10		ND	39	200	7/11/12 3:05	WSD
1,3-Butadiene	ND	10		ND	22	200	7/11/12 3:05	WSD
2-Butanone (MEK)	ND	400		ND	1200	200	7/11/12 3:05	WSD
Carbon Disulfide	ND	100		ND	310	200	7/11/12 3:05	WSD
Carbon Tetrachloride	ND	10		ND	63	200	7/11/12 3:05	WSD
Chlorobenzene	ND	10		ND	46	200	7/11/12 3:05	WSD
Chloroethane	ND	10		ND	26	200	7/11/12 3:05	WSD
Chloroform	ND	10		ND	49	200	7/11/12 3:05	WSD
Chloromethane	ND	10		ND	21	200	7/11/12 3:05	WSD
Cyclohexane	30	10		100	34	200	7/11/12 3:05	WSD
Dibromochloromethane	ND	10		ND	85	200	7/11/12 3:05	WSD
1,2-Dibromoethane (EDB)	ND	10		ND	77	200	7/11/12 3:05	WSD
1,2-Dichlorobenzene	ND	10		ND	60	200	7/11/12 3:05	WSD
1,3-Dichlorobenzene	ND	10		ND	60	200	7/11/12 3:05	WSD
1,4-Dichlorobenzene	ND	10		ND	60	200	7/11/12 3:05	WSD
Dichlorodifluoromethane (Freon 12)	ND	10		ND	49	200	7/11/12 3:05	WSD
1,1-Dichloroethane	ND	10		ND	40	200	7/11/12 3:05	WSD
1,2-Dichloroethane	ND	10		ND	40	200	7/11/12 3:05	WSD
1,1-Dichloroethylene	22	10		88	40	200	7/11/12 3:05	WSD
cis-1,2-Dichloroethylene	19000	200		77000	790	4000	7/11/12 3:43	WSD
trans-1,2-Dichloroethylene	91	10		360	40	200	7/11/12 3:05	WSD
1,2-Dichloropropane	ND	10		ND	46	200	7/11/12 3:05	WSD
cis-1,3-Dichloropropene	ND	10		ND	45	200	7/11/12 3:05	WSD
trans-1,3-Dichloropropene	ND	10		ND	45	200	7/11/12 3:05	WSD
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	ND	10		ND	70	200	7/11/12 3:05	WSD
1,4-Dioxane	17	10		63	36	200	7/11/12 3:05	WSD
Ethanol	ND	400		ND	750	200	7/11/12 3:05	WSD
Ethyl Acetate	560	10		2000	36	200	7/11/12 3:05	WSD
Ethylbenzene	11	10		49	43	200	7/11/12 3:05	WSD
4-Ethyltoluene	ND	10		ND	49	200	7/11/12 3:05	WSD
Heptane	33	10		140	41	200	7/11/12 3:05	WSD
Hexachlorobutadiene	ND	10		ND	110	200	7/11/12 3:05	WSD

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ANALYTICAL RESULTS

Project Location: Majestic Cleaners Brooklyn, NY
Date Received: 6/29/2012
Field Sample #: SVE-1230
Sample ID: 12G0003-02
Sample Matrix: Soil Gas
Sampled: 6/26/2012 12:30

Sample Description/Location:
Sub Description/Location:
Canister ID: 1623
Canister Size: 6 liter
Flow Controller ID: 4002
Sample Type: grab

Work Order: 12G0003
Initial Vacuum(in Hg): -28
Final Vacuum(in Hg): -8
Receipt Vacuum(in Hg): -9.2
Flow Controller Type: fixed-orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

EPA TO-15

Analyte	ppbv Results	ppbv RL	Flag	ug/m3 Results	ug/m3 RL	Dilution	Date/Time Analyzed	Analyst
Hexane	ND	400		ND	1400	200	7/11/12 3:05	WSD
2-Hexanone (MBK)	ND	10		ND	41	200	7/11/12 3:05	WSD
Isopropanol	ND	400		ND	980	200	7/11/12 3:05	WSD
Methyl tert-Butyl Ether (MTBE)	ND	10		ND	36	200	7/11/12 3:05	WSD
Methylene Chloride	170	100		610	350	200	7/11/12 3:05	WSD
4-Methyl-2-pentanone (MIBK)	ND	10		ND	41	200	7/11/12 3:05	WSD
Naphthalene	32	10		170	52	200	7/11/12 3:05	WSD
Propene	ND	400		ND	690	200	7/11/12 3:05	WSD
Styrene	ND	10		ND	43	200	7/11/12 3:05	WSD
1,1,2,2-Tetrachloroethane	ND	10		ND	69	200	7/11/12 3:05	WSD
Tetrachloroethylene	41000	200		280000	1400	4000	7/11/12 3:43	WSD
Tetrahydrofuran	ND	10		ND	29	200	7/11/12 3:05	WSD
Toluene	65	10		240	38	200	7/11/12 3:05	WSD
1,2,4-Trichlorobenzene	ND	20		ND	150	200	7/11/12 3:05	WSD
1,1,1-Trichloroethane	ND	10		ND	55	200	7/11/12 3:05	WSD
1,1,2-Trichloroethane	ND	10		ND	55	200	7/11/12 3:05	WSD
Trichloroethylene	2600	10		14000	54	200	7/11/12 3:05	WSD
Trichlorofluoromethane (Freon 11)	ND	10		ND	56	200	7/11/12 3:05	WSD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	10		ND	77	200	7/11/12 3:05	WSD
1,2,4-Trimethylbenzene	17	10		83	49	200	7/11/12 3:05	WSD
1,3,5-Trimethylbenzene	ND	10		ND	49	200	7/11/12 3:05	WSD
Vinyl Acetate	ND	20		ND	70	200	7/11/12 3:05	WSD
Vinyl Chloride	5000	10		13000	26	200	7/11/12 3:05	WSD
m&p-Xylene	ND	20		ND	87	200	7/11/12 3:05	WSD
o-Xylene	ND	10		ND	43	200	7/11/12 3:05	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	101	70-130	7/11/12 3:43
4-Bromofluorobenzene (1)	100	70-130	7/11/12 3:05

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ANALYTICAL RESULTS

Project Location: Majestic Cleaners Brooklyn, NY
Date Received: 6/29/2012
Field Sample #: AS/SVE-1400
Sample ID: 12G0003-03
Sample Matrix: Soil Gas
Sampled: 6/26/2012 14:00

Sample Description/Location:
Sub Description/Location:
Canister ID: 1868
Canister Size: 6 liter
Flow Controller ID: 5039
Sample Type: grab

Work Order: 12G0003
Initial Vacuum(in Hg): -28
Final Vacuum(in Hg): -8
Receipt Vacuum(in Hg): -8.9
Flow Controller Type: fixed-orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

EPA TO-15

Analyte	ppbv Results	ppbv RL	Flag	ug/m3 Results	ug/m3 RL	Dilution	Date/Time Analyzed	Analyst
Acetone	1100	400		2600	950	200	7/11/12 4:22	WSD
Benzene	61	10		200	32	200	7/11/12 4:22	WSD
Benzyl chloride	ND	10		ND	52	200	7/11/12 4:22	WSD
Bromodichloromethane	ND	10		ND	67	200	7/11/12 4:22	WSD
Bromoform	ND	10		ND	100	200	7/11/12 4:22	WSD
Bromomethane	ND	10		ND	39	200	7/11/12 4:22	WSD
1,3-Butadiene	ND	10		ND	22	200	7/11/12 4:22	WSD
2-Butanone (MEK)	ND	400		ND	1200	200	7/11/12 4:22	WSD
Carbon Disulfide	ND	100		ND	310	200	7/11/12 4:22	WSD
Carbon Tetrachloride	ND	10		ND	63	200	7/11/12 4:22	WSD
Chlorobenzene	ND	10		ND	46	200	7/11/12 4:22	WSD
Chloroethane	ND	10		ND	26	200	7/11/12 4:22	WSD
Chloroform	ND	10		ND	49	200	7/11/12 4:22	WSD
Chloromethane	ND	10		ND	21	200	7/11/12 4:22	WSD
Cyclohexane	130	10		460	34	200	7/11/12 4:22	WSD
Dibromochloromethane	ND	10		ND	85	200	7/11/12 4:22	WSD
1,2-Dibromoethane (EDB)	ND	10		ND	77	200	7/11/12 4:22	WSD
1,2-Dichlorobenzene	ND	10		ND	60	200	7/11/12 4:22	WSD
1,3-Dichlorobenzene	ND	10		ND	60	200	7/11/12 4:22	WSD
1,4-Dichlorobenzene	ND	10		ND	60	200	7/11/12 4:22	WSD
Dichlorodifluoromethane (Freon 12)	ND	10		ND	49	200	7/11/12 4:22	WSD
1,1-Dichloroethane	ND	10		ND	40	200	7/11/12 4:22	WSD
1,2-Dichloroethane	ND	10		ND	40	200	7/11/12 4:22	WSD
1,1-Dichloroethylene	33	10		130	40	200	7/11/12 4:22	WSD
cis-1,2-Dichloroethylene	26000	200		100000	790	4000	7/11/12 4:58	WSD
trans-1,2-Dichloroethylene	130	10		530	40	200	7/11/12 4:22	WSD
1,2-Dichloropropane	ND	10		ND	46	200	7/11/12 4:22	WSD
cis-1,3-Dichloropropene	ND	10		ND	45	200	7/11/12 4:22	WSD
trans-1,3-Dichloropropene	ND	10		ND	45	200	7/11/12 4:22	WSD
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	ND	10		ND	70	200	7/11/12 4:22	WSD
1,4-Dioxane	ND	10		ND	36	200	7/11/12 4:22	WSD
Ethanol	ND	400		ND	750	200	7/11/12 4:22	WSD
Ethyl Acetate	600	10		2200	36	200	7/11/12 4:22	WSD
Ethylbenzene	52	10		230	43	200	7/11/12 4:22	WSD
4-Ethyltoluene	ND	10		ND	49	200	7/11/12 4:22	WSD
Heptane	130	10		550	41	200	7/11/12 4:22	WSD
Hexachlorobutadiene	ND	10		ND	110	200	7/11/12 4:22	WSD

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ANALYTICAL RESULTS

Project Location: Majestic Cleaners Brooklyn, NY
Date Received: 6/29/2012
Field Sample #: AS/SVE-1400
Sample ID: 12G0003-03
Sample Matrix: Soil Gas
Sampled: 6/26/2012 14:00

Sample Description/Location:
Sub Description/Location:
Canister ID: 1868
Canister Size: 6 liter
Flow Controller ID: 5039
Sample Type: grab

Work Order: 12G0003
Initial Vacuum(in Hg): -28
Final Vacuum(in Hg): -8
Receipt Vacuum(in Hg): -8.9
Flow Controller Type: fixed-orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

EPA TO-15

Analyte	ppbv Results	ppbv RL	Flag	ug/m3 Results	ug/m3 RL	Dilution	Date/Time Analyzed	Analyst
Hexane	ND	400		ND	1400	200	7/11/12 4:22	WSD
2-Hexanone (MBK)	ND	10		ND	41	200	7/11/12 4:22	WSD
Isopropanol	ND	400		ND	980	200	7/11/12 4:22	WSD
Methyl tert-Butyl Ether (MTBE)	ND	10		ND	36	200	7/11/12 4:22	WSD
Methylene Chloride	230	100		790	350	200	7/11/12 4:22	WSD
4-Methyl-2-pentanone (MIBK)	ND	10		ND	41	200	7/11/12 4:22	WSD
Naphthalene	29	10		150	52	200	7/11/12 4:22	WSD
Propene	ND	400		ND	690	200	7/11/12 4:22	WSD
Styrene	ND	10		ND	43	200	7/11/12 4:22	WSD
1,1,2,2-Tetrachloroethane	ND	10		ND	69	200	7/11/12 4:22	WSD
Tetrachloroethylene	57000	200		390000	1400	4000	7/11/12 4:58	WSD
Tetrahydrofuran	ND	10		ND	29	200	7/11/12 4:22	WSD
Toluene	73	10		270	38	200	7/11/12 4:22	WSD
1,2,4-Trichlorobenzene	ND	20		ND	150	200	7/11/12 4:22	WSD
1,1,1-Trichloroethane	ND	10		ND	55	200	7/11/12 4:22	WSD
1,1,2-Trichloroethane	37	10		200	55	200	7/11/12 4:22	WSD
Trichloroethylene	3500	10		19000	54	200	7/11/12 4:22	WSD
Trichlorofluoromethane (Freon 11)	ND	10		ND	56	200	7/11/12 4:22	WSD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	10		ND	77	200	7/11/12 4:22	WSD
1,2,4-Trimethylbenzene	34	10		170	49	200	7/11/12 4:22	WSD
1,3,5-Trimethylbenzene	14	10		67	49	200	7/11/12 4:22	WSD
Vinyl Acetate	ND	20		ND	70	200	7/11/12 4:22	WSD
Vinyl Chloride	6900	10		18000	26	200	7/11/12 4:22	WSD
m&p-Xylene	ND	20		ND	87	200	7/11/12 4:22	WSD
o-Xylene	12	10		53	43	200	7/11/12 4:22	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	101	70-130	7/11/12 4:58
4-Bromofluorobenzene (1)	102	70-130	7/11/12 4:22

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ANALYTICAL RESULTS

Project Location: Majestic Cleaners Brooklyn, NY
Date Received: 6/29/2012
Field Sample #: AS/SVE-1540
Sample ID: 12G0003-04
Sample Matrix: Soil Gas
Sampled: 6/26/2012 15:40

Sample Description/Location:
Sub Description/Location:
Canister ID: 1331
Canister Size: 6 liter
Flow Controller ID: 5040
Sample Type: grab

Work Order: 12G0003
Initial Vacuum(in Hg): -28
Final Vacuum(in Hg): -8
Receipt Vacuum(in Hg): -9
Flow Controller Type: fixed-orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

EPA TO-15

	ppbv			ug/m3			Date/Time	
Analyte	Results	RL	Flag	Results	RL	Dilution	Analyzed	Analyst
Acetone	1100	400		2700	950	200	7/11/12 5:37	WSD
Benzene	93	10		300	32	200	7/11/12 5:37	WSD
Benzyl chloride	ND	10		ND	52	200	7/11/12 5:37	WSD
Bromodichloromethane	ND	10		ND	67	200	7/11/12 5:37	WSD
Bromoform	ND	10		ND	100	200	7/11/12 5:37	WSD
Bromomethane	ND	10		ND	39	200	7/11/12 5:37	WSD
1,3-Butadiene	ND	10		ND	22	200	7/11/12 5:37	WSD
2-Butanone (MEK)	ND	400		ND	1200	200	7/11/12 5:37	WSD
Carbon Disulfide	110	100		330	310	200	7/11/12 5:37	WSD
Carbon Tetrachloride	ND	10		ND	63	200	7/11/12 5:37	WSD
Chlorobenzene	ND	10		ND	46	200	7/11/12 5:37	WSD
Chloroethane	ND	10		ND	26	200	7/11/12 5:37	WSD
Chloroform	ND	10		ND	49	200	7/11/12 5:37	WSD
Chloromethane	ND	10		ND	21	200	7/11/12 5:37	WSD
Cyclohexane	300	10		1000	34	200	7/11/12 5:37	WSD
Dibromochloromethane	ND	10		ND	85	200	7/11/12 5:37	WSD
1,2-Dibromoethane (EDB)	ND	10		ND	77	200	7/11/12 5:37	WSD
1,2-Dichlorobenzene	ND	10		ND	60	200	7/11/12 5:37	WSD
1,3-Dichlorobenzene	ND	10		ND	60	200	7/11/12 5:37	WSD
1,4-Dichlorobenzene	ND	10		ND	60	200	7/11/12 5:37	WSD
Dichlorodifluoromethane (Freon 12)	ND	10		ND	49	200	7/11/12 5:37	WSD
1,1-Dichloroethane	ND	10		ND	40	200	7/11/12 5:37	WSD
1,2-Dichloroethane	ND	10		ND	40	200	7/11/12 5:37	WSD
1,1-Dichloroethylene	37	10		150	40	200	7/11/12 5:37	WSD
cis-1,2-Dichloroethylene	32000	200		130000	790	4000	7/11/12 6:13	WSD
trans-1,2-Dichloroethylene	170	10		670	40	200	7/11/12 5:37	WSD
1,2-Dichloropropane	ND	10		ND	46	200	7/11/12 5:37	WSD
cis-1,3-Dichloropropene	ND	10		ND	45	200	7/11/12 5:37	WSD
trans-1,3-Dichloropropene	ND	10		ND	45	200	7/11/12 5:37	WSD
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	ND	10		ND	70	200	7/11/12 5:37	WSD
1,4-Dioxane	ND	10		ND	36	200	7/11/12 5:37	WSD
Ethanol	ND	400		ND	750	200	7/11/12 5:37	WSD
Ethyl Acetate	670	10		2400	36	200	7/11/12 5:37	WSD
Ethylbenzene	67	10		290	43	200	7/11/12 5:37	WSD
4-Ethyltoluene	ND	10		ND	49	200	7/11/12 5:37	WSD
Heptane	290	10		1200	41	200	7/11/12 5:37	WSD
Hexachlorobutadiene	ND	10		ND	110	200	7/11/12 5:37	WSD

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ANALYTICAL RESULTS

Project Location: Majestic Cleaners Brooklyn, NY
Date Received: 6/29/2012
Field Sample #: AS/SVE-1540
Sample ID: 12G0003-04
Sample Matrix: Soil Gas
Sampled: 6/26/2012 15:40

Sample Description/Location:
Sub Description/Location:
Canister ID: 1331
Canister Size: 6 liter
Flow Controller ID: 5040
Sample Type: grab

Work Order: 12G0003
Initial Vacuum(in Hg): -28
Final Vacuum(in Hg): -8
Receipt Vacuum(in Hg): -9
Flow Controller Type: fixed-orifice
Flow Controller Calibration
RPD Pre and Post-Sampling: Grab

EPA TO-15

Analyte	ppbv Results	ppbv RL	Flag	ug/m3 Results	ug/m3 RL	Dilution	Date/Time Analyzed	Analyst
Hexane	ND	400		ND	1400	200	7/11/12 5:37	WSD
2-Hexanone (MBK)	ND	10		ND	41	200	7/11/12 5:37	WSD
Isopropanol	ND	400		ND	980	200	7/11/12 5:37	WSD
Methyl tert-Butyl Ether (MTBE)	ND	10		ND	36	200	7/11/12 5:37	WSD
Methylene Chloride	270	100		930	350	200	7/11/12 5:37	WSD
4-Methyl-2-pentanone (MIBK)	ND	10		ND	41	200	7/11/12 5:37	WSD
Naphthalene	26	10		130	52	200	7/11/12 5:37	WSD
Propene	ND	400		ND	690	200	7/11/12 5:37	WSD
Styrene	ND	10		ND	43	200	7/11/12 5:37	WSD
1,1,2,2-Tetrachloroethane	ND	10		ND	69	200	7/11/12 5:37	WSD
Tetrachloroethylene	67000	200		460000	1400	4000	7/11/12 6:13	WSD
Tetrahydrofuran	ND	10		ND	29	200	7/11/12 5:37	WSD
Toluene	82	10		310	38	200	7/11/12 5:37	WSD
1,2,4-Trichlorobenzene	ND	20		ND	150	200	7/11/12 5:37	WSD
1,1,1-Trichloroethane	ND	10		ND	55	200	7/11/12 5:37	WSD
1,1,2-Trichloroethane	ND	10		ND	55	200	7/11/12 5:37	WSD
Trichloroethylene	4100	10		22000	54	200	7/11/12 5:37	WSD
Trichlorofluoromethane (Freon 11)	ND	10		ND	56	200	7/11/12 5:37	WSD
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	10		ND	77	200	7/11/12 5:37	WSD
1,2,4-Trimethylbenzene	35	10		170	49	200	7/11/12 5:37	WSD
1,3,5-Trimethylbenzene	12	10		61	49	200	7/11/12 5:37	WSD
Vinyl Acetate	ND	20		ND	70	200	7/11/12 5:37	WSD
Vinyl Chloride	7400	10		19000	26	200	7/11/12 5:37	WSD
m&p-Xylene	22	20		95	87	200	7/11/12 5:37	WSD
o-Xylene	13	10		58	43	200	7/11/12 5:37	WSD

Surrogates	% Recovery	% REC Limits	
4-Bromofluorobenzene (1)	100	70-130	7/11/12 6:13
4-Bromofluorobenzene (1)	102	70-130	7/11/12 5:37

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Sample Extraction Data

Prep Method: TO-15 Prep-EPA TO-15

Lab Number [Field ID]	Batch	Pressure Dilution	Pre Dilution	Pre-Dil Initial mL	Pre-Dil Final mL	Default Injection mL	Actual Injection mL	Date
12G0003-01 [SVE-1035]	B054839	2	100	10	1000	400	400	07/10/12
12G0003-01RE1 [SVE-1035]	B054839	2	100	10	1000	400	20	07/10/12
12G0003-02 [SVE-1230]	B054839	2	100	10	1000	400	400	07/10/12
12G0003-02RE1 [SVE-1230]	B054839	2	100	10	1000	400	20	07/10/12
12G0003-03 [AS/SVE-1400]	B054839	2	100	10	1000	400	400	07/10/12
12G0003-03RE1 [AS/SVE-1400]	B054839	2	100	10	1000	400	20	07/10/12
12G0003-04 [AS/SVE-1540]	B054839	2	100	10	1000	400	400	07/10/12
12G0003-04RE1 [AS/SVE-1540]	B054839	2	100	10	1000	400	20	07/10/12

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QUALITY CONTROL

Air Toxics by EPA Compendium Methods - Quality Control

Analyte	ppbv Results	ppbv RL	ug/m3 Results	ug/m3 RL	Spike Level ppbv	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch B054839 - TO-15 Prep											
Blank (B054839-BLK1)					Prepared & Analyzed: 07/10/12						
Acetone	ND	1.0									
Benzene	ND	0.025									
Benzyl chloride	ND	0.025									
Bromodichloromethane	ND	0.025									
Bromoform	ND	0.025									
Bromomethane	ND	0.025									
1,3-Butadiene	ND	0.025									
2-Butanone (MEK)	ND	1.0									
Carbon Disulfide	ND	0.25									
Carbon Tetrachloride	ND	0.025									
Chlorobenzene	ND	0.025									
Chloroethane	ND	0.025									
Chloroform	ND	0.025									
Chloromethane	ND	0.025									
Cyclohexane	ND	0.025									
Dibromochloromethane	ND	0.025									
1,2-Dibromoethane (EDB)	ND	0.025									
1,2-Dichlorobenzene	ND	0.025									
1,3-Dichlorobenzene	ND	0.025									
1,4-Dichlorobenzene	ND	0.025									
Dichlorodifluoromethane (Freon 12)	ND	0.025									
1,1-Dichloroethane	ND	0.025									
1,2-Dichloroethane	ND	0.025									
1,1-Dichloroethylene	ND	0.025									
cis-1,2-Dichloroethylene	ND	0.025									
trans-1,2-Dichloroethylene	ND	0.025									
1,2-Dichloropropane	ND	0.025									
cis-1,3-Dichloropropene	ND	0.025									
trans-1,3-Dichloropropene	ND	0.025									
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	ND	0.025									
1,4-Dioxane	ND	0.025									
Ethanol	ND	1.0									
Ethyl Acetate	ND	0.025									
Ethylbenzene	ND	0.025									
4-Ethyltoluene	ND	0.025									
Heptane	ND	0.025									
Hexachlorobutadiene	ND	0.025									
Hexane	ND	1.0									
2-Hexanone (MBK)	ND	0.025									
Isopropanol	ND	1.0									
Methyl tert-Butyl Ether (MTBE)	ND	0.025									
Methylene Chloride	ND	0.25									
4-Methyl-2-pentanone (MIBK)	ND	0.025									
Naphthalene	ND	0.025									
Propene	ND	1.0									
Styrene	ND	0.025									

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QUALITY CONTROL

Air Toxics by EPA Compendium Methods - Quality Control

Analyte	ppbv Results	ppbv RL	ug/m3 Results	ug/m3 RL	Spike Level ppbv	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch B054839 - TO-15 Prep											
Blank (B054839-BLK1)					Prepared & Analyzed: 07/10/12						
1,1,2,2-Tetrachloroethane	ND	0.025									
Tetrachloroethylene	ND	0.025									
Tetrahydrofuran	ND	0.025									
Toluene	ND	0.025									
1,2,4-Trichlorobenzene	ND	0.050									
1,1,1-Trichloroethane	ND	0.025									
1,1,2-Trichloroethane	ND	0.025									
Trichloroethylene	ND	0.025									
Trichlorofluoromethane (Freon 11)	ND	0.025									
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.025									
1,2,4-Trimethylbenzene	ND	0.025									
1,3,5-Trimethylbenzene	ND	0.025									
Vinyl Acetate	ND	0.050									
Vinyl Chloride	ND	0.025									
m&p-Xylene	ND	0.050									
o-Xylene	ND	0.025									
Surrogate: 4-Bromofluorobenzene (1)	*7.99*				*8.00*		*99.8*	*70-130*			
LCS (B054839-BS1)					Prepared & Analyzed: 07/10/12						
Acetone	4.04				5.00		80.9	50-150			
Benzene	4.14				5.00		82.8	70-130			
Benzyl chloride	4.15				5.00		83.1	70-130			
Bromodichloromethane	4.17				5.00		83.4	70-130			
Bromoform	5.14				5.00		103	70-130			
Bromomethane	5.47				5.00		109	70-130			
1,3-Butadiene	4.69				5.00		93.8	70-130			
2-Butanone (MEK)	4.02				5.00		80.4	70-130			
Carbon Disulfide	4.23				5.00		84.6	70-130			
Carbon Tetrachloride	4.15				5.00		83.0	70-130			
Chlorobenzene	4.85				5.00		97.0	70-130			
Chloroethane	4.98				5.00		99.5	70-130			
Chloroform	5.14				5.00		103	70-130			
Chloromethane	4.59				5.00		91.9	70-130			
Cyclohexane	3.95				5.00		78.9	50-150			
Dibromochloromethane	4.78				5.00		95.7	70-130			
1,2-Dibromoethane (EDB)	4.80				5.00		96.0	70-130			
1,2-Dichlorobenzene	4.94				5.00		98.7	70-130			
1,3-Dichlorobenzene	5.07				5.00		101	70-130			
1,4-Dichlorobenzene	4.95				5.00		99.0	70-130			
Dichlorodifluoromethane (Freon 12)	5.03				5.00		101	70-130			
1,1-Dichloroethane	4.96				5.00		99.1	70-130			
1,2-Dichloroethane	4.55				5.00		91.1	70-130			
1,1-Dichloroethylene	4.36				5.00		87.2	70-130			
cis-1,2-Dichloroethylene	4.97				5.00		99.4	70-130			
trans-1,2-Dichloroethylene	4.68				5.00		93.7	70-130			
1,2-Dichloropropane	4.17				5.00		83.4	70-130			

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QUALITY CONTROL

Air Toxics by EPA Compendium Methods - Quality Control

Analyte	ppbv Results	ppbv RL	ug/m3 Results	ug/m3 RL	Spike Level ppbv	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch B054839 - TO-15 Prep											
LCS (B054839-BS1)					Prepared & Analyzed: 07/10/12						
cis-1,3-Dichloropropene	4.34				5.00		86.7	70-130			
trans-1,3-Dichloropropene	3.81				5.00		76.3	70-130			
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	5.43				5.00		109	70-130			
1,4-Dioxane	4.56				5.00		91.3	70-130			
Ethanol	3.89				5.00		77.8	50-150			
Ethyl Acetate	4.30				5.00		86.0	50-150			
Ethylbenzene	4.44				5.00		88.8	70-130			
4-Ethyltoluene	4.46				5.00		89.2	50-150			
Heptane	3.88				5.00		77.5	50-150			
Hexachlorobutadiene	4.73				5.00		94.7	70-130			
Hexane	3.92				5.00		78.4	70-130			
2-Hexanone (MBK)	3.30				5.00		66.1	50-150			
Isopropanol	3.54				5.00		70.7	50-150			
Methyl tert-Butyl Ether (MTBE)	4.72				5.00		94.5	70-130			
Methylene Chloride	3.92				5.00		78.3	70-130			
4-Methyl-2-pentanone (MIBK)	3.95				5.00		78.9	70-130			
Naphthalene	4.62				5.00		92.4	50-150			
Propene	4.72				5.00		94.4	50-150			
Styrene	4.68				5.00		93.7	70-130			
1,1,2,2-Tetrachloroethane	5.05				5.00		101	70-130			
Tetrachloroethylene	4.76				5.00		95.2	70-130			
Tetrahydrofuran	4.21				5.00		84.3	50-150			
Toluene	4.49				5.00		89.8	70-130			
1,2,4-Trichlorobenzene	5.64				5.00		113	70-130			
1,1,1-Trichloroethane	3.84				5.00		76.9	70-130			
1,1,2-Trichloroethane	4.76				5.00		95.1	70-130			
Trichloroethylene	4.48				5.00		89.6	70-130			
Trichlorofluoromethane (Freon 11)	5.10				5.00		102	70-130			
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	5.16				5.00		103	70-130			
1,2,4-Trimethylbenzene	4.54				5.00		90.9	70-130			
1,3,5-Trimethylbenzene	4.54				5.00		90.8	70-130			
Vinyl Acetate	3.57				5.00		71.3	70-130			
Vinyl Chloride	5.06				5.00		101	70-130			
m&p-Xylene	8.63				10.0		86.3	70-130			
o-Xylene	4.56				5.00		91.1	70-130			
Surrogate: 4-Bromofluorobenzene (1)	*8.13*				*8.00*		*102*	*70-130*			

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

con-test® ANALYTICAL LABORATORY

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INTERNAL STANDARD AREA AND RT SUMMARY

EPA TO-15

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (S002520-CCV1)			Lab File ID: F071002.D			Analyzed: 07/10/12 14:33			
Bromochloromethane (1)	157828	8.587	228536	8.592	69	60 - 140	-0.0050	+/-0.50	
1,4-Difluorobenzene (1)	602371	10.333	684560	10.345	88	60 - 140	-0.0120	+/-0.50	
Chlorobenzene-d5 (1)	527019	14.687	610110	14.697	86	60 - 140	-0.0100	+/-0.50	
LCS (B054839-BS1)			Lab File ID: F071003.D			Analyzed: 07/10/12 15:09			
Bromochloromethane (1)	159673	8.587	157828	8.587	101	60 - 140	0.0000	+/-0.50	
1,4-Difluorobenzene (1)	607636	10.34	602371	10.333	101	60 - 140	0.0070	+/-0.50	
Chlorobenzene-d5 (1)	536362	14.687	527019	14.687	102	60 - 140	0.0000	+/-0.50	
Blank (B054839-BLK1)			Lab File ID: F071005.D			Analyzed: 07/10/12 16:31			
Bromochloromethane (1)	154240	8.572	157828	8.587	98	60 - 140	-0.0150	+/-0.50	
1,4-Difluorobenzene (1)	570698	10.325	602371	10.333	95	60 - 140	-0.0080	+/-0.50	
Chlorobenzene-d5 (1)	505627	14.68	527019	14.687	96	60 - 140	-0.0070	+/-0.50	
SVE-1035 (12G0003-01)			Lab File ID: F071017.D			Analyzed: 07/11/12 01:49			
Bromochloromethane (1)	156556	8.594	157828	8.587	99	60 - 140	0.0070	+/-0.50	
1,4-Difluorobenzene (1)	598866	10.34	602371	10.333	99	60 - 140	0.0070	+/-0.50	
Chlorobenzene-d5 (1)	506413	14.71	527019	14.687	96	60 - 140	0.0230	+/-0.50	
SVE-1035 (12G0003-01RE1)			Lab File ID: F071018.D			Analyzed: 07/11/12 02:26			
Bromochloromethane (1)	160562	8.572	157828	8.587	102	60 - 140	-0.0150	+/-0.50	
1,4-Difluorobenzene (1)	616419	10.325	602371	10.333	102	60 - 140	-0.0080	+/-0.50	
Chlorobenzene-d5 (1)	541985	14.68	527019	14.687	103	60 - 140	-0.0070	+/-0.50	
SVE-1230 (12G0003-02)			Lab File ID: F071019.D			Analyzed: 07/11/12 03:05			
Bromochloromethane (1)	162241	8.572	157828	8.587	103	60 - 140	-0.0150	+/-0.50	
1,4-Difluorobenzene (1)	616794	10.326	602371	10.333	102	60 - 140	-0.0070	+/-0.50	
Chlorobenzene-d5 (1)	541078	14.68	527019	14.687	103	60 - 140	-0.0070	+/-0.50	
SVE-1230 (12G0003-02RE1)			Lab File ID: F071020.D			Analyzed: 07/11/12 03:43			
Bromochloromethane (1)	156939	8.572	157828	8.587	99	60 - 140	-0.0150	+/-0.50	
1,4-Difluorobenzene (1)	602188	10.325	602371	10.333	100	60 - 140	-0.0080	+/-0.50	
Chlorobenzene-d5 (1)	531882	14.68	527019	14.687	101	60 - 140	-0.0070	+/-0.50	
AS/SVE-1400 (12G0003-03)			Lab File ID: F071021.D			Analyzed: 07/11/12 04:22			
Bromochloromethane (1)	162733	8.572	157828	8.587	103	60 - 140	-0.0150	+/-0.50	
1,4-Difluorobenzene (1)	614256	10.325	602371	10.333	102	60 - 140	-0.0080	+/-0.50	
Chlorobenzene-d5 (1)	538654	14.688	527019	14.687	102	60 - 140	0.0010	+/-0.50	
AS/SVE-1400 (12G0003-03RE1)			Lab File ID: F071022.D			Analyzed: 07/11/12 04:58			
Bromochloromethane (1)	156541	8.579	157828	8.587	99	60 - 140	-0.0080	+/-0.50	
1,4-Difluorobenzene (1)	608578	10.325	602371	10.333	101	60 - 140	-0.0080	+/-0.50	
Chlorobenzene-d5 (1)	539961	14.68	527019	14.687	102	60 - 140	-0.0070	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

EPA TO-15

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
AS/SVE-1540 (12G0003-04)			Lab File ID: F071023.D			Analyzed: 07/11/12 05:37			
Bromochloromethane (1)	161584	8.587	157828	8.587	102	60 - 140	0.0000	+/-0.50	
1,4-Difluorobenzene (1)	606420	10.333	602371	10.333	101	60 - 140	0.0000	+/-0.50	
Chlorobenzene-d5 (1)	531544	14.695	527019	14.687	101	60 - 140	0.0080	+/-0.50	
AS/SVE-1540 (12G0003-04RE1)			Lab File ID: F071024.D			Analyzed: 07/11/12 06:13			
Bromochloromethane (1)	158385	8.565	157828	8.587	100	60 - 140	-0.0220	+/-0.50	
1,4-Difluorobenzene (1)	625256	10.318	602371	10.333	104	60 - 140	-0.0150	+/-0.50	
Chlorobenzene-d5 (1)	554386	14.68	527019	14.687	105	60 - 140	-0.0070	+/-0.50	

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CONTINUING CALIBRATION CHECK

EPA TO-15

S002520-CCV1

COMPOUND	TYPE	CONC. (ppbv)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acetone	A	5.00	3.97	0.9572932	0.7596928	0.05	-20.6	50
Benzene	A	5.00	4.07	0.7445976	0.6066667	0.05	-18.5	30
Benzyl chloride	A	5.00	4.01	1.039369	0.8339555	0.05	-19.8	30
Bromodichloromethane	A	5.00	4.14	0.5037588	0.4174889	0.05	-17.1	30
Bromoform	A	5.00	5.06	0.5202506	0.5260106	0.05	1.1	30
Bromomethane	A	5.00	5.46	0.6800857	0.7419317	0.05	9.1	30
1,3-Butadiene	A	5.00	4.62	0.5168669	0.4774818	0.05	-7.6	30
2-Butanone (MEK)	A	5.00	3.99	1.442287	1.14992	0.05	-20.3	30
Carbon Disulfide	A	5.00	4.22	1.990114	1.677796	0.05	-15.7	30
Carbon Tetrachloride	A	5.00	4.05	0.4616211	0.3742013	0.05	-18.9	30
Chlorobenzene	A	5.00	4.80	0.7711919	0.7404029	0.05	-4.0	30
Chloroethane	A	5.00	4.74	0.3673746	0.3480751	0.05	-5.3	30
Chloroform	A	5.00	5.09	1.424879	1.451758	0.05	1.9	30
Chloromethane	A	5.00	4.55	0.6045946	0.5503814	0.05	-9.0	30
Cyclohexane	A	5.00	3.95	0.3404812	0.2687274	0.05	-21.1	50
Dibromochloromethane	A	5.00	4.76	0.5565529	0.530431	0.05	-4.7	30
1,2-Dibromoethane (EDB)	A	5.00	4.74	0.5224367	0.4953506	0.05	-5.2	30
1,2-Dichlorobenzene	A	5.00	4.80	0.7350193	0.7055776	0.05	-4.0	30
1,3-Dichlorobenzene	A	5.00	4.89	0.774909	0.7578414	0.05	-2.2	30
1,4-Dichlorobenzene	A	5.00	4.76	0.7899202	0.7521915	0.05	-4.8	30
Dichlorodifluoromethane (Freon 12)	A	5.00	4.98	1.676061	1.668611	0.05	-0.4	30
1,1-Dichloroethane	A	5.00	4.91	1.265918	1.242142	0.05	-1.9	30
1,2-Dichloroethane	A	5.00	4.48	0.9102673	0.8151659	0.05	-10.4	30
1,1-Dichloroethylene	A	5.00	4.18	1.036199	0.8665028	0.05	-16.4	30
cis-1,2-Dichloroethylene	A	5.00	4.89	0.9291754	0.908726	0.05	-2.2	30
trans-1,2-Dichloroethylene	A	5.00	4.77	0.994264	0.9477152	0.05	-4.7	30
1,2-Dichloropropane	A	5.00	4.10	0.2704444	0.221684	0.05	-18.0	30
cis-1,3-Dichloropropene	A	5.00	4.33	0.4016621	0.3478335	0.05	-13.4	30
trans-1,3-Dichloropropene	A	5.00	3.57	0.4003214	0.28578	0.05	-28.6	30
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 1	A	5.00	5.11	1.873473	1.915341	0.05	2.2	30
1,4-Dioxane	A	5.00	4.58	0.1553033	0.1422565	0.05	-8.4	30
Ethanol	A	5.00	3.36	0.2417121	0.1625567	0.05	-32.7	50
Ethyl Acetate	A	5.00	4.21	0.2271156	0.1913171	0.05	-15.8	50
Ethylbenzene	A	5.00	4.46	1.276998	1.139915	0.05	-10.7	30
4-Ethyltoluene	A	5.00	4.43	1.413115	1.253274	0.05	-11.3	50
Heptane	A	5.00	3.85	0.2255311	0.1736206	0.05	-23.0	50
Hexachlorobutadiene	A	5.00	4.42	0.4997336	0.4415446	0.05	-11.6	30
Hexane	A	5.00	3.78	0.8010376	0.6049421	0.05	-24.5	30

con-test® ANALYTICAL LABORATORY

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CONTINUING CALIBRATION CHECK

EPA TO-15

S002520-CCV1

COMPOUND	TYPE	CONC. (ppbv)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
2-Hexanone (MBK)	A	5.00	3.35	0.6180448	0.4144579	0.05	-32.9	50
Isopropanol	A	5.00	3.27	1.280226	0.8377525	0.05	-34.6	50
Methyl tert-Butyl Ether (MTBE)	A	5.00	4.73	1.981639	1.873148	0.05	-5.5	30
Methylene Chloride	A	5.00	3.69	0.764772	0.564199	0.05	-26.2	30
4-Methyl-2-pentanone (MIBK)	A	5.00	4.00	0.2259675	0.1805744	0.05	-20.1	30
Propene	A	5.00	4.70	0.4763985	0.4482753	0.05	-5.9	50
Styrene	A	5.00	4.60	0.7668346	0.7053712	0.05	-8.0	30
1,1,2,2-Tetrachloroethane	A	5.00	4.94	0.697533	0.6892412	0.05	-1.2	30
Tetrachloroethylene	A	5.00	4.72	0.4642605	0.437862	0.05	-5.7	30
Tetrahydrofuran	A	5.00	4.23	0.7981852	0.6751451	0.05	-15.4	50
Toluene	A	5.00	4.46	0.9857128	0.8794977	0.05	-10.8	30
1,2,4-Trichlorobenzene	A	5.00	4.83	0.5310595	0.5129196	0.05	-3.4	30
1,1,1-Trichloroethane	A	5.00	3.82	0.4743502	0.3619829	0.05	-23.7	30
1,1,2-Trichloroethane	A	5.00	4.72	0.3284759	0.3097422	0.05	-5.7	30
Trichloroethylene	A	5.00	4.42	0.3129761	0.2769961	0.05	-11.5	30
Trichlorofluoromethane (Freon 11)	A	5.00	5.11	1.706165	1.744502	0.05	2.2	30
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	A	5.00	5.06	1.350825	1.365933	0.05	1.1	30
1,2,4-Trimethylbenzene	A	5.00	4.47	1.153349	1.03138	0.05	-10.6	30
1,3,5-Trimethylbenzene	A	5.00	4.47	1.16111	1.038876	0.05	-10.5	30
Vinyl Acetate	A	5.00	3.60	2.070403	1.489115	0.05	-28.1	30
Vinyl Chloride	A	5.00	5.01	0.6972394	0.6982285	0.05	0.1	30
m&p-Xylene	A	10.0	8.54	1.024508	0.8755085	0.05	-14.5	30
o-Xylene	A	5.00	4.48	1.014615	0.9099998	0.05	-10.3	30

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA TO-15 in Air	
Acetone	AIHA
Benzene	AIHA,FL,NJ,NY
Benzyl chloride	AIHA,FL,NJ,NY
Bromodichloromethane	AIHA,NJ
Bromoform	AIHA,NJ
Bromomethane	AIHA,FL,NJ,NY
1,3-Butadiene	AIHA,NJ
2-Butanone (MEK)	AIHA,FL,NJ,NY
Carbon Disulfide	AIHA,NJ
Carbon Tetrachloride	AIHA,FL,NJ,NY
Chlorobenzene	AIHA,FL,NJ,NY
Chloroethane	AIHA,FL,NJ,NY
Chloroform	AIHA,FL,NJ,NY
Chloromethane	AIHA,FL,NJ,NY
Cyclohexane	AIHA,NJ
Dibromochloromethane	AIHA,NY
1,2-Dibromoethane (EDB)	AIHA,NJ,NY
1,2-Dichlorobenzene	AIHA,FL,NJ,NY
1,3-Dichlorobenzene	AIHA,NJ,NY
1,4-Dichlorobenzene	AIHA,FL,NJ,NY
Dichlorodifluoromethane (Freon 12)	AIHA,NY
1,1-Dichloroethane	AIHA,FL,NJ,NY
1,2-Dichloroethane	AIHA,FL,NJ,NY
1,1-Dichloroethylene	AIHA,FL,NJ,NY
cis-1,2-Dichloroethylene	AIHA,FL,NY
trans-1,2-Dichloroethylene	AIHA,NJ,NY
1,2-Dichloropropane	AIHA,FL,NJ,NY
cis-1,3-Dichloropropene	AIHA,FL,NJ,NY
trans-1,3-Dichloropropene	AIHA,NY
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	AIHA,NJ
1,4-Dioxane	AIHA,NJ
Ethanol	AIHA
Ethyl Acetate	AIHA
Ethylbenzene	AIHA,FL,NJ,NY
4-Ethyltoluene	AIHA,NJ
Heptane	AIHA,NJ,NY
Hexachlorobutadiene	AIHA,NJ,NY
Hexane	AIHA,FL,NJ,NY
2-Hexanone (MBK)	AIHA
Isopropanol	AIHA,NY
Methyl tert-Butyl Ether (MTBE)	AIHA,FL,NJ,NY
Methylene Chloride	AIHA,FL,NJ,NY
4-Methyl-2-pentanone (MIBK)	AIHA,FL,NJ,NY
Naphthalene	NY
Propene	AIHA
Styrene	AIHA,FL,NJ,NY
1,1,2,2-Tetrachloroethane	AIHA,FL,NJ,NY

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA TO-15 in Air	
Tetrachloroethylene	AIHA,FL,NJ,NY
Tetrahydrofuran	AIHA
Toluene	AIHA,FL,NJ,NY
1,2,4-Trichlorobenzene	AIHA,NJ,NY
1,1,1-Trichloroethane	AIHA,FL,NJ,NY
1,1,2-Trichloroethane	AIHA,FL,NJ,NY
Trichloroethylene	AIHA,FL,NJ,NY
Trichlorofluoromethane (Freon 11)	AIHA,NY
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	AIHA,NJ,NY
1,2,4-Trimethylbenzene	AIHA,NJ,NY
1,3,5-Trimethylbenzene	AIHA,NJ,NY
Vinyl Acetate	AIHA,FL,NJ,NY
Vinyl Chloride	AIHA,FL,NJ,NY
m&p-Xylene	AIHA,FL,NJ,NY
o-Xylene	AIHA,FL,NJ,NY

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC	100033	02/1/2014
MA	Massachusetts DEP	M-MA100	06/30/2013
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2013
NY	New York State Department of Health	10899 NELAP	04/1/2013
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2013
RI	Rhode Island Department of Health	LAO00112	12/30/2012
NC	North Carolina Div. of Water Quality	652	12/31/2012
NJ	New Jersey DEP	MA007 NELAP	06/30/2013
FL	Florida Department of Health	E871027 NELAP	06/30/2013
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2012
WA	State of Washington Department of Ecology	C2065	02/23/2013
ME	State of Maine	2011028	06/9/2013
VA	Commonwealth of Virginia	1381	12/14/2012

con-test® ANALYTICAL LABORATORY
Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com
www.contestlabs.com

AIR SAMPLE CHAIN OF CUSTODY RECORD

39 SPRUCE ST
EAST LONGMEADOW, MA 01028

Page 1 of 1

1260003

Company Name: ARCADIS U.S. INC.
Address: 855 ROUTE 146, SUITE 210
CLIFTON PARK, NY 12065
Attention: STEFAN BAGNATO
MAJESTIC CLEANERS
Project Location: BROOKLYN, NY
Sampled By: STEFAN BAGNATO

Telephone: (518) 250 7300
Project # 00266384.0000
Client PO #

DATA DELIVERY (check one):
☐ FAX ☑ EMAIL ☐ WEBSITE CLIENT
Fax # :
Email: stefan.bagnato@arcadis-us.com
Format: ☑ EXCEL ☑ PDF ☐ GIS KEY ☐ OTHER___

Proposal Provided? (For Billing purposes)
☐ yes _____ proposal date

Field ID	Sample Description	Media	Lab #	Date Sampled Start Date Time	Date Sampled Stop Date Time	ONLY USE WHEN USING PUMPS Total Minutes Sampled	Flow Rate M^3/Min. or L / Min.	Volume Liters or M^3	Matrix Code*	ANALYSIS REQUESTED Tedlar	" Hg Initial pressure	" Hg Final Pressure	" Hg Lab Receipt Pressure	Summa Canister ID	Flow Controller ID
SVE1035	GRAB	S	01	6/26/12 1035	6/26/12 1035				SG	X	-30	-9	9.5	1119	4009
SVE-1230	GRAB	S	02	6/26/12 1230	6/26/12 1230				SG	X	-28	-8	9.2	1623	4002
AS/SVE-1400	GRAB	S	03	6/26/12 1400	6/26/12 1400				SG	X	-28	-8	9.9	1868	5039
AS/SVE-1540	GRAB	S	04	6/26/12 1540	6/26/12 1540				SG	X	-28	-8	9	1331	5040

Please fill out completely, sign, d and retain the yello copy for your record.

Summa canisters and flow controllers must be returned within 14 days of receipt or rental fees will apply.

Summa canisters will be retained for a minimum of 14 days after sampling date prior to cleaning.

Laboratory Comments:

CLIENT COMMENTS: STD + NYSPEC EDD

Relinquished by: (signature)	Date/Time: 6/27/12 1230
Received by: (signature) Paula	Date/Time: 6.29.12 10:16
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Turnaround **
☐ 7-Day
☐ 10-Day
☒ Other STD
RUSH *
☐ *24-Hr ☐ *48-Hr
☐ *72-Hr ☐ *4-Day
*Approval Required

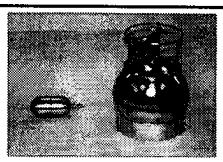
Special Requirements
Regulations:_____
Data Enhancement/RCP? ☐ Y ☐ N
Enhanced Data Package ☒ Y ☐ N
(Surchage Applies)
Required Detection Limits:_____
Other:_____

***Matrix Code:**
SG= SOIL GAS
IA= INDOOR AIR
AMB=AMBIENT
SS = SUB SLAB
D = DUP
BL = BLANK
O = other_____

****Media Codes:**
S=summa can
TB=tedlar bag
P=PUF
T=tube
F= filter
C=cassette
O = Other_____

** TURNAROUND TIME STARTS AT 9:00 A.M. THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON YOUR CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME WILL NOT START UNTIL ALL QUESTIONS ARE ANSWERED BY OUR CLIENT.

AIHA, NELAC & WBE/DBE Certified



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con-test® ANALYTICAL LABORATORY

AIR Only Receipt Checklist

39 Spruce St.
East Longmeadow, MA.
01028
P: 413-525-2332
F: 413-525-6405

CLIENT NAME: Arcadis **RECEIVED BY:** PB **DATE:** ~~7-2~~ 6.29.12

1) Was the chain(s) of custody relinquished and signed? (Yes) No

2) Does the chain agree with the samples? (Yes) No
If not, explain:

3) Are all the samples in good condition? (Yes) No
If not, explain:

4) Are there any samples "On Hold"? Yes (No) Stored where: _____

5) Are there any RUSH or SHORT HOLDING TIME samples? Yes (No)
Who was notified _____ Date _____ Time _____

6) Location where samples are stored: Air Lab

Permission to subcontract samples? Yes No
(Walk-in clients only) if not already approved
Client Signature: _____

Containers received at Con-Test

	# of Containers	Types (Size, Duration)
Summa Cans	5	6 L
Tedlar Bags		
Tubes		
Regulators	4	Grab
Restrictors		
Tubing		
Other		

Unused Summas: 1868, 1623, 1331, 1119, 1302

Unused Regulators: 5039, 5040, 4002, 4001

1) Was all media (used & unused checked into the WASP?

2) Were all returned summa cans, Restrictors, & Regulators documented as returned in the Air Lab Inbound/Outbound Excel Spreadsheet?

Laboratory Comments:

Air Sampling Media Certificate of Analysis

Date Analyzed: 5/29/2012 **Batch #:** 12CC0178

Certification Type: *Batch Certified* ☑ *Individual Certified* ☐

Media Type: *Summa Canister* ☑ *Flow Controllers* ☐

Media IDs: BC1119 BC1331

Note:Two ID's grouped together, for example BC2136/BC3145, represents matched pairs of certified summa canisters and flow controllers.

Units: PPBv

<0.80	Propene	<0.04	Vinyl acetate	<0.02	Dibromchloromethane
<0.02	Dichlorodifluoromethane	<0.80	Hexane	<0.02	1,2-Dibromomethane
<0.02	Chloromethane	<0.02	Ethyl acetate	<0.02	Tetrachloroethylene
<0.02	Freon 114	<0.02	Chloroform	<0.02	Chlorobenzene
<0.02	Vinyl chloride	0.06	Tetrahydrofuran	<0.02	Ethylbenzene
<0.02	1.3-Butadiene	<0.02	1,2-Dichloroethane	<0.04	m,p-Xylenes
<0.02	Bromomethane	<0.02	1,1,1-Trichloroethane	<0.02	Bromoform
<0.02	Chloroethane	<0.02	Benzene	<0.02	Styrene
<0.08	Acrolein	<0.02	Carbon Tetrachloride	<0.02	o-Xylene
<0.80	Acetone	<0.02	Cyclohexane	<0.02	1,1,2,2-Tetrachloroethane
<0.02	Trichlorofluoromethane	<0.02	1,2-Dichloropropane	<0.02	4-Ethyltoluene
<0.80	Ethanol	<0.02	Bromodichloromethane	<0.02	1,3,5-Trimethylbenzene
<0.02	1,1-Dichloroethylene	<0.02	Trichloroethylene	<0.02	1,2,4-Trimethylbenzene
0.24	Methylene chloride	<0.02	1,4-Dioxane	<0.02	1,3-Dichlorobenzene
<0.02	Freon 113	<0.02	Methylmethacrylate	<0.02	Benzyl chloride
<0.02	Carbon disulfide	<0.02	Heptane	<0.02	1,4-Dichlorobenzene
<0.02	t-1,2-Dichloroethylene	<0.02	MIBK	<0.02	1,2-Dichlorobenzene
<0.02	1,1-Dichloroethane	<0.02	c-1,3-Dichloropropylene	<0.04	1,2,4-Trichlorobenzene
<0.02	MTBE	<0.02	t-1,3-Dichloropropylene	<0.02	Naphthalene
<0.80	IPA	<0.02	1,1,2-Trichloroethylene	<0.02	Hexachlorobutadiene
<0.80	2-Butanone (MEK)	<0.02	Toluene		
<0.02	c-1,2-Dichloroethylene	<0.02	2-Hexanone (MBK)		

Special Notes:

Analyst Initials/Date: WSD 7/11/12

Air Sampling Media Certificate of Analysis

Date Analyzed: 5/30/2012 **Batch #:** 12CC0180

Certification Type: *Batch Certified* ☑ *Individual Certified* ☐

Media Type: *Summa Canister* ☑ *Flow Controllers* ☐

Media IDs: BC1623

Note:Two ID's grouped together, for example BC2136/BC3145, represents matched pairs of certified summa canisters and flow controllers.

Units: PPBv

<0.80	Propene	<0.04	Vinyl acetate	<0.02	Dibromchloromethane
<0.02	Dichlorodifluoromethane	<0.80	Hexane	<0.02	1,2-Dibromomethane
<0.02	Chloromethane	<0.02	Ethyl acetate	<0.02	Tetrachloroethylene
<0.02	Freon 114	<0.02	Chloroform	<0.02	Chlorobenzene
<0.02	Vinyl chloride	0.25	Tetrahydrofuran	<0.02	Ethylbenzene
<0.02	1.3-Butadiene	<0.02	1,2-Dichloroethane	<0.04	m,p-Xylenes
<0.02	Bromomethane	<0.02	1,1,1-Trichloroethane	<0.02	Bromoform
<0.02	Chloroethane	<0.02	Benzene	<0.02	Styrene
<0.08	Acrolein	<0.02	Carbon Tetrachloride	<0.02	o-Xylene
1.01	Acetone	<0.02	Cyclohexane	<0.02	1,1,2,2-Tetrachloroethane
<0.02	Trichlorofluoromethane	<0.02	1,2-Dichloropropane	<0.02	4-Ethyltoluene
<0.80	Ethanol	<0.02	Bromodichloromethane	<0.02	1,3,5-Trimethylbenzene
<0.02	1,1-Dichloroethylene	<0.02	Trichloroethylene	<0.02	1,2,4-Trimethylbenzene
0.24	Methylene chloride	<0.02	1,4-Dioxane	<0.02	1,3-Dichlorobenzene
<0.02	Freon 113	<0.02	Methylmethacrylate	<0.02	Benzyl chloride
<0.02	Carbon disulfide	<0.02	Heptane	<0.02	1,4-Dichlorobenzene
<0.02	t-1,2-Dichloroethylene	<0.02	MIBK	<0.02	1,2-Dichlorobenzene
<0.02	1,1-Dichloroethane	<0.02	c-1,3-Dichloropropylene	<0.04	1,2,4-Trichlorobenzene
<0.02	MTBE	<0.02	t-1,3-Dichloropropylene	<0.02	Naphthalene
<0.80	IPA	<0.02	1,1,2-Trichloroethylene	<0.02	Hexachlorobutadiene
<0.80	2-Butanone (MEK)	<0.02	Toluene		
<0.02	c-1,2-Dichloroethylene	<0.02	2-Hexanone (MBK)		

Special Notes:

Analyst Initials/Date: WSD 7/11/12

Air Sampling Media Certificate of Analysis

Date Analyzed: 5/30/2012 **Batch #:** 12CC0202

Certification Type: *Batch Certified* ☑ *Individual Certified* ☐

Media Type: *Summa Canister* ☑ *Flow Controllers* ☐

Media IDs: BC1868

Note:Two ID's grouped together, for example BC2136/BC3145, represents matched pairs of certified summa canisters and flow controllers.

Units: PPBv

<0.80	Propene	<0.04	Vinyl acetate	<0.02	Dibromchloromethane
<0.02	Dichlorodifluoromethane	<0.80	Hexane	<0.02	1,2-Dibromomethane
<0.02	Chloromethane	<0.02	Ethyl acetate	<0.02	Tetrachloroethylene
<0.02	Freon 114	<0.02	Chloroform	<0.02	Chlorobenzene
<0.02	Vinyl chloride	<0.02	Tetrahydrofuran	<0.02	Ethylbenzene
<0.02	1.3-Butadiene	<0.02	1,2-Dichloroethane	<0.04	m,p-Xylenes
<0.02	Bromomethane	<0.02	1,1,1-Trichloroethane	<0.02	Bromoform
<0.02	Chloroethane	<0.02	Benzene	<0.02	Styrene
<0.08	Acrolein	<0.02	Carbon Tetrachloride	<0.02	o-Xylene
<0.80	Acetone	<0.02	Cyclohexane	<0.02	1,1,2,2-Tetrachloroethane
<0.02	Trichlorofluoromethane	<0.02	1,2-Dichloropropane	<0.02	4-Ethyltoluene
<0.80	Ethanol	<0.02	Bromodichloromethane	<0.02	1,3,5-Trimethylbenzene
<0.02	1,1-Dichloroethylene	<0.02	Trichloroethylene	<0.02	1,2,4-Trimethylbenzene
<0.20	Methylene chloride	<0.02	1,4-Dioxane	<0.02	1,3-Dichlorobenzene
<0.02	Freon 113	<0.02	Methylmethacrylate	<0.02	Benzyl chloride
<0.02	Carbon disulfide	<0.02	Heptane	<0.02	1,4-Dichlorobenzene
<0.02	t-1,2-Dichloroethylene	<0.02	MIBK	<0.02	1,2-Dichlorobenzene
<0.02	1,1-Dichloroethane	<0.02	c-1,3-Dichloropropylene	<0.04	1,2,4-Trichlorobenzene
<0.02	MTBE	<0.02	t-1,3-Dichloropropylene	<0.02	Naphthalene
<0.80	IPA	<0.02	1,1,2-Trichloroethylene	<0.02	Hexachlorobutadiene
<0.80	2-Butanone (MEK)	<0.02	Toluene		
<0.02	c-1,2-Dichloroethylene	<0.02	2-Hexanone (MBK)		

Special Notes:

Analyst Initials/Date: WSD 7/11/12

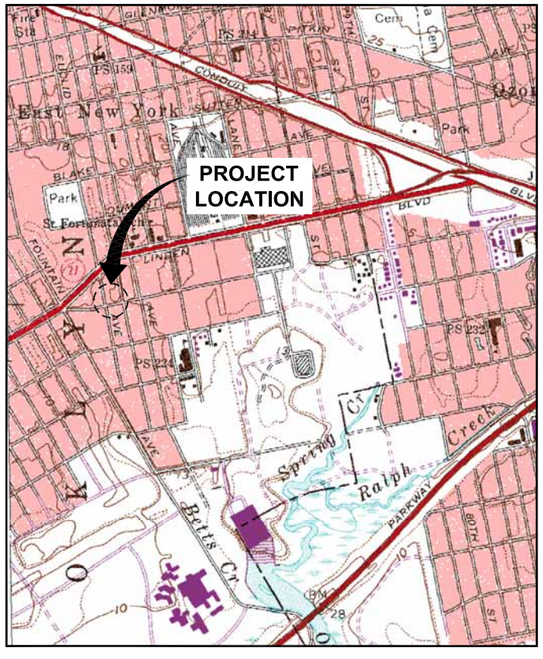
ARCADIS

Appendix C

Design Drawings

CONTRACT DRAWINGS

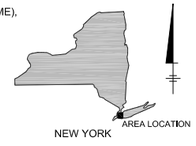
INTERIM REMEDIAL MEASURE AIR SPARGE/SOIL VAPOR EXTRACTION SYSTEM



REFERENCE: BASE MAP USGS 7.5 MINUTE QUADRANGLE., (QUADNAME), (ST)., (DATE)

LOCATION MAP

0 2000' 4000'
GRAPHIC SCALE



DATE ISSUED / DATE REVISED
AUGUST 2012

DRAFT

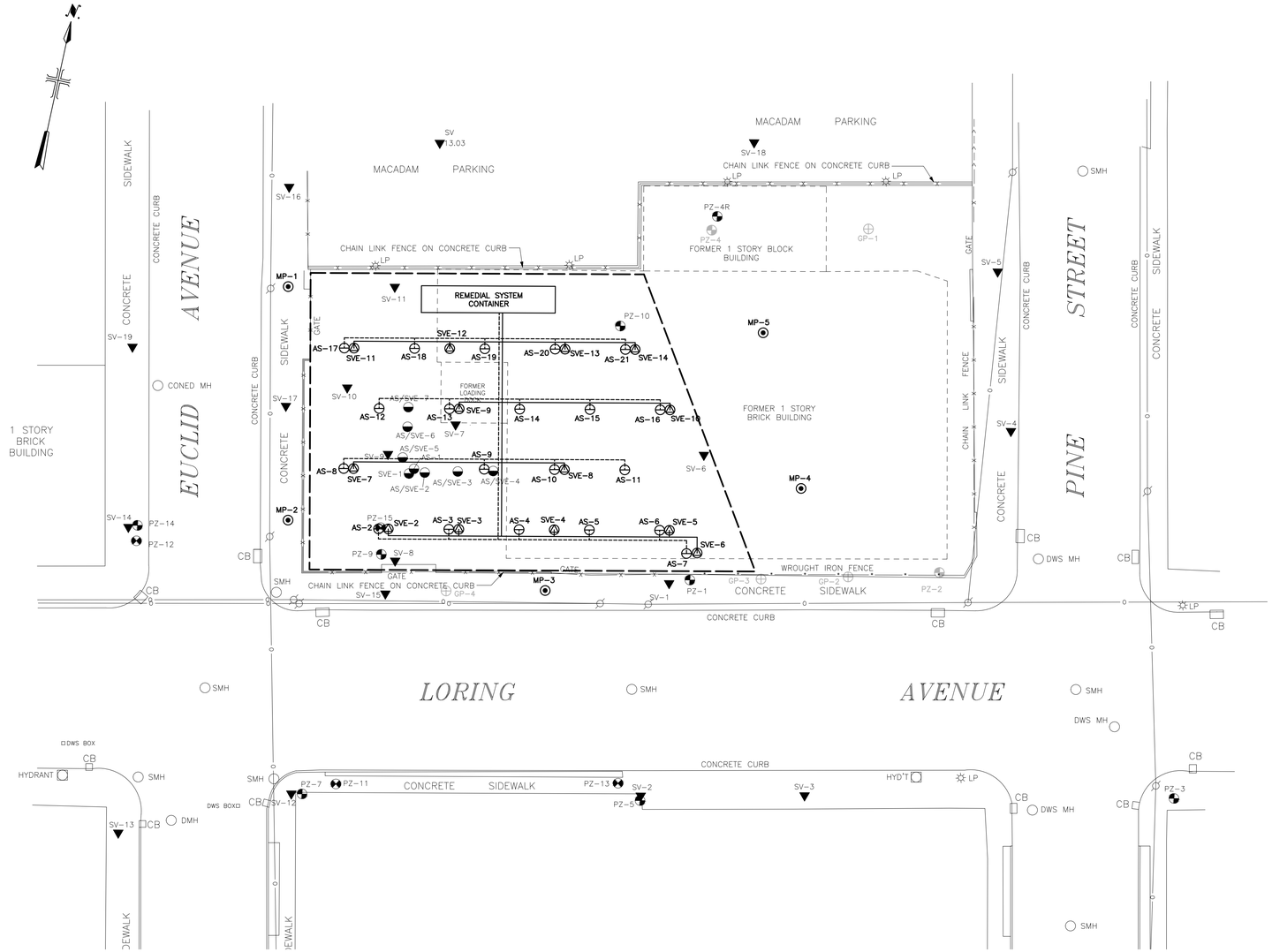
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
FORMER MAJESTIC GARMENT CLEANERS SITE (#2-24-035)
BROOKLYN, NEW YORK

MALCOLM PIRNIE ARCADIS

Infrastructure · Water · Environment · Buildings

ARCADIS U.S., INC.

INDEX TO DRAWINGS



LEGEND

- AS/SVE PILOT TEST POINTS
- DEEP PIEZOMETER WELL
- PIEZOMETER WELL
- SOIL VAPOR POINT
- CHAIN LINK FENCE
- WROUGHT IRON FENCE
- METAL FENCE
- UTILITY POLE
- OVERHEAD WIRE
- DRAINAGE MANHOLE
- CON ED MANHOLE
- CATCH BASIN
- LIGHT POLE
- HYDRANT
- SEWER MANHOLE
- PROPOSED SOIL VAPOR EXTRACTION POINT
- PROPOSED AIR SPARGE POINT
- PROPOSED MONITORING POINT
- PROPOSED SOIL VAPOR EXTRACTION PIPING
- PROPOSED AIR SPARGE PIPING
- AREA OF REMEDIATION

NOTES:

1. HALF–TONED ITEMS HAVE BEEN REMOVED OR DESTROYED.
2. SEE DRAWING G–2 FOR DETAILS ON UNDERGROUND PIPING, WELL HEADS AND WELL CONSTRUCTION.

SOURCE: 2001/2002, APRIL 2011, AUGUST 2011, JUNE 2012 SURVEY PERFORMED BY YEC INC., VALLEY COTTAGE, NY

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No.	Date	Revisions	By	Ckd
		DRAFT 65% RD		

Professional Engineer's Name

Professional Engineer's No.

State	Date Signed	Project Mgr.
		BRN
Designed by	Drawn by	Checked by
	SMH	

MALCOLM PIRNIE ARCADIS
Infrastructure · Water · Environment · Buildings

FORMER MAJESTIC GARMENT CLEANERS SITE (#2-24-035) • BROOKLYN, NEW YORK
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
INTERIM REMEDIAL MEASURE • AIR SPARGE/SOIL VAPOR EXTRACTION SYSTEM

SITE PLAN / REMEDIAL DESIGN LAYOUT

GENERAL

ARCADIS Project No.
00266384.0000

Date
2012

ARCADIS of New York, Inc.
855 ROUTE 146, SUITE 210
CLIFTON PARK, NY
TEL: 518.250.7300

G-1

XREFS: G:\ACAD\PROJ\00266384\VREF\Basemap-JUN2012-30SCALE.dwg IMAGES:None
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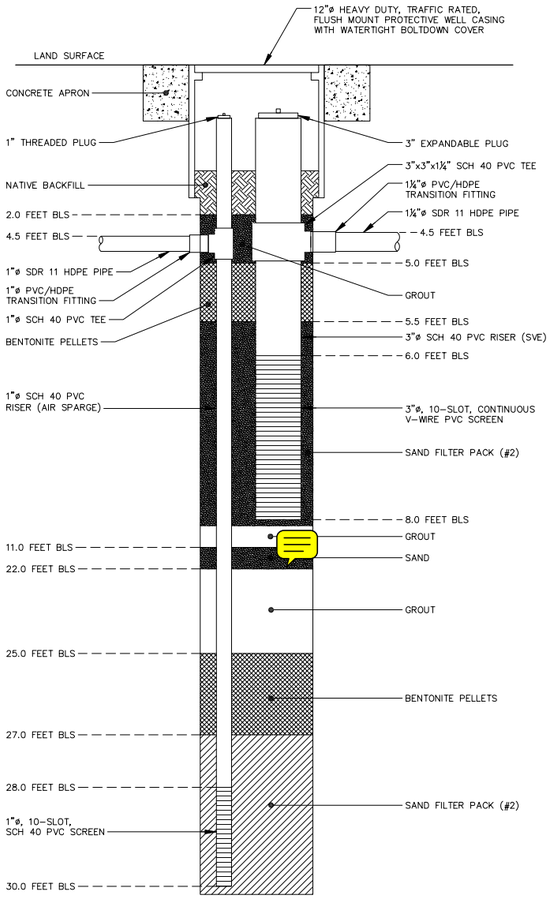
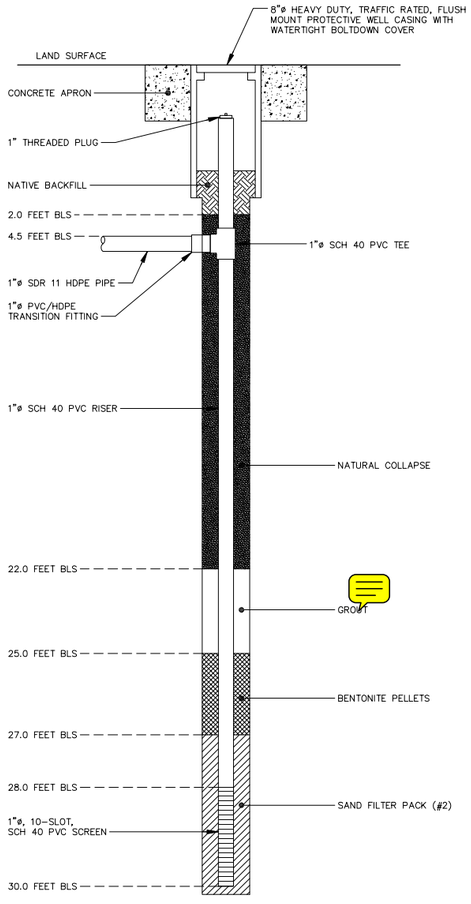


NESTED AIR SPARGE/SOIL VAPOR EXTRACTION WELL

NOT TO SCALE



AIR SPARGE WELL

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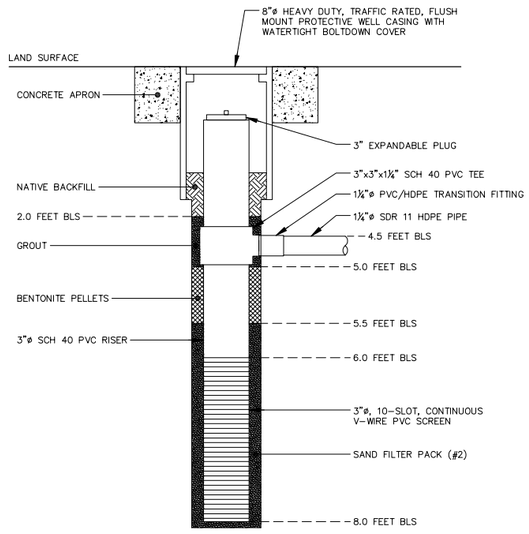

SOIL VAPOR EXTRACTION WELL

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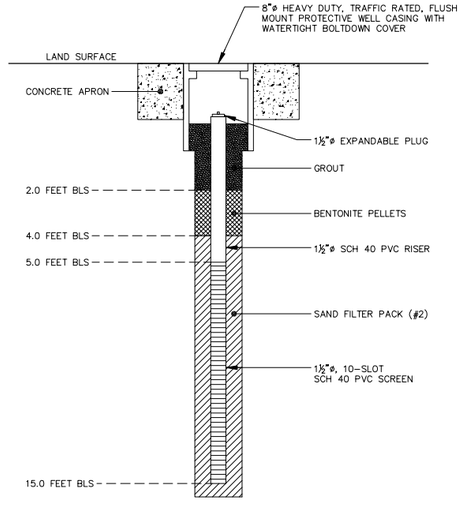
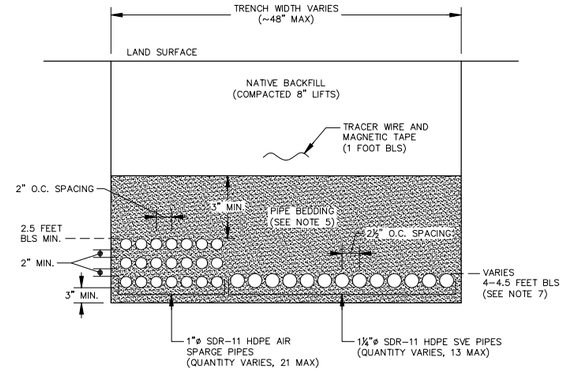


MONITORING WELL

NOT TO SCALE



PIPING AND TRENCHING CROSS SECTION

NOT TO SCALE

NOTES:

1. REFER TO DRAWING G-1 FOR AIR SPARGE/SOIL VAPOR EXTRACTION WELL LAYOUT AND PROPOSED CONVEYANCE PIPING/TRENCHING ROUTES.
2. REFER TO DRAWING M-2 FOR PROCESS AND INSTRUMENTATION DIAGRAM.
3. SOIL CUTTINGS FROM DRILLING SHALL BE CONTINUOUSLY SCREENED FOR VOLATILE ORGANIC COMPOUNDS USING A PHOTO-IONIZATION DETECTOR.
4. ALL HORIZONTAL AIR SPARGE AND SOIL VAPOR EXTRACTION PIPING SHALL BE PNEUMATICALLY PRESSURE TESTED BY THE CONTRACTOR IN THE PRESENCE OF THE ENGINEER. PRESSURE TESTS SHALL BE PERFORMED AT 20 POUNDS PER SQUARE INCH (PSI) FOR A DURATION OF 15 MINUTES. NO MORE THAN A 0.1 PSI PRESSURE DROP WILL BE A CONSIDERED A SUCCESSFUL TEST.
5. IF TRENCH SPOILS UNSUITABLE AS PIPE BEDDING, THEN CLEAN SAND SHALL BE IMPORTED AS BEDDING AND DISPLACED TRENCH SPOILS SHALL BE PLACED INTO ROLL-OFF CONTAINERS WITH PLASTIC LINERS.
6. SOIL CUTTINGS FROM DRILLING SHALL BE PLACED INTO 55-GALLON STEEL DRUMS.
7. HORIZONTAL SVE PIPING SHALL MAINTAIN A DOWNWARD SLOPE TOWARDS SVE WELLS AS REQUIRED TO ACHIEVE DESIGN DEPTHS FOR WELL LOCATION AND REMEDIAL SYSTEM CONTAINER TIE-IN DESIGN DEPTH OF 4 FEET.
8. HORIZONTAL AIR SPARGE PIPING SHALL MAINTAIN A MINIMUM DEPTH OF 2.5 FEET BELOW GROUND SURFACE.
9. CONTRACTOR SHALL SUBMIT A PROPOSED CONVEYANCE PIPING PLAN THAT SHALL INCLUDE PROPOSED PIPING ROUTES, AND PROPOSED PIPE ELEVATIONS AT EVERY CHANGE IN DIRECTION AND AT ADDITIONS OF EACH NEW PIPE TO TRENCH.
10. ALL HORIZONTAL BELOW-GRADE PIPING SHALL BE PROVIDED WITH SUPPORTING EVERY 10 FEET AND EVERY CHANGE IN DIRECTION SUCH THAT THE DESIGNED SPACING AND SLOPING ARE ADEQUATELY MAINTAINED. MEANS TO SUPPORT PIPING TO BE APPROVED BY ENGINEER. ROUTING/JOINING OF NEW PIPES TO TRENCH SHALL BE DONE SUCH THAT SVE PIPES MAINTAIN DESIGN SLOPE (I.E. AIR SPARGE PIPING MAY MAKE NECESSARY BENDS/TRAVERSES).
11. HDPE INSTALLATION AND CONNECTING PROCEDURES SHALL BE DONE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND BY EXPERIENCED PERSONNEL.
12. ALL FLUSHMOUNT WELL COVERS SHALL BE PROVIDED BY DRILLER, BUT THOSE FOR AIR SPARGE AND/OR SOIL VAPOR WELLS SHALL BE INSTALLED BY CONTRACTOR. COVERS FOR MONITORING WELLS INSTALLED BY DRILLER. DRILLER SHALL FINISH MONITORING WELLS TO SURFACE AS DESIGNED. DRILLER SHALL FINISH TO TOP OF BENTONITE SEAL FOR AIR SPARGE AND/OR SOIL VAPOR EXTRACTION WELLS. CONTRACTOR SHALL FINISH AIR SPARGE AND/OR SOIL VAPOR EXTRACTION WELLS FROM TOP OF BENTONITE SEAL TO SURFACE.

CITY: SYRACUSE, NY DIV/GROUP: ENV/CAD DB: S.KOWALCZYK PIC: PM: TM: C.DANVER LYR:ON=*;OFF=*REF*
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SCALE(S) AS INDICATED

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1	8/24/12	DRAFT 65% RD	SJK	CMD

Professional Engineer's Name

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State	Date Signed	Project Mgr.
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Designed by	Drawn by	Checked by
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WELL CONSTRUCTION AND TRENCH DETAILS

GENERAL

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G-2

GENERAL PROCESS DESCRIPTION:

THE SYSTEM IS AN SVE/AIR SPARGE SYSTEM DESIGNED TO EXTRACT SOIL VAPORS FROM TWELVE (12) SVE WELLS WHILE SIMULTANEOUSLY INJECTING AIR INTO THE SATURATED ZONE. A TOTAL OF TWENTY (20) AIR SPARGE WELLS SHALL BE DIVIDED INTO FOUR INJECTION ZONES. AIR SHALL BE INJECTED INTO ONE OR MORE OF THE FOUR AIR SPARGE ZONES AT ANY TIME. THE SVE PORTION OF THE SYSTEM SHALL CONSIST OF ONE (1) KNOCKOUT TANK DESIGNED TO REMOVE LIQUID FROM THE VAPOR STREAM, TWO (2) 1,000 LB VPGAC VESSELS FOR TREATMENT, AND ONE (1) REGENERATIVE BLOWER TO APPLY VACUUM AT THE SVE WELLS. THE REGENERATIVE BLOWER SHALL BE CONTROLLED BY A VARIABLE FREQUENCY DRIVE TO ALLOW FOR ADJUSTMENT OF MOTOR SPEED. ONE (1) PUMP WILL TRANSFER WATER FROM THE KNOCKOUT TANK TO A 55 GALLON STEEL DRUM IF THE WATER LEVEL IN THE KNOCKOUT TANK REACHES THE HIGH LIQUID LEVEL SENSOR. TREATED SOIL VAPORS WILL BE DISCHARGED TO THE ATMOSPHERE VIA A ROOF STACK EXTENDING 4' ABOVE THE TREATMENT CONTAINER. THE AIR SPARGE PORTION OF THE SYSTEM SHALL CONSIST OF ONE (1) AIR COMPRESSOR TO SUPPLY AIR TO THE AS WELLS AND FOUR SOLENOID VALVES TO CONTROL DISTRIBUTION OF INJECTION AIR AMONGST THE FOUR (4) AIR SPARGE ZONES.

TELEMETRY CAPABILITIES SHALL INCLUDE OPERATORS HAVING THE ABILITY TO REMOTELY CONNECT TO THE PLC TO BOTH MONITOR THE STATUS OF ALL EQUIPMENT/TRANSMITTERS/SENSORS AND CONTROL OPERATION OF EQUIPMENT. ALARM AND/OR SCHEDULE NOTIFICATIONS SHALL BE MADE WITH THE INTERNET OR TELEPHONE CONNECTION.

EQUIPMENT OPERATION:

1. ALL HAND-OFF-AUTO SWITCHES (HOA) SHALL OPERATE AS FOLLOWS:
   - WHEN THE HOA SWITCH IS SET TO THE "OFF" POSITION THE EQUIPMENT SHALL BE OFF REGARDLESS OF WHETHER OR NOT THE PLC IS CALLING FOR ITS OPERATION.
   - WHEN THE HOA SWITCH IS SET TO THE "HAND" POSITION THE EQUIPMENT SHALL OPERATE REGARDLESS OF WHETHER OR NOT THE PLC IS CALLING FOR ITS OPERATION.
   - WHEN THE HOA SWITCH IS SET TO THE "AUTO" POSITION THE EQUIPMENT SHALL RUN AS DIRECTED BY THE PLC.
2. THE GREEN INDICATOR LIGHT (YL-###) SHALL BE ILLUMINATED WHEN THAT PIECE OF EQUIPMENT IS OPERATING, REGARDLESS OF THE POSITION OF THE HOA SWITCH FOR THAT PIECE OF EQUIPMENT.
3. THE RED FAULT LIGHT (FL-###) SHALL BE ILLUMINATED WHEN THAT ALARM CONDITION IS PRESENT OR IF THAT ALARM CONDITION WAS PRESENT BUT HAS NOT YET BEEN ACKNOWLEDGED BY A SYSTEM OPERATOR VIA THE PLC. SEE THIS DRAWING FOR ALARM CONDITIONS AND PANEL MOUNTED FAULT LIGHTS.
4. THE PLC SHALL BE EQUIPPED WITH A VIRTUAL SYSTEM "STARTUP" SWITCH WHICH WILL START THE SYSTEM IN AN AUTOMATED SEQUENCE.
5. ALARM CONDITIONS SHALL BE EITHER NON-FATAL, A-SHUTDOWN, OR B-SHUTDOWN. NON-FATAL ALARMS SHALL NOT AFFECT SYSTEM OPERATION BUT SHALL SEND AN ALARM NOTIFICATION TO THE SYSTEM OPERATOR. A-SHUTDOWN ALARMS SHALL TURN OFF THE AIR SPARGE SYSTEM AND SEND AN ALARM NOTIFICATION TO THE SYSTEM OPERATOR. B-SHUTDOWN ALARMS SHALL TURN OFF BOTH THE AIR SPARGE SYSTEM AND THE SVE SYSTEM AND SEND AN ALARM NOTIFICATION TO THE SYSTEM OPERATOR. SEE THIS DRAWING FOR ALARM CONDITIONS.

REGENERATIVE BLOWER B-400:

1. B-400 MOTOR SPEED SHALL BE CONTROLLED BY THE VFD-400 OUTPUT SIGNAL. THE VFD-400 OUTPUT SIGNAL SHALL AUTOMATICALLY ADJUST BASED ON VACUUM TRANSMITTER VT-300 SUCH THAT A VACUUM OF 25+/-5 INWC SHALL BE MAINTAINED AT VT-300. THE VACUUM SETPOINT FOR VT-300 SHALL BE ADJUSTABLE BY THE SYSTEM OPERATOR.
2. FOLLOWING INITIATION OF THE AUTOMATED SYSTEM STARTUP SEQUENCE, AND IF THE B-400 HOA SWITCH HS-400 IS IN THE AUTO POSITION, B-400 SHALL OPERATE UNLESS "B-SHUTDOWN" CONDITIONS ARE PRESENT.

AIR COMPRESSOR AC-500:

1. FOLLOWING INITIATION OF THE AUTOMATED SYSTEM STARTUP SEQUENCE, AND IF THE AC-500 HOA SWITCH HS-500 IS IN THE AUTO POSITION, AC-500 SHALL OPERATE UNLESS "A-SHUTDOWN" OR "B-SHUTDOWN" CONDITIONS ARE PRESENT.

SOLENOID VALVE SV-500:

1. SV-500 SHALL PERMIT AIR FLOW TO THE AS WELLS UNLESS "A-SHUTDOWN" OR "B-SHUTDOWN" CONDITIONS ARE PRESENT.
2. SV-500 SHALL POSSESS A VIRTUAL HOA SWITCH THROUGH THE PLC.

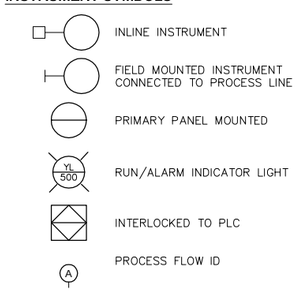
SOLENOID VALVES SV-601 THROUGH SV-604:

1. SOLENOID VALVES SV-601 THROUGH SV-604 SHALL OPEN BASED ON AN AUTOMATED SCHEDULE UNLESS "A-SHUTDOWN" OR "B-SHUTDOWN" CONDITIONS ARE PRESENT, DURING WHICH THEY SHALL BE CLOSED.
2. EACH SOLENOID VALVE SHALL HAVE TWO ADJUSTABLE VARIABLES REPRESENTING THE DURATION OF TIME (HOURS) OPEN AND THE DURATION OF TIME CLOSED.
3. EACH SOLENOID VALVE SHALL POSSESS A VIRTUAL HOA SWITCH THROUGH THE PLC.

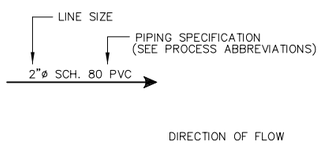
TRANSFER PUMP TP-200:

1. TP-200 SHALL OPERATE BASED ON LIQUID LEVEL SENSORS LSL-100 AND LSH-100 IF THE TP-200 HOA SWITCH HS-200 IS IN THE AUTO POSITION AND NEITHER "A-SHUTDOWN" NOR "B-SHUTDOWN" CONDITIONS ARE PRESENT.

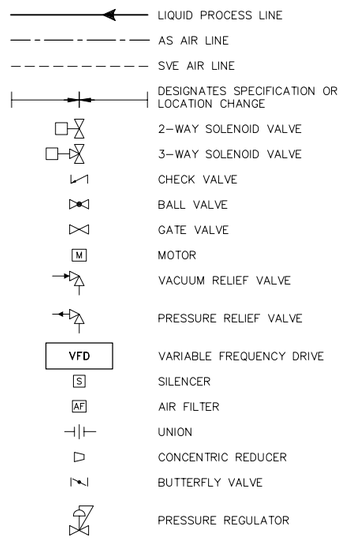
INSTRUMENT SYMBOLS



PIPE IDENTIFICATION



LEGEND



ALARM INTERLOCKS:

No.	INSTRUMENT	ALARM DESCRIPTION	TYPE	ALARM RANGE	DELAY	FAULT LIGHT
1	TP-200	TRANSFER PUMP MOTOR FAILURE	B-SHUTDOWN	NO RUN	2 SECONDS	FL-200
2	B-400	BLOWER MOTOR FAILURE	B-SHUTDOWN	NO RUN	2 SECONDS	FL-400
3	AC-500	AIR COMPRESSOR MOTOR FAILURE	A-SHUTDOWN	NO RUN	2 SECONDS	FL-500
4	LSHH-100	HIGH-HIGH LIQUID LEVEL IN KNOCKOUT TANK	B-SHUTDOWN	RAISED	2 SECONDS	FL-100
5	LSHH-200	HIGH-HIGH LIQUID LEVEL IN STORAGE DRUM	B-SHUTDOWN	RAISED	2 SECONDS	FL-201
6	FIT-300	HIGH SVE AIR FLOWRATE	NON-FATAL	> 300 CFM	5 SECONDS	-
7	FIT-300	LOW SVE AIR FLOWRATE	NON-FATAL	< 50 CFM	5 SECONDS	-
8	FIT-300	LOW-LOW SVE FLOWRATE	B-SHUTDOWN	< 30 CFM	5 SECONDS	FL-300
9	VT-300	HIGH PRE-CARBON VACUUM	NON-FATAL	< -60 INWC	15 SECONDS	-
10	VT-300	LOW PRE-CARBON VACUUM	NON-FATAL	> -40 INWC	15 SECONDS	-
11	VT-300	LOW-LOW PRE-CARBON VACUUM	B-SHUTDOWN	> -35 INWC	15 SECONDS	FL-301
12	TT-300	HIGH SVE INFLUENT TEMPERATURE	NON-FATAL	> -120 F	5 SECONDS	-
13	TT-300	LOW SVE INFLUENT TEMPERATURE	NON-FATAL	< -40 F	5 SECONDS	-
14	VT-400	HIGH-HIGH BLOWER VACUUM	B-SHUTDOWN	< -70 INWC	15 SECONDS	FL-401
15	VT-400	HIGH BLOWER VACUUM	NON-FATAL	< -65 INWC	15 SECONDS	-
16	VT-400	LOW BLOWER VACUUM	NON-FATAL	> -40 INWC	15 SECONDS	-
17	PT-400	HIGH-HIGH POST-BLOWER PRESSURE	B-SHUTDOWN	> 15 INWC	5 SECONDS	FL-402
18	PT-400	HIGH POST-BLOWER PRESSURE	NON-FATAL	> 10 INWC	5 SECONDS	-
19	PT-400	LOW POST-BLOWER PRESSURE	NON-FATAL	< 1 INWC	5 SECONDS	-
20	TT-400	HIGH SVE EFFLUENT TEMPERATURE	NON-FATAL	> 200 F	2 MINUTES	-
21	TT-400	LOW SVE EFFLUENT TEMPERATURE	NON-FATAL	< 40 F	2 MINUTES	-
22	FIT-500	HIGH AIR SPARGE AIR FLOWRATE	NON-FATAL	> 75 CFM	5 SECONDS	-
23	FIT-500	HIGH-HIGH AIR SPARGE FLOWRATE	A-SHUTDOWN	> 300 CFM	5 SECONDS	FL-501
24	FIT-500	LOW AIR SPARGE AIR FLOWRATE	NON-FATAL	< 15 CFM	5 SECONDS	-
25	PT-501	HIGH-HIGH AIR SPARGE PRESSURE	A-SHUTDOWN	> 20 PSI	15 SECONDS	FL-502
26	PT-501	HIGH AIR SPARGE PRESSURE	NON-FATAL	> 15 PSI	15 SECONDS	-
27	PT-501	LOW AIR SPARGE PRESSURE	NON-FATAL	< 5 PSI	15 SECONDS	-

NOTES:
1. "HIGH VACUUM" INDICATES MORE VACUUM, I.E. WITH AN ALARM SETPOINT AT -25 INWC, A VALUE OF -30 INWC WOULD BE CONSIDERED "HIGH VACUUM."
2. "DELAY" REFERS TO THE AMOUNT OF TIME WHICH AN ALARM CONDITION MUST PERSIST BEFORE THE ALARM RESPONSE IS INITIATED.
3. FAULT LIGHTS TO BE MOUNTED ON MAIN CONTROL PANEL.
4. ALL ALARM RANGES (SETPOINTS) SHALL BE ADJUSTABLE BY THE SYSTEM OPERATOR.

MAJOR EQUIPMENT DESCRIPTIONS

AIR COMPRESSOR
DESIGNATION: AC-500
MAKE: INGERSOLL-RAND
MODEL: IRN15H-115
MOTOR RATINGS: 15 HP, 60 HZ, 3P
OPTIONS: 120 GALLON RECEIVER, DRYER, ELECTRIC DRAIN VALVE, COALESCING AND PARTICULATE FILTERS

REGENERATIVE BLOWER
DESIGNATION: B-400
MAKE: ROTRON
MODEL: EN909BG72WL
MOTOR RATINGS: 15 HP, XP, 230 V, 3P
RANGE: 600 SCFM MAX FLOW

KNOCKOUT TANK
DESIGNATION: KT-100
MAKE: GASHO
MODEL: GX-90
SIZE: 90 GALLON
OPTIONS: SITE GAUGE, THREE LEVEL SENSOR PORTS, PUMPDOWN PORT, AND SPARE PORT

TRANSFER PUMP
DESIGNATION: TP-200
MAKE: OBERDORFER
MODEL: 992R
CAPACITY: 4 GPM
SIZE: 0.5 HP, 3PH, 460 V

VAPOR PHASE GRANULAR ACTIVATED CARBON VESSELS
DESIGNATION: VPGAC-300 & VPGAC-301
MAKE: SIEMENS
MODEL: VSC-1000
MEDIA: SIEMENS VOCARB 48C

STORAGE TANK
DESIGNATION: ST-200
TYPE: 55 GALLON STEEL DRUM, CLOSED TOP, 2" & 3/4" BUNGS

ABBREVIATIONS

ACFM	ACTUAL CUBIC FEET PER MINUTE
AF	AIR FILTER
AS	AIR SPARGE
B	BLOWER
BV	BALL VALVE
CPH	CLEAR PVC HOSE
CS	CARBON STEEL
CV	CHECK VALVE
F	FAHRENHEIT
FAL	FLOW ALARM LOW
FL	FAULT LIGHT
FI	FLOW INDICATOR
FIT	FLOW INDICATING TRANSMITTER
FT	FEET
G	GREEN LIGHT
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
GV	GATE VALVE
HDPE	HIGH DENSITY POLYETHYLENE
HP	HORSE POWER
HOA	HAND-OFF-AUTO
HS	HAND SWITCH
INWC	INCHES OF WATER COLUMN
KT	KNOCKOUT TANK
LAHH	LEVEL ALARM HIGH HIGH
LALL	LEVEL ALARM LOW LOW
LDS	LEAK DETECTION SENSOR
LSH	LEVEL SENSOR HIGH
LSHH	LEVEL SENSOR HIGH HIGH
LSL	LEVEL SENSOR LOW
M	MOTOR
MCC	MOTOR CONTROL CENTER
MCP	MAIN CONTROL PANEL
MS	MOTION SENSOR
NPT	NATIONAL PIPE THREAD
NTS	NOT TO SCALE
PAHH	PRESSURE ALARM HIGH HIGH
PAH	PRESSURE ALARM HIGH
PALL	PRESSURE ALARM LOW LOW
PI	PRESSURE INDICATOR
PRV	PRESSURE RELIEF VALVE
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TRANSMITTER
PVC	POLYVINYL CHLORIDE
R	RED LIGHT
RCC	ROTARY CLAW COMPRESSOR
RH	RUBBER HOSE
SCFM	STANDARD CUBIC FEET PER MINUTE
SCH	SCHEDULE
SDR	STANDARD DIMENSION RATIO
SG	SIGHT GAUGE
SP	SAMPLE PORT
SS	STAINLESS STEEL
ST	STORAGE TANK
SV	SOLENOID VALVE
SVE	SOIL VAPOR EXTRACTION
TAL	TEMPERATURE ALARM LOW
TDH	TOTAL DYNAMIC HEAD
TI	TEMPERATURE INDICATOR
TP	TRANSFER PUMP
TT	TEMPERATURE TRANSMITTER
TYP	TYPICAL
UN	UNION
V	VOLTS
VFD	VARIABLE FREQUENCY DRIVE
VPGAC	VAPOR PHASE GRANULAR ACTIVATED CARBON
VRV	VACUUM RELIEF VALVE
VI	VACUUM INDICATOR
YL	INDICATING LIGHT
Ø	DIAMETER

INSTRUMENTATION DESCRIPTIONS

LIQUID LEVEL SENSOR(S)
DESIGNATION: LSL-100, LSH-100 & LSHH-100
MAKE: FLOTECT
MODEL: L6EPB-B-S-3-0

LIQUID LEVEL SENSOR(S):
DESIGNATION: LSHH-200
MAKE: NATIONAL MAGNETIC SENSORS
MODEL: 80158

VACUUM TRANSMITTER(S)
DESIGNATION: VT-300 & VT-400
MAKE: OMEGA
MODEL: PX409-005VI

PRESSURE TRANSMITTER(S)
DESIGNATION: PT-400
MAKE: WIKA
MODEL: C-10
RANGE: 0-100 INWC

PRESSURE TRANSMITTER(S)
DESIGNATION: PT-501
MAKE: WIKA
MODEL: C-10
RANGE: 0-100 PSI

TEMPERATURE TRANSMITTER(S)
DESIGNATION: TT-300 & TT-400
MAKE: DWYER
MODEL: 651A-10
RANGE: 32-212 F
ACCESSORIES: A-709 ENCLOSURE AND RTD-646 PROBE

AIR FLOW TRANSMITTER(S)
DESIGNATION: FIT-300
MAKE: DWYER
MODEL: DH3-003
OPTIONS: DWYER 166-6 PITOT TUBE

AIR FLOW TRANSMITTER(S)
DESIGNATION: FIT-500
MAKE: DWYER
MODEL: CAM-30

VACUUM INDICATOR(S)
DESIGNATION: VI-001 THROUGH VI-012, VI-100, VI-112 THROUGH VI-107, VI-300, VI-301, VI-302 & VI-400
MAKE: DWYER
MODEL: SGF-D7722N
RANGE: -100 - 0 INWC

PRESSURE INDICATOR(S)
DESIGNATION: PI-400
MAKE: DWYER
MODEL: SGF-D8622N
RANGE: 0-100 INWC

PRESSURE INDICATOR(S)
DESIGNATION: PI-500
MAKE: DWYER
MODEL: SGB-C0521N
RANGE: 0-100 PSI

PRESSURE INDICATOR(S)
DESIGNATION: PI-501, PI-601 THROUGH PI-620
MAKE: DWYER
MODEL: SGB-C0321N
RANGE: 0-30 PSI

TEMPERATURE INDICATOR(S)
DESIGNATION: TI-100, TI-300, & TI-501
MAKE: WIKA
MODEL: TI.33
RANGE: 0-140 F

TEMPERATURE INDICATOR(S)
DESIGNATION: TI-400
MAKE: WIKA
MODEL: TI.33
RANGE: 0-250 F

SOLENOID VALVE(S)
DESIGNATION: SV-500
MAKE: PARKER
MODEL: N3557904549

SOLENOID VALVE(S)
DESIGNATION: SV-401
MAKE: ASCO
MODEL: 295604-262
OPTIONS: TIMER

SOLENOID VALVE(S)
DESIGNATION: SV-601 THROUGH SV-604
MAKE: ASCO
MODEL: 8210G004

SCALE(S) AS INDICATED

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Professional Engineer's Name

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State	Date Signed	Project Mgr.
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Designed by	Drawn by	Checked by
CMD	SJK	

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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LEGEND, EQUIPMENT, PROCESS FLOW DESCRIPTIONS, AND ALARMS

MECHANICAL

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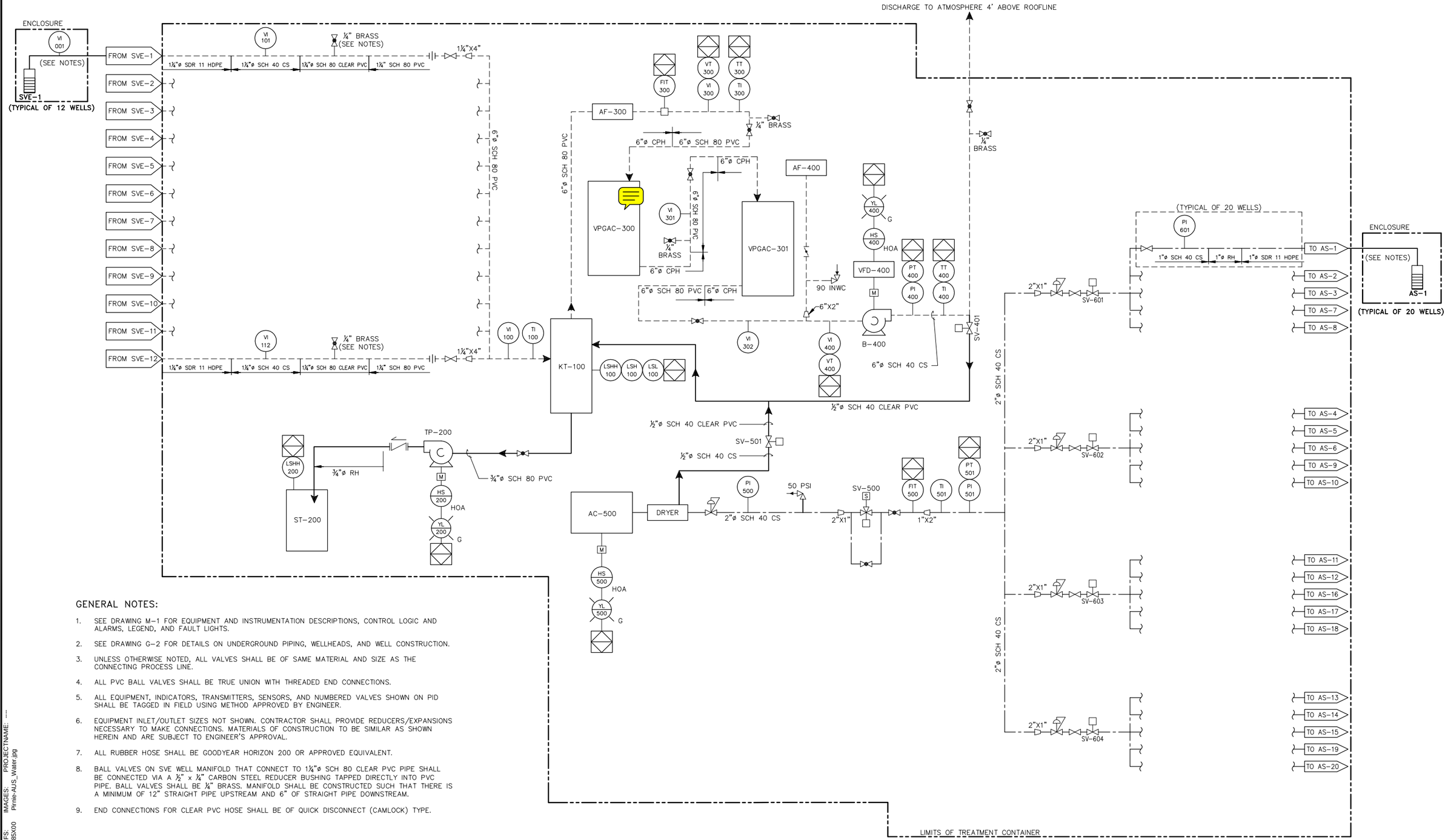
TEL: 518.250.7300

M-1



GENERAL NOTES:

1. SEE DRAWING M-1 FOR EQUIPMENT AND INSTRUMENTATION DESCRIPTIONS, CONTROL LOGIC AND ALARMS, LEGEND, AND FAULT LIGHTS.
2. SEE DRAWING G-2 FOR DETAILS ON UNDERGROUND PIPING, WELLHEADS, AND WELL CONSTRUCTION.
3. UNLESS OTHERWISE NOTED, ALL VALVES SHALL BE OF SAME MATERIAL AND SIZE AS THE CONNECTING PROCESS LINE.
4. ALL PVC BALL VALVES SHALL BE TRUE UNION WITH THREADED END CONNECTIONS.
5. ALL EQUIPMENT, INDICATORS, TRANSMITTERS, SENSORS, AND NUMBERED VALVES SHOWN ON PID SHALL BE TAGGED IN FIELD USING METHOD APPROVED BY ENGINEER.
6. EQUIPMENT INLET/OUTLET SIZES NOT SHOWN. CONTRACTOR SHALL PROVIDE REDUCERS/EXPANSIONS NECESSARY TO MAKE CONNECTIONS. MATERIALS OF CONSTRUCTION TO BE SIMILAR AS SHOWN HEREIN AND ARE SUBJECT TO ENGINEER'S APPROVAL.
7. ALL RUBBER HOSE SHALL BE GOODYEAR HORIZON 200 OR APPROVED EQUIVALENT.
8. BALL VALVES ON SVE WELL MANIFOLD THAT CONNECT TO 1¼"ø SCH 80 CLEAR PVC PIPE SHALL BE CONNECTED VIA A ½" x ¼" CARBON STEEL REDUCER BUSHING TAPPED DIRECTLY INTO PVC PIPE. BALL VALVES SHALL BE ¼" BRASS. MANIFOLD SHALL BE CONSTRUCTED SUCH THAT THERE IS A MINIMUM OF 12" STRAIGHT PIPE UPSTREAM AND 6" OF STRAIGHT PIPE DOWNSTREAM.
9. END CONNECTIONS FOR CLEAR PVC HOSE SHALL BE OF QUICK DISCONNECT (CAMLOCK) TYPE.

SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
1	8/24/12	DRAFT 65% RD	SJK	CMD

Professional Engineer's Name

Professional Engineer's No.

State	Date Signed	Project Mgr.
		BRN
Designed by	Drawn by	Checked by
CMD	SJK	

MALCOLM PIRNIE ARCADIS
Infrastructure · Water · Environment · Buildings

FORMER MAJESTIC GARMENT CLEANERS SITE (#2-24-035) • BROOKLYN, NEW YORK
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
INTERIM REMEDIAL MEASURE • AIR SPARGE/SOIL VAPOR EXTRACTION SYSTEM

PROCESS AND INSTRUMENTATION DIAGRAM

MECHANICAL

ARCADIS Project No.
00266384.0000

Date
2012

ARCADIS of New York, Inc.
855 ROUTE 146, SUITE 210
CLIFTON PARK, NY
TEL: 518.250.7300

M-2

ARCADIS

Appendix D

Technical Specifications

TABLE OF CONTENTS

SECTION 01010
SUMMARY OF WORK

PART 1 - GENERAL

1.1 DEFINITIONS

A. Whenever the following terms are used in these Specifications, it is understood that they represent the following:

1. Owner/Client:
New York State Department of Environmental Conservation (NYSDEC)

2. Engineer/Consultant:
TBD

3. Contractor: The individual, firm, partnership, or corporation designated as the Contractor in these contract documents.

4. Vendor, supplier, or manufacturer: The individual, firm, partnership, or corporation selected to supply specific system equipment components.

5. Site: The area as indicated on the contract drawings.

1.2 SITE CONDITIONS

A. General

There will be no payment for any extras as a consequence of the contractor's misunderstanding the descriptions contained in the Contract, Contract Drawings or Technical Specifications. The contractor shall inspect the site and request answers to all questions that relate to the Work, its execution, and other details prior to submitting a Bid.

B. Night and Weekend Work

Unless otherwise specially permitted, no Work shall be done between the hours of 6:00 p.m. and 6:00 a.m. or on Saturday or on Sunday or on a major holiday, except as necessary for the proper care of and protection of Work already performed. If it shall become necessary to perform Work at night or on a weekend, the engineer/consultant shall be informed at least seventy two (72) hours in advance of the beginning of performance of such Work. Only such Work shall be done at night as can be done satisfactorily and in a safe, first-class manner. Good lighting and all other necessary facilities for carrying out and inspecting the Work shall be provided and maintained by the contractor at all points where such Work is being done.

D. Work in Bad Weather

During freezing, stormy or inclement weather, no Work shall be done except such as can be done satisfactorily and in a manner to secure safe first-class construction throughout. Material backfill and compaction shall not be undertaken during freezing, heavy precipitation, or otherwise inclement weather, as determined by the consultant/engineer.

1.3 CODES AND STANDARDS

A. The Work shall conform to all local, state and federal codes, and comply with standards referenced in these Technical Specifications. The latest issue shall be used unless specifically noted otherwise.

1.4 SCOPE OF WORK

A. The Scope-of-Work shall include but not be limited to furnishing all labor, materials, methods, services, tools, machinery and equipment necessary for the construction of the Work as specified herein and shown on the following Drawings:

ARCADIS/Malcolm Pirnie DWG No.	Drawing Name
G-1	Site Plan / Remedial Design Layout
G-2	Well Construction and Trench Details
M-1	Legend, Equipment, Process Flow Descriptions, and Alarms
M-2	Process and Instrumentation Diagram

B. The contractor shall supply all necessary materials except those specifically designated as furnished by the owner/client, the consultant/engineer, or furnished by others.

C. The Work covered under this Contract shall include, but is not limited to the following items:

1. Furnishing temporary field offices, along with temporary electrical (generator) power, printing, sanitary facilities, and potable water.

2. Establishment and maintenance of erosion and sediment controls and stormwater management, including sedimentation basin, ditches, silt fence, erosion mat, and any other necessary controls required in these Specifications and Drawings, and to perform the Work.

3. Furnishing, testing, transporting, and placing of soil materials, including sub-base material, pipe bedding, backfill soil, and structural base fill.

4. Installation of extraction and air supply piping.

5. Furnishing, constructing, installing, and testing the air sparge / soil vapor extraction system, including the container, tanks, vessels, piping and all connections, instrumentation, field gauges, pump, blower, air compressor, and controls.

6. Furnishing and installing of all electrical work as required to meet these Specifications and as shown on the Drawings.

7. Installation, maintenance and removal of temporary and permanent access roads.

8. Miscellaneous site work, including site cleanup, site restoration to match previous conditions.

9. Other Work shown on the Drawings and specified herein, or as otherwise required for a complete and proper installation.

1.5 QUALITY ASSURANCE

A. The contractor warrants in presenting a Bid that all Work will be performed to the highest standards. The contractor further warrants that defects that are the result of the contractor's methods, workmanship, or protection of Work will be corrected, removed, and/or replaced at the contractor's expense immediately. Further, the contractor shall warrant all Work and repairs for one year after the completion and acceptance of the Work or repairs.

1.6 CARE AND STORAGE OF MATERIALS

A. The contractor shall unload, inspect, and store all equipment and material items delivered to project site for its Work, including items supplied by the owner, the consultant, or furnished by others.

B. The contractor shall replace at its sole expense all owner, consultant, furnished by others, and/or contractor-furnished materials damaged by the contractor or the contractor’s Subcontractors during unloading and storage, damaged by weather, or other related causes.

C. Special attention shall be paid to instructions issued by the manufacturer for handling and storage of materials and/or equipment. These instructions shall be followed in every respect.

D. The contractor shall be solely responsible for all security of equipment and material items delivered to the Site for its Work, including items supplied by the owner, the consultant, or furnished by others. Replacement of any equipment or material shall be at the sole expense of the contractor.

1.7 CONTRACTOR'S RESPONSIBILITIES AND WORK

A. The contractor shall furnish all construction equipment, machines, tools, materials, field sanitary facilities, security, protection of Work, other services, supplies, labor, and supervision that are necessary to complete the Work and requirements as described or implied in these Specifications and Drawings.

B. The contractor shall provide all transportation for the items included in this Section from its headquarters or other locations to and from the site.

C. The contractor shall furnish all housing, travel, required training, personal safety equipment, and related allowances required by its employees to meet the minimum standards of the owner and the Site Health and Safety Plan. No housing facilities shall be permitted on the site.

D. Neither the contractor nor any of its employees shall drive or park any vehicle anywhere on the site, except at such locations as shown or as specifically approved by the owner.

E. The contractor shall provide sufficient workers and supervisory personnel to maintain Work progress so that the various areas of Work will be completed in accordance with the schedule or sequence defined elsewhere in these Specifications. If, in the opinion of the owner, the Work is behind schedule or is improperly staffed, the owner will direct the contractor to increase its complement of supervisors, workmen, or equipment so as to comply with the schedule. The contractor shall discharge any such directives promptly and without expectation of additional compensation. If the contractor fails to discharge any of these directives, the consultant may arrange for such directives to be discharged at the sole cost of the contractor.

F. The contractor shall make all overtime, premium, and incentive payments to the contractor's employees that may be required to complete the Work in accordance with the schedule. No exceptions shall be allowed for lack of performance, late material deliveries, or interference with other contractors possibly employed at the site or with the owner’s personnel.

G. The contractor shall obtain any state, county, or local building permits required in the performance of its Work, except as provided by the consultant.

H. By submitting a Bid for the Work, the contractor acknowledges to be entirely familiar with the requirements prescribed by the State of New York that relate to the Work, with regulations prescribed by the United States Environmental Protection Agency Comprehensive Environmental Response, and Liability Act (CERCLA) with the rules and regulations of OSHA, and with local conditions, including weather, availability of supplies, and logistics. The contractor further acknowledges itself to be entirely qualified to perform the Work described by these Specifications and the Drawings.

I. The contractor shall maintain the site completely free of refuse and debris at all times at their expense. The contractor shall promptly comply with any directives

from the owner, or its Representative, regarding housekeeping. The contractor shall provide the appropriate containers at convenient locations for the disposal of paper cups, disposable personnel protection equipment and other items of trash. Upon completion of the Work and before final payment, the contractor shall completely remove all tools, equipment, supplies, materials, structures, and debris from the site and leave the premises clean. Debris shall be removed to disposal locations off the site that are selected by the contractor, and are permitted to receive the debris to be disposed, and prior approved by the consultant. Refuse shall be accumulated for a minimum of weekly disposal.

J. Safety

It is the contractor's responsibility to perform all Work in a safe manner, and meet all applicable federal, state and local laws and those requirements imposed by the OWNER.

K. Environmental Protection

All Work to be performed by the contractor as a part of this project is regulated by the New York State Department of Environmental Conservation (NYSDEC) for the protection of the environment. By acceptance of the terms of the Contract, the contractor acknowledges that it is familiar with the rules and regulations of the NYSDEC. The contractor further acknowledges familiarity with, and accepts as a condition of this Contract, all of the terms, stipulations, and commitments pertaining to the Work. Questions concerning the permits or regulations shall be referred to the consultant; the consultant's decision in all cases shall be final.

PART 2 - PRODUCTS

2.1 REGISTERED TRADE NAMES

A. Products are referenced and specified throughout these Specifications by registered trade names. This does not constitute a recommendation of these products to the exclusion of other products. Equivalent products may be used upon receiving approval of the owner, its representative, or the consultant.

B. The reference to registered trade names establishes a standard of required function, dimension, appearance and quality of the required equipment, materials or products.

PART 3 – EXECUTION

Not used

END OF SECTION

SECTION 01039
COORDINATION AND MEETINGS

PART 1— GENERAL

1.1 SECTION INCLUDES

A. Site Progress Meetings

B. Weekly Progress Reports

C. Coordination

1.2 SITE PROGRESS MEETINGS

A. The owner or consultant/engineer shall designate, as necessary, progress meetings that will be conducted to review the progress of the work and any unexpected conditions or situations that may have arisen. The contractor is required to attend all progress meetings unless exempted by the consultant/engineer or owner. The consultant/engineer will ensure conformance with the financial plan. The contractor shall be fully responsible for any and all of the subcontractors and shall be responsible for subcontractor attendance and/or input into the meetings.

B. The meetings shall be documented by the consultant/engineer and copies of the meeting minutes shall be distributed to the contractor.

C. Progress meetings shall be held approximately weekly, at which time the weekly progress report will be reviewed.

1.3 WEEKLY PROGRESS REPORTS

A. The contractor shall provide written weekly progress reports to the consultant/engineer outlining the status of the work, any projected budget impacts, unexpected conditions or situations, updated schedule, and any information pertinent to the progress of the work.

1.4 COORDINATION

A. All on-site work shall be coordinated by the contractor, with the approval of the consultant/engineer.

B. Site, facility, and utility access shall be coordinated through the owner's representative and/or the appropriate utility authority.

C. Issues related to design and construction of the specified system shall be handled through the consultant/engineer in accordance with sections 01010 ("Summary of Work"), 01300 ("Submittals"), and 01400 ("Quality Control").

—END OF SECTION—

SECTION 01300
SUBMITTALS

PART 1— GENERAL

1.1 SECTION INCLUDES

A. General

B. Submittal Procedures

C. Shop Drawings

D. Product Data

E. Manufacturer's Instructions

F. Proposed Supplier List

G. Proposed Subcontractor List

H. Health and Safety Plan (HASP)

I. Construction Progress Schedules

J. Operation and Maintenance Manuals

K. As-Built Drawings

L. Traffic Control Plan

M. Stormwater Management and Excavation Plan

N. Pressure Testing and Startup and Testing Plan

O. Construction and Demolition Debris Waste Management Plan

1.2 GENERAL

A. All submittals shall be complete, neat, and orderly.

B. Submittals shall be provided according to the contract schedule.

1.3 SUBMITTAL PROCEDURES

A. Transmit one electronic copy of each submittal to the consultant/engineer.

B. Sequentially number the transmittal forms. Re-submittals shall have the original number with an alphabetic suffix.

C. Identify project, contractor name, subcontractor or supplier name, submission date, pertinent drawing sheet and detail number(s), and specification-section number(s) as appropriate.

D. Apply contractor's stamp, signature, or initials certifying that review, verification of products, field dimensions, adjacent construction work, and coordination of information, is completed as required.

E. All submittals are to be submitted to and approved by the consultant/engineer in writing before beginning work for the item that requires submittal.

F. Distribute copies of reviewed submittals to the appropriate parties concerned. Instruct the parties to promptly report any inability to comply with provisions.

G. Provide space for consultant/engineer to place review stamp or signature.

H. Revise and resubmit submittals as required by the consultant/engineer until approved; identify all changes made since previous submittal.

1.4 SHOP DRAWINGS

A. The contractor shall furnish shop drawings to the consultant/engineer for review and approval within 21 calendar days after award of contract.

B. Shop drawings shall show how the contractor intends to perform the work.

C. The shop drawings should include:

1. The location, elevation, size, and anchoring details of all service (mechanical and electrical) penetrations.

2. All piping-manifolds profile-layout and associated wall/floor-penetration pipe-sleeve locations.

3. Photos and specifications of the system enclosure/container.

4. Equipment layout inside container.

5. Motor control-panel layout.

6. Programmable Logic Controller layout.

7. Warranties extended by the contractor for the work to be completed.

D. Copies of the drawings and data submitted by the contractor will be returned to the contractor by the consultant/engineer with comments such as, ”Review Date,” “Approved, ” “Rejected” and “Comments.” The contractor shall make all necessary revisions, corrections, or clarifications, if required, and resubmit one copy of the revised drawings and data within seven (7) calendar days.

1.5 PRODUCT DATA

A. The contractor shall supply the consultant/engineer with a proposed products list within seven (7) calendar days after contract award. This list shall be subject to approval by the consultant/engineer.

B. The proposed product list shall indicate all products the contractor believes will be incorporated. This list shall be interpreted as agreement by the contractor to use the specified products. Omission from this list of any product required by the contract documents shall not relieve the contractor of the responsibility to provide that product and complete the associated work as specified.

C. The contractor shall submit for the consultant/engineer’s approval, within 21 calendar days after contract award, all information and product data related to the products in the proposed products list. The product data shall be submitted with the shop drawings and include data called for under the specifications or requested by the consultant/engineer, including but not limited to:

1. Manufacturers’ descriptions, technical specifications, shop drawings, and data for each component specified that will not be fabricated on-site.

2. Manufacturer equipment warranties.

3. Submittals shall indicate that the material or product conforms to or exceeds specified requirements. Submit supporting data or certifications as appropriate.

1.6 MANUFACTURER'S INSTRUCTIONS

A. Contractor shall submit to the consultant/engineer printed instructions for delivery, storage, assembly, installation, and maintenance of specified components that will not be fabricated on-site. Instructions shall be provided at least seven (7) calendar days before delivery.

1.7 PROPOSED SUPPLIER LIST

A. A complete list of suppliers with product, name, and address shall be submitted for the consultant/engineer's review within seven (7) calendar days after contract award.

1.8 PROPOSED SUBCONTRACTOR LIST

A. A final list of subcontractors with name, address, and experience shall be submitted for review to the consultant/engineer within seven (7) calendar days after contract award.

B. No work on the contract shall begin until all proposed subcontractors have been approved by the owner/consultant/engineer in writing.

1.9 HEALTH AND SAFETY PLAN

A. The contractor shall prepare a construction health and safety plan (HASP) in accordance with the HASP currently in place at the site. The HASP shall be submitted to the consultant/engineer for their review within seven calendar days after award of contract.

B. Contractor shall be responsible for implementing the HASP.

C. No work shall begin at the site until a HASP is in place.

1.10 CONSTRUCTION PROGRESS SCHEDULES

The contractor shall:

A. Submit initial project schedule within seven (7) calendar days after award of contract.

B. Submit revised schedules as substantial variations are identified or as required by the consultant/engineer.

C. Show the complete sequence of construction by activity, identifying work in separate stages and in logically grouped activities. Indicate the start and finish dates and duration. The presentation shall be neat and accurate, using *Microsoft Project*® or comparable project-tracking software.

1.11 OPERATION AND MAINTENANCE MANUALS

A. The contractor shall provide the consultant/engineer with equipment manufacturers' operation and maintenance manuals and warranty and service

information within 15 days before system startup. The contractor shall prepare an operation and maintenance manual that addresses the following items:

1. Operating Procedures: startup, break-in, and routine normal operating instructions and sequences, regulation, control, stopping, shut-down, emergency instructions, summer, winter, and any special operating instructions.

2. Maintenance Requirements: routine procedures and guidance for troubleshooting, disassembly, repair, reassembly, alignment, adjusting, balancing, and equipment checking.

3. Manufacturer's parts list, illustrations, assembly drawings, and maintenance diagrams.

4. Manufacturer's record drawings and any additional submittal information.

1.12 AS-BUILT DRAWINGS

A. The contractor shall furnish the consultant/engineer with drawings clearly indicating all technical information (including product data, manufacturer's instructions, and certificates) and all field modifications. All information necessary to create record drawings shall be provided by the contractor within 14 calendar days of substantial completion of construction.

1.13 TRAFFIC CONTROL PLAN

A. The contractor shall prepare a construction traffic control plan (TCP) for all work that will take place on-site. The TCP shall be submitted to the consultant/engineer for their review within seven (7) calendar days after award of contract.

B. No work shall begin at the site until the TCP is in place.

1.14 STORMWATER MANAGEMENT AND EXCAVATION PLAN

A. The contractor shall prepare a Storm Water Management and Excavation Plan for any required excavation work per the contract drawings. The plan shall be submitted to the consultant/engineer for their review within seven (7) calendar days after award of contract.

B. No intrusive activities (e.g. saw cutting, asphalt removal, excavation work, etc) shall begin at the site until the plan is in place.

1.15 PRESSURE TESTING AND STARTUP AND SHAKEDOWN PLAN

A. The contractor shall prepare a pressure testing and startup and shakedown plan for all above and below grade piping to be installed per the contract drawings. The testing plans shall be submitted to the consultant/engineer for their review within seven (7) calendar days after award of contract.

B. Starting of systems will not be permitted onsite until the testing plan is in place.

1.16 CONSTRUCTION AND DEMOLITION DEBRIS WASTE MANAGEMNT PLAN

A. The contractor shall prepare a C&D Waste Management Plan shall be prepared in order to properly maintain a clean working environment. The C&D waste management plan shall be submitted to the consultant/engineer for their review within seven (7) calendar days after award of contract.

B. No work shall begin at the site until the C&D Plan is in place.

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—END OF SECTION—

SECTION 01400
QUALITY CONTROL

PART 1— GENERAL

1.1 SECTION INCLUDES

A. Contractor Quality Control and Assurance of Installation

B. Workmanship

1.2 RELATED SECTIONS

A. Section 01039— “Coordination and Meetings”

B. Section 01300— “Submittals”

1.3 CONTRACTOR QUALITY CONTROL AND ASSURANCE OF INSTALLATION

The contractor shall:

A. Monitor and exercise quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.

B. Comply fully with manufacturers’ instructions, including each step in an installation and startup sequence.

C. If manufacturer’s instructions conflict with contract documents, contractor shall request clarification from the consultant/engineer before proceeding.

D. Comply with specified standards as a minimum quality for the work, except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by individuals qualified to produce workmanship of specified quality.

F. Secure products and equipment in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

G. During freezing or inclement weather or other adverse conditions, no work shall be performed except that which can be performed in a manner that will ensure first-class construction throughout.

1.4 WORKMANSHIP

A. The intent of these technical specifications is to describe definitively and fully the character of materials and workmanship required with regard to all ordinary features, and to require first-class work and material in all particulars.

B. For any unexpected features arising during the progress of the work and not fully covered herein, the specifications shall be interpreted by the consultant/engineer to require first-class work and materials, and such interpretation shall be accepted by the contractor.

C. All labor shall be performed in the best and most competent manner by mechanics skilled in their respective trades. The standards of the work required throughout shall be of such grade as will bring only first-class results.

D. Materials and methods used in the assemblage of the equipment shall comply with relevant standards, codes, or specifications related to the manufacture and operation of the specified equipment.

1.5 FIELD INSPECTION OF CONTRACTOR'S WORK

A. The consultant/engineer will periodically inspect the contractor's work to ensure that the work is being performed in accordance with the contract drawings and these technical specifications, such that the product will conform to the contract drawings and technical specifications.

B. The contractor is responsible for complete conformance to the contract drawings and technical specifications for all work on the project, including all subcontractors.

C. The contractor will provide ample opportunity for safe and easy access to the inspectors to properly inspect the work.

D. Inform the consultant/engineer in advance of periods when the contractor does not intend to work due to, but not limited to, inability to obtain materials or equipment or expected inclement weather.

E. Upon completion of the work, the contractor shall notify the consultant/engineer to arrange for final system inspection. The contractor or their representative must accompany the consultant/engineer on the final inspection. The contractor shall have craftspeople available or on call to make changes or corrections to the system after or during the inspection, as determined by the consultant/engineer.

PART 2— PRODUCTS

2.1 BACKFILL AND PIPE-BEDDING MATERIALS

A. Any fill from an off-site location shall be a certified-clean fill material acceptable to the owner and the consultant/engineer. The contractor shall perform any/all analytical testing as per owner's policy prior to bringing materials onsite. The contractor shall submit the results of chemical analyses of all fill material from off-site to confirm that it is free of contamination, and will provide the consultant/engineer and owner with documentation of the material's origin.

2.2 MECHANICAL MATERIALS AND EQUIPMENT

A. All mechanical materials and equipment shall be new and free of manufacturer defects which prevent those products from meeting their minimum performance criteria and safe operation.

2.3 ELECTRICAL MATERIALS AND EQUIPMENT

A. All electrical materials and equipment shall be new and free of manufacturer defects which prevent those products from meeting their minimum performance criteria and safe operation.

PART 3— EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance of existing conditions.

B. Examine and verify specific conditions described in individual specification sections.

C. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.2 FIELD QUALITY CONTROL

A. Allow representatives of the testing laboratory access to the work at all times.

B. Provide all equipment, labor, materials, and facilities required by the laboratory to properly perform its functions.

C. Cooperate with and assist laboratory personnel during their work.

D. Test specimens and samples shall be taken by the individual(s) designated in other sections, or as directed by the consultant/engineer. Conduct field sampling and testing in the presence of the consultant/engineer.

—END OF SECTION—

SECTION 01450
PIPE TESTING

PART 1— GENERAL

1.1 SECTION INCLUDES

A. Piping tests

B. Pipe-leakage testing shall comply with the limitations established in the attached schedule

1.2 RELATED SECTIONS

A. Section 01400 - “Quality Control”

B. Section 01300 - “Submittals”

1.3 DEFINITIONS

A. Leakage– For hydrostatic pressure testing, leakage refers to the quantity of water to be supplied into the newly laid pipe, any valved section thereof, or other appurtenance, necessary to maintain the specified leakage-test pressure after the pipe has been filled with water and the air expelled. For pneumatic pressure testing, leakage refers to the quantity of pressure drop measured between the initial test pressure and final pressure for the section of pipe to be tested.

1.4 QUALITY ASSURANCE

The contractor shall:

A. Before substantial completion, pressure pipes shall meet specific leakage requirements. These leakage requirements shall be satisfied by the basic materials alone. Where joint filters and the like have been specified, primarily to protect jointing materials, and secondarily to provide a safety factor, they shall not be applied until after leakage tests have been completed and accepted by the consultant/engineer.

B. The consultant/engineer will witness all tests. Tests not witnessed will be considered as not having been performed.

C. Work shall not be closed or covered up until it has been observed for proper and satisfactory construction and installation in compliance with the contract documents. Should incomplete or unacceptable work be covered, the contractor shall, at their own expense, uncover all work so that it may be properly observed. After such observations, repair and replace the work that was found defective, unsatisfactory, and not in accord with the contract documents. After such repair and replacement, bring all work to completeness and status as it was before it was

closed and covered, all at the contractor's expense. The contractor shall submit for review and approval the means and methods for correcting failed systems.

D. Successful completion of required tests shall in no way be interpreted as relieving the contractor of responsibility for defects that become apparent subsequent to the test. The consultant/engineer has the sole right to determine whether defects exist. Retest, before substantial completion, all portions of the work deemed by the consultant/engineer in need thereof.

1. 5 SUBMITTALS

A. Submit under provisions of section 01300

B. Complete details and specifications on testing apparatus

C. At the consultant/engineer's discretion, when working conditions or the standard of workmanship have been altered, testing of additional sections of pipelines may be required as soon as pipe is laid and before backfilling.

PART 2— PRODUCTS

2.1 TESTING APPARATUS

A. Provide labor, plugs, measuring equipment, and other apparatus, complete, to perform testing.

B. Provide clean water, air, and other materials as required to accomplish testing.

C. Provide plugs and caps capable of withstanding test pressures.

D. Provide temporary flanges, plugs, bulkheads, thrust blocks, weighing, bracing and other items necessary to prevent joints from separating, and to prevent injuries or damage.

E. Provide source of compressed air rated for the testing schedules noted in the schedule.

F. Provide test gauges at each end of the line being tested.

G. Provide clean, potable water for hydrostatic pressure testing.

PART 3— EXECUTION

3.1 PREPARATION

A. Plug open ends, adequately block bends, tees, ends, and other fittings, and do whatever is necessary to brace the piping system so that it will safely withstand the pressures developed under the tests and so that no damage or injury occur to the pipeline, people, or property.

B. Before tests are conducted, isolate, or remove any regulator, gauge, trap, or other apparatus or equipment that may be damaged by test pressures.

C. All tanks and vessels shall be filled with clean potable water prior to starting the system.

3.2 TESTS FOR PRESSURE PIPES

A. General

1. Leakage shall include the main exiting pipe, service connections, and other appurtenances on the section of pipeline being tested.

2. Test pipes before applying insulation and before they are concealed or furred-in.

3. Provide all necessary gauges. Gauges shall be standard pressure type with a minimum 6-inch diameter dial and a pressure range not to exceed 50% of the maximum required test-pressure.

4. Provide and maintain at the site a gauge stand with an approved laboratory-calibrated test gauge. Periodically check the site gauge used for testing against the laboratory-calibrated test gauge, and whenever requested by consultant/engineer.

5. Where necessary for testing, tap pipes and insert approved plugs after testing is completed.

6. Provide a hand or motor-driven compressor to maintain the required test–pressure-constant throughout the test's duration. If a water pump is used, pump water from a container with a known volume of water. If an air or inert gas pump is used, leakage shall be determined and calculated by pump cycling.

B. Pneumatic and Hydrostatic Testing

1. All sections of newly installed air supply and vacuum pipe shall be subject to pneumatic and hydrostatic pressure and leakage tests at the pressures shown in the schedule. The contractor shall follow the pipe manufacturer's recommendations for pressure-testing procedures.

2. Tests will consist of an initial pressurization to the test pressure as shown in the schedule. The section of pipe being tested shall be allowed to stand without make-up pressure for at least one hour to allow pipe expansion or stretching to stabilize. Following the stabilization period, testing fluid shall be added, if needed, to return pipe to test pressure.

3. Following this equilibrium period, the pressure test will be conducted for a duration as specified in the schedule.

3.3 ALLOWABLE LEAKAGE

A. The maximum allowable leakage for the various piping systems is presented in the schedule.

B. This contract is intended to secure piping systems without leakage. No section of pipe shall exceed the allowable leakage. This contract is also intended to secure a piping system free of visible drips, streams, and leaks. Therefore, even if a portion of the system meets the requirements for allowable leakage, visible leaks are not permitted and shall be repaired.

C. Leakage tests will be considered to have been satisfactorily passed when the rate of leakage is equal to or less than the stipulated allowances and when no visible leaks or other system defects are evident.

3.4 RETESTING

A. Pipes not passing these tests shall have all defects corrected to the satisfaction of and with methods approved by the consultant/engineer, and shall be retested and re-corrected as often as necessary until the test requirements are met.

B. This contract is intended to obtain work meeting test requirements on their own and solely through the use of the normal integral-sealing-components. Joint leaks shall not be stopped using concrete, caulking, mortar, or other patching materials. Leaking pipe joints shall be re-jointed or replaced if necessary.

3.5 SCHEDULE

LEAKAGE TESTING REQUIREMENTS

SERVICE	FLUID	PRESSURE	DURATION (min)	ALLOWABLE LEAKAGE (psig)
Air Supply Piping	Air	20 psig	15	0.1
Vacuum Piping	Air	20 psig	15	0.1

—END OF SECTION—

SECTION 01650
STARTING OF SYSTEMS

PART 1— GENERAL

1.1 SECTION INCLUDES

A. Scope

B. Division of Responsibilities

C. Process Testing

1.2 RELATED SECTIONS

A. Section 01010— “Summary of Work”

B. Section 01039— Coordination and Meetings

C. Section 01300— “Submittals”

D. Section 01400— “Quality Assurance”

1.3 SCOPE

A. This section delineates the division of responsibilities between the consultant/engineer and contractor for activities during the startup/shakedown and turnover period (five weeks) after substantial construction has been accomplished.

1.4 DIVISION OF RESPONSIBILITIES

A. Certain specific activities are to be completed before the final turnover notice will be issued to the contractor to signify substantial completion of a portion (or all) of the work. Following issuance of a turnover notice, the contractor shall continue to complete all unfinished work covered by a “punch-list” resulting from known deficiencies.

B. Undoubtedly, a certain amount of “make-good” work will be required after issuance of a turnover notice; for example, insulation, paint, or paving may require repair through no fault of the consultant/engineer or owner. In such instances, the contractor will be expected to make such repairs promptly and to the satisfaction of the consultant/engineer and owner.

C. The contractor shall be responsible for subcontractor and/or vendor representatives/ technicians being available on the site during the first running of equipment and is to arrange for the manufacturer to check out equipment as required. The contractor shall provide subcontractor and vendor services at no charge to the owner or consultant/engineer for all subcontractors and vendors contracted through the contractor.

D. The contractor shall be responsible for implementing the system programming and testing the system automated controls and interlocks. The contractor shall be responsible for subcontractor and/or vendor representatives/ technicians being available on the site to assist in troubleshooting control wiring and transmitter functions with engineer.

1.5 PROCESS TESTING

A. The contractor or manufacturer's representative shall perform functional testing before start-up. Manufacturer's representative or the contractor shall be available (on-site) during start-up, in accordance with the relevant section(s) of the technical specifications.

B. Instrumentation controls, and complete system-integration shall be tested by the contractor in the presence of the consultant/engineer before system start-up.

C. The consultant/engineer shall collect samples for evaluation and/or laboratory analyses to verify the performance of the process equipment.

1.6 EQUIPMENT ADJUSTMENT AND CALIBRATION

A. All mechanical and electrical equipment, including related control systems, shall be subjected to preliminary operation and testing before the individual facilities and systems are put into operation. Tests shall be made to determine whether the equipment has been properly assembled, aligned, adjusted, wired, or connected.

B. The demonstration test of each piece of equipment shall include check-out from the control panel. All alarm systems and safety lockout systems shall be demonstrated for proper function along with all process instrumentation and controls.

C. The contractor shall coordinate and be present during all such tests.

D. The contractor shall provide written documentation verifying the testing and calibration of each individual monitoring/controls input to the PLC including all sensors, transmitters, etc. Adequate level of documentation may be determined at the consultant/engineer's discretion. Should any component be deemed insufficient

by the consultant/engineer, the contractor shall replace and re-test that component at no expense to the OWNER or consultant/engineer.

1.7 SYSTEM STARTUP AND OPERATION

A. The contractor shall place the various items of equipment into operation, along with related piping and metering systems. After satisfactory startup of these individual systems, including all related equipment, they will remain in continuous or intermittent operation as required. System start-up shall be conducted for a period of five weeks following installation of all process equipment, piping, and electrical devices as defined in section 1010 (“Summary of Work”) and verification of substantial completion.

B. All equipment and accessories shall be adjusted and calibrated before any startup, as specified under these special conditions. Any equipment placed into temporary operation before final completion of the total project shall be readjusted and/or calibrated.

C. The contractor (in coordination with the engineer/consultant) shall supervise, control, and be responsible for the operation and maintenance of the new equipment and/or system after each individual item is placed into operation. An adequate number of competent startup personnel shall be furnished until the equipment is functional and working properly. The contractor shall remain responsible for making any required changes, repairs, or replacements to the new installation during the startup period.

D. The contractor shall provide system operational parameters to the consultant/engineer on a daily basis for the duration of the startup period (five weeks).

—END OF SECTION—

SECTION 02225
TRENCHING AND BACKFILLING

PART 1— GENERAL

1.1 WORK INCLUDED

A. Trench Excavation

B. Support of utilities across/adjacent to trench excavation

C. Temporary sheeting, shoring and bracing

D. Backfill around new piping with pipe bedding

E. Backfill and compaction of trench

F. Backfill around existing utilities

G. Water Management

1.2 RELATED SECTIONS

A. Section 01010— “Summary of Work”

B. Section 01300— “Submittals”

C. Section 01400— “Quality Control”

PART 2— PRODUCTS

2.1 BACKFILL MATERIAL

A. Suitable backfill/trench spoil material shall include excavated material capable of being compacted to the required density at the proper moisture content, and of such type and characteristics as have been approved by the consultant/engineer. No rock, broken concrete, demolition material, frozen material, topsoil, nor any material designated as unsuitable in paragraph B shall be used for fill material.

B. Unsuitable material shall include, but not be limited to, all grass, weeds, vegetation of any type, roots, trash, rocks, boulders, debris, demolition materials, or any layer, strata, formation, or deposit of soil determined by the consultant/engineer to be

unsuitable to support footings, slabs, or for any other intended purpose. No material will be classified as unsuitable solely based on excessive moisture content.

C. All backfill shall be free of frozen particles, clay lumps, trash, roots, wood, metal, scrap material, other vegetable matter, and refuse. Backfill shall contain no stones larger than four inches in their greatest dimension.

2.2 IMPORTED FILL

A. All imported fill material shall be the as defined for "Suitable Material" above, except that it shall be obtained from approved certified-clean fill material sources from off-site locations acceptable to the owner and consultant/engineer. As specified in section 01400 ("Quality Control"), the contractor shall verify and document to the consultant/engineer that proposed borrow material is certified-clean fill.

B. All tests of imported fill materials, including but not limited to sieve analysis, proctor testing and compaction testing, will be performed by the contractor.

C. PIPE BEDDING MATERIAL

1. Gradation— the material shall have the following gradation:

Sieve Size	% Passing by Weight
1-inch	100
¾-inch	90–100
No. 4	0–10
No. 8	0–8

2. Soundness— the material shall be substantially free of shale or other soft particles of poor durability.

D GRANULAR FILL

1. Granular material shall be the same as defined for "Suitable Material" above, except that it shall contain a maximum of 12% by dry weight of particles passing the No. 200 sieve, and a maximum of 40% passing the No. 40 sieve.

E. OTHER IMPORTED FILL

1. Imported fill for backfill and restoration shall meet local or NYSDOT specification requirements and gradation analysis for each material will be submitted to the consultant/engineer.

2.4 TEMPORARY SHEETING, SHORING, AND BRACING

A. The type of excavation support used, design, and method of installation, including embedment and bracing, shall be determined by contractor and submitted to the consultant/engineer for approval.

PART 3— EXECUTION

3.1 TRENCHING

A. Excavate material encountered to subgrade elevations, indicated slopes, lines, depths and invert elevations required for foundations or utilities as shown on the drawings.

B. All material encountered during excavation, of whatever nature, within the limits indicated shall be segregated and stockpiled for use as possible use as suitable backfill or removed and disposed of as directed by the consultant/engineer.

C. Final excavation shall be carried to the depth, lines, grades, and slopes shown on the drawings, within a tolerance of 0.1 foot.

D. Subgrade shall be maintained in such condition that it will be well drained at all times.

E. Grade top perimeter of excavation to prevent surface water from draining into excavation. The work area shall be protected from surface water run-on.

F. Excavate open trench no more than 100 linear feet in advance of pipe installation without the express permission of the consultant/engineer.

G. Provide sheeting and shoring, as required, to prevent collapse of excavations and where required by local codes and regulations. Use timbers, cribbing, planking, or sheet piling, as required.

H. Dewatering— Keep pipe trenches free of water from any source during excavation, installation, and backfilling. Construct a berm or grade to prevent surface run-off into the excavation.

1. The contractor shall dewater the trench excavation as necessary if groundwater is encountered or accumulate precipitation is encountered during trenching.

2. The contractor shall be responsible for storage for future on-site treatment and discharge of the water as directed by the consultant/engineer. Groundwater encountered during trenching shall be pumped to an appropriately sized frac-tank for temporary storage for on-site treatment.

I. Protect the excavation bottom from freezing when the temperature is less than 32º F.

J. Provide access for all local traffic, use road plates as necessary to allow exiting roadways to remain open.

3.2 PIPE BEDDING

A. Pipe bedding placement depths, thicknesses, and type shall be consistent with those required per the drawings.

B. Place a uniform blanket of loose bedding material under the piping.

C. Where soil at the bottom of trench is unsuitable, remove material and stabilize the trench bottom with bedding material. Provide depth of stabilization as required to construct a firm subgrade for the bedding material.

3.3 PLACING BACKFILL

A. Backfill depths, thicknesses, and type shall be consistent with those required per the drawings.

B. Unless otherwise specified by local requirements, all fill shall be placed in approximately horizontal lifts not exceeding 8 inches in loose thickness. So far as is practicable, each layer of materials shall extend the entire length and width of the area being filled.

C. Backfill shall not be placed in water on surfaces that are muddy, frozen, or that contain frost.

C. No frozen backfill shall be placed.

D. Backfill surface shall be sloped to facilitate removal of run-off from the site and to prevent ponding of surface water. When inclement weather is anticipated, the surface of the backfill shall be graded and sealed as directed by the owner or consultant/engineer to preclude percolation of surface water.

E. Excavations for pipe shall not be backfilled until the pipe has been tested by the contractor and approved by the consultant/engineer.

F. After the consultant/engineer has approved the testing, fill around and over the pipe shall be compacted, unless otherwise noted, for the entire depth of the excavation.

G. If the existing sub-base is not well draining to a minimum depth of three feet, it shall be removed and replaced with non-frost-susceptible material, and compacted as per section 3.4.

H. Imported granular fill shall be used for backfill if sufficient suitable trench spoil backfill is not available

I. Remove and properly dispose of all surplus backfill materials.

J. Do not place backfill during freezing or excessively wet field conditions.

K. Grade backfill to existing elevations or as shown in the construction drawings.

3.4 COMPACTION

A. Compact backfill utilizing appropriately sized compaction equipment, such as rammers or plate compactors, or steel-wheel vibratory rollers.

B. The compaction technique used shall be to the satisfaction of the consultant/engineer to obtain a non-yielding surface after compaction.

C. Make a minimum of four passes or a sufficient number of additional passes as required by the consultant/engineer to obtain the required compaction density per the drawings.

D. Do not place fill over a layer that has not been accepted by the consultant/engineer.

E. Maintain moisture content of the exposed lift; desiccation cracking shall result in removal and reinstallation of affected area by the contractor at their own expense.

F. Backfill within existing street work shall be completed in accordance with NYSDOT specification and applicable permits. All tests of imported fill materials, including but not limited to sieve analysis, proctor testing and compaction testing, will be performed by the contractor.

3.5 UNDERGROUND UTILITIES

A. Locate existing underground utilities before excavation utilizing air-vacuum extraction or "Air Knife/Soft Dig" technology and hand-digging exploratory pits where earthwork will be done near the utilities, and at locations where offsets in utility lines are likely to exist. Have a representative of the respective utility company and the consultant/engineer present during this exploratory work.

B. The contractor shall coordinate with the utility company and shall perform excavation in compliance with utility company rules and directives for excavation work and make necessary arrangements to avoid damage. Contractor shall be responsible for damage during excavation to existing pipe, conduit, or equipment, and repair any damage.

C. For all trench excavation within 5 feet of underground utilities, all excavation will be performed utilizing air-vacuum extraction or "Air Knife/Soft Dig" technology.

D. Provide utility supports for pipes, sewers, cables, and conduit previously installed and uncovered during excavation. For all excavations, the contractor shall be responsible for providing required supports including all materials

—END OF SECTION—

SECTION 15200
HIGH DENSITY POLYETHYLENE PIPE

PART 1 - GENERAL

1.1 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A-536-84 – Standard Specification for Ductile Iron Castings.

2. ASTM D-638-89 – Standard Test Method for Tensile Properties of Plastics.

3. ASTM D-790-86 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Places and Electrical Insulating Materials.

4. ASTM D-1238-89 – Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer

5. ASTM D-1248-84 – Standard Specification for Polyethylene Plastics Molding and Extrusion Materials.

6. ASTM D-1505-85 – Standard Test Method for Density of Plastics by the Density-Gradient Technique

7. ASTM D-1693-70 – Standard Test method for Environmental Stress-Cracking of Ethylene Plastics.

8. ASTM D-2122-88 – Standard Test Method of Determining Dimensions of Thermoplastic Pipe and Fittings.

9. ASTM D-2513-90 – Standard Specifications for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.

10. ASTM D-2837-90 – Standard Test method for Obtaining Hydrostatic Design for Thermoplastic Pipe Materials.

11. ASTM D-3 261-88 – Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.

12. ASTM D-3350-84 – Specification for Polyethylene Plastics and Fittings Material.

B. American National Standards Institute (ANSI):

1. ANSI 316.5-88 – Pipe Flanges and Flanged Fittings.

1.2 SUBMITTALS

A. Manufacturer's test specification data listing resin type, cell classification, stock density, melt flow, flexural modulus, tensile strength, and coloration.

B. Include test results with shipment of materials.

C. Pipe Dimensions:

1. Average outside diameter.

2. Average inside diameter.

3. Minimum and average wall thickness.

D. Complete submittals in accordance with Section 01300 - SUBMITTALS.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Pipe Storage:

1. Store or stack pipe to prevent damage from marring, crushing or puncture. Limit maximum stacking height to 6 feet.

2. Store in accordance with manufacturer's recommendations.

B. Pipe Handling:

1. Protect pipe from excessive heat or harmful chemicals.

PART 2 - PRODUCTS

2.1 PHYSICAL PROPERTIES OF PIPE RESIN

A. Density: ASTM D-1505, Not Less than 0.941 grams/cubic centimeter.

B. Melt Flow: ASTM D-1238 – Condition E, Not greater than 0.15.

C. Flexural Modulus: ASTM D-790, 110,000 to less than 160,000 psi.

D. Tensile Strength at Yield: ASTM D-638, 3,000 to less than 3,500 psi.

E. Environmental Stress Crack Resistance (ESCR): ASTM D-1693 – Condition C, shall be in excess of 5,000 hrs with zero failures.

F. Hydrostatic Design Basis: ASTM D-2837, 1,600 psi at 23 degrees C.

2.2 PIPE

A. Manufacturers:

1. Phillips Driscopipe, Inc., or approved equal.

B. High Performance, high molecular weight, high density polyethylene pipe (Type 3408 resin).

C. ASTM D-1248 (Type III, Class C, Category 5, P34).

D. ASTM D-3350, minimum cell classification value 345434C.

E. Standard dimension ratio as shown on drawings.

F. Marking: Intervals of 5 feet or less.

1. Manufacturer's name or trademark.

2. Nominal pipe size.

3. Type of plastic pipe (i.e., PE 3408).

4. Standard dimension ratio.

5. ASTM D-2513.

6. Extrusion date, period of manufacture or lot, or batch number.

G. Dimensions:

1. Conform to standard dimensions and tolerances of ASTM D-2513.

2.3 FITTINGS

A. Fittings from polyethylene compound having cell classification equal to or exceeding compounding used in pipe to ensure compatibility of polyethylene resins.

B. Provide molded fittings rather than factory fabricated fittings in available diameters.

C. Flanged Joints:

1. 150-lb carbon steel or convoluted epoxy coated ductile iron backup flanges as recommended by manufacturer.

2. Stainless Steel nuts and bolts.

3. Flanges and bolt patterns consistent with ANSI B16.5, AWWA C207, ASTM A-536, and as recommended by manufacturer.

D. Fitting dimensions shall conform to standard dimensions and tolerances in accordance with ASTM D-3261.

E. Markings:

1. Manufacturer's name or trademark.

2. Nominal size.

3. Type of plastic pipe (i.e., PE 3408)

4. Standard dimension ratio as shown on drawings.

5. ASTM D-2513.

6. Extrusion date, lot number or batch number.

F. Pressure rating of fittings shall be equal to or greater than pressure rating of pipe.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Trench, backfill, and compact in accordance with Section 02225.

B. Heat Fusion of Pipe.

1. Join pipe in accordance with manufacturer's requirements.

C. Flange Jointing:

1. There will be no flanged connections for HDPE pipe.

D. Pipe Placement:

1. Grade control equipment shall be of type to accurately maintain design grades and slopes during installation of pipe.

2. Dewatering – Remove standing water in trench before pipe installation.

3. Unless otherwise specifically stated, install pipe in accordance with manufacturer's recommendations.

4. Maximum lengths of fused pipe to be handled as one section shall be according to manufacturer's recommendations as to pipe size, pipe SDR, and topography so as not to cause excessive gouging or surface abrasion; but not to exceed 400 feet.

5. Cap pipe sections longer than single joint (usually 40 feet) on both ends during placement except during fusing operations.

6. Prevent migration of dirt or debris through perforations during placement. Remove dirt or debris from pipe before backfilling

7. Notify engineer prior to installing pipe into trench and allow time for engineer's inspection. Correct irregularities found during inspection.

8. Complete tie-ins within trench whenever possible to prevent overstressed connections.

9. Allow pipe sufficient time to adjust to trench temperature prior to testing, segment tie-ins or backfilling activity.

10. Install reducers adjacent to laterals and tees.

11. Place in trench by allowing minimum 12 in./100 ft. for thermal contraction and expansion.

12. Coordinate installation of piping with OWNER to limit impediment of normal OWNER operations.

3.2 PIPE TESTING

A. Test pipe sections in accordance with Section 01450.

END OF SECTION

SECTION 15400
COMPRESSED AIR SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDED

A. This section includes requirements for the supply, delivery, installation and functional testing during initial start-up of the compressed air system with the consultant/engineer as specified in these Technical Specifications and as shown on the drawings.

1.2 RELATED SECTIONS

A. Section 01300 - Submittals.

B. Section 01400 - Quality Control.

C. Section 01450 - Testing.

D. Section 01650 - Starting of Systems.

1.3 GENERAL

A. The contractor shall supply, deliver, and install the air compressor and all appurtenances as shown on the drawings. Contractor shall be responsible for any extra costs incurred in the event of a rush in the manufacturing, delivery and installation is required to make up for delays in schedule caused by the contractor.

B. The contractor shall be responsible for obtaining mounting and installation details for the air compressor and appurtenances, and shall install the compressed air system in accordance with the vendor's requirements, these Technical Specifications and the drawings.

C. The contractor is responsible for the process equipment installations (i.e., prepare access, tie-in compressed air delivery lines and condensate drain line, break and seal access holes through walls/roof, etc.) and shall provide any miscellaneous materials and labor necessary to complete a workable system in accordance with the drawings and these Technical Specifications.

D. The contractor shall be responsible to supply and install the complete compressed air system.

E. The contractor shall be responsible for all electrical installations associated with the compressed air system. This includes but is not limited to electrical supply and controls. The contractor shall obtain a list of electrical supply requirements and controls from the vendor.

1.4 REFERENCES

A. ASTM F2786 - 10 Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Gaseous Media Under Pressure.

B. ASME B16.3 - Malleable Iron Threaded Fittings.

1.5 SUBMITTALS

A. The contractor shall submit to the consultant/engineer for review Shop Drawings for the reciprocating air compressor and all associated appurtenances, including but not limited to, the desiccant dryer assembly, filter/regulator assembly, and electronic condensate drain valve, in accordance with Section 01300 (Submittals).

1.6 PERMITS AND REGULATIONS

A. The CONTRACTOR shall comply with all Local, State, and Federal regulations.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. The air compressor will be manufactured by Ingersoll-Rand as indicated on the contract drawings.

2.2 INSTRUMENTATION AND CONTROLS

A. General

1. Instrumentation and controls shall be provided as specified herein and as shown on the drawings.

2. All instrumentation and controls shall be suitable for operation in areas designated as unclassified per NEC.

3. All controls shall be supplied and installed by the contractor or electrical subcontractor.

PART 3 - EXECUTION

3.1 INSTALLATION AND INSPECTION

A. The contractor is responsible for arranging for supply, delivery and installation of the compressed air system in accordance with these Technical Specifications and the drawings and instructions supplied by the vendor.

END OF SECTION

SECTION 16920
CONTROL PANEL

PART 1— GENERAL

1.1 WORK INCLUDED

A. The work covered by this specification consists of furnishing all labor, equipment, supplies, and materials to provide a completely integrated, operable, control system. The system shall be constructed and programmed as shown in the contract drawings and specified herein. All controls and associated equipment shall be included.

1.2 QUALITY ASSURANCE

A. The control-system supplier shall have in their direct employ a staff of capable personnel for detail engineering, coordination, drafting, procurement, expediting, scheduling, construction inspection, installation start-up service for calibration and commissioning, and service for guarantee compliance.

1.3 REFERENCES

A. All work shall conform to applicable standards of ANSI, IEEE, JSA, NEMA, UL, and NEC.

B. All work shall comply with applicable New York electrical codes.

C. All control components shall be UL Listed.

D. All assembled control panels shall be UL Listed and be equipped with a label indicating UL Listing.

1.4 CONTROL LOOP DESCRIPTIONS

A. The air sparge / soil vapor extraction system control-system shall consist of the main control panel (MCP):

1. Main Control Panel (MCP): The MCP shall house the PLC, all alarm indicators, all control and instrumentation inputs and outputs, hand switches and push buttons, power for local analog instrumentation, intrinsically safe relays or barriers (where required), and the operator-interface terminal. No high voltage (>120 volts) power shall be routed through the MCP.

B. All control-loop alarms that shut down equipment shall latch, unless noted otherwise, to prevent automatic system-restart. Control loops shall be designed such that alarms must be manually reset before equipment restart. All alarm lights on the control panels shall be unique to one alarm condition and be clearly and permanently marked to identity the alarm condition. The program of the MCP should be configured such that only the “first in” alarm is displayed before acknowledgment. Following acknowledgment/reset, any existing alarms will then be displayed by illuminating the appropriate indicator light.

1.5 SUBMITTALS

A. The following items shall be submitted for each system as a complete package. NEMA-standard symbols and identification designations shall be used on shop drawings. Format for shop drawings shall be as follows:

1. Schematic or Elementary Diagrams

a. Diagrams shall be drawn between vertical lines representing the source of power. The diagram shall be complete with all system control-devices indicated. Devices remote from the control panel shall be indicated by appropriate symbols.

b. Each line shall be numbered to facilitate identification and explanation. All wires shall be identified with a wire number.

c. Where color-coded cable is used, the color code shall be included in the diagram.

d. Limit, pressure, temperature, floats, and similar devices shall be indicated in the turned off, disconnected, or shelf position.

e. Selector and other multi-contact switches shall have their contact closure-sequence shown on the diagram.

f. Descriptions of the functions of valves, starters, and indicating lights shall be indicated on the diagram and shall completely describe the sequence of operation, both automatic and manual.

2. Interconnection Diagrams: Interconnection diagrams shall indicate all field-mounted devices external to panels and cabinets. These devices need not be shown in their relative locations. All field-device and control-panel terminal-numbers shall be indicated. Interconnection diagrams may be incorporated on schematic or elementary diagrams.

3. Dimensions: Shop drawings shall be drawn to scale and indicate all outline, mounting, and clearance dimensions. Relative location and size of panel-mounted components shall be indicated. Nameplate legends with exact engraving shall be indicated. Usable spare panel-space shall be indicated, identified, and dimensioned. The panel-space layout drawn to scale, together with a complete nameplate schedule (including wording), shall be submitted for review to the consultant/engineer before fabrication.

4. Operator Interface-Layout: The contractor shall submit to the consultant/engineer print outs or drawings depicting the various screens proposed for the operator-interface units. Before acceptance of the completed system, the layout must be accepted by the consultant/engineer.

5. As-Built Documentation: The following documentation will be submitted within 30 calendar days of acceptance of the completed control system:

   a. All wiring, schematic, and interconnecting diagrams originally submitted for the consultant/engineer's approval shall be updated to incorporate modifications made to the controls during fabrication, installation, and/or startup and shakedown. These updated diagrams shall then be submitted, along with *AutoCAD*® (2010–2011) files, for the project record and operation manual.

   b. An electronic copy of the PLC software and logic file.

   c. An electronic copy of the operator interface-terminal program/setup.

1.6 EQUIPMENT PROTECTION

A. The contractor shall be responsible for all damage to equipment in the factory or during shipment. The contractor shall be responsible for fully protecting the equipment until it is accepted by the consultant/engineer.

B. All damage to the equipment shall be repaired to the satisfaction of the consultant/engineer. The contractor shall pay for all costs of repairing the equipment.

1.7 INSPECTION AND TESTING

A. The contractor shall guarantee that any component or equipment they furnish which shall fail, due to defects in materials or workmanship, within one year after acceptance by the consultant/engineer shall be replaced or repaired without further cost to the consultant/engineer for labor, parts or transportation.

PART 2— PRODUCTS

2.1 SUPPLIERS

A. All control-panel components shall be provided and programmed by the contractor.

2.2 GENERAL

A. The main control panel (MCP) shall contain indicator lights, indicators, control switches, terminals, an operator-interface terminal, and wiring, as shown in the contract drawings and described herein.

B. All wiring shall be minimum AWG #14, run in wire ways, clearly marked at all terminations with Brady or equivalent markers. Field wiring shall terminate on 600V, barrier terminals. All terminals shall be clearly marked. All interior devices and terminals shall be mounted on sub-panels.

C. Field wiring shall enter the panel through conduit and be attached to specified wiring terminals located on the bottom or sides of the MCP.

2.3 SPECIFIC COMPONENTS

A. Refer to the contract drawings for additional information pertaining to specific components, in order to obtain the desired operation and monitoring requirements.

B. Programmable-Logic Controller: The programmable controller shall be an Allen-Bradley, Micrologix 1400 model (or an approved equivalent) with I/O provided to meet the requirements of the system as described in the contract drawings and specifications. Provide a minimum of 20% spare discrete I/O for future upgrade or expansion.

C. Battery-Backup/Uninterruptible Power-Supply: A battery-backup/uninterruptible power-supply shall be supplied to provide surge protection and redundant battery backup to the PLC and auto-dialer. The battery backup/uninterruptible power supply shall be an APC model # ES350 or an approved equivalent.

D. Nameplates: Nameplates shall be $^{1}/_{16}$-inch laminated plastic. Exterior nameplates shall be white with black core (letters). Interior nameplates shall be black with white core (letters). The lettering shall be arranged in two or three rows. The overall size shall be $1 \times 2^{1}/_{2}$-inches, unless mounting space or legend content dictates otherwise.

E. Panel Control Switches: Unless otherwise indicated. Control and selector switches shall be of the heavy-duty, oil-tight, NEMA-rated rotary type with enclosed contacts. The switches shall have positive, quick acting contacts with contact operation not dependent on springs. Each switch shall be equipped with pistol-grip handles and rectangular escutcheon with legends, as shown in the contract drawings. Switches shall be manufactured by Allen-Bradley, Square D, General Electric, or other manufacturer of an approved equivalent.

F. Push Buttons: Push buttons shall be heavy-duty, oil-tight, and NEMA-rated. Manufacturer shall be General Electric, Allen-Bradley, Square D, or other manufacturer of an approved equivalent.

G. Indicator Lights: Indicator lamps shall be of the transformer type for 120 volt AC service. The lamp assemblies shall be equipped with lenses of the required color (as shown in the P&ID and described herein) and readily removable from the front of the panel. Indicator lights shall be oil-tight and NEMA rated. Allowable manufacturers include Allen-Bradley, General Electric, Square D, or other manufacturer of an approved equivalent.

H. Control Panel Enclosures:

1. The main control-panel enclosure shall be NEMA-4 and be provided with a swing-out door with sight glass, subpanels, dead-front kits, and other accessories as required. The control panel door shall be provided with a three-point latching system with a lockable handle. The main control panel enclosure shall be Hoffman or equivalent and be of sufficient size to provide at least 30% available unused volume for future expansion or upgrade.

I. Terminal Blocks and Accessories

1. Terminal Blocks: ANSI/NEMA ICS 4, UL Listed.

2. Power Terminals: Unit construction type, closed-back type, with tubular pressure-screw connectors, rated 600 volts.

3. Signal and Control Terminals: Modular construction type, channel mounted, tubular pressure-screw connectors, rated 600 volts.

4. 30% spare signal and control-terminal block points shall be provided for

2.4 CONTROL PANEL FEATURES

A. Emergency-Stop Push Button(s): The MCP will be equipped with a red mushroom-type “Emergency Stop” switch, which, once depressed, disconnects power to all MCP components and control outputs. The switch used must require manual reset.

B. External-Programming Port: The MCP shall be equipped with an external-programming port for access to serial communication with the PLC without having to open the MCP door. This port shall be clearly marked “Programming Port.”

C. Auto-dialer: The MCP shall be equipped with an auto-dialer, such as that manufactured by Sensaphone (model #AD-2000). An approved equivalent may be substituted.

D. The control panel door shall be equipped with a sight-glass window to allow viewing of the PLC LCD without having to open the MCP door.

PART 3— EXECUTION

3.1 INSTALLATION

A. All electrical control-equipment shall be installed in a neat and competent manner in complete accordance with the contract drawings, approved shop drawings, and manufacturers’ printed installation instructions.

B. Ground all devices and shields according to manufacturers’ directions.

C. All terminations shall be accessible from the front of the panel.

3.2 FABRICATION/LAYOUT

A. Input/Output Layout

1. All field instrumentation, field-control switches, control-panel push buttons, and hand switches shall be assigned unique inputs into the PLC. No field devices, instruments, or switches shall be permitted to drive indicators, alarms, motor controllers, or controls without entering the PLC.

2. All control-panel indicators, motor controllers, field devices, external alarms, or relays shall be driven directly from the PLC output(s).

3.3 PROGRAMMING

A. The contractor shall provide all PLC programming, as described in the contract drawings and described herein. The contractor will be responsible for any program modification necessary to reach an acceptable level of system performance, as determined during system startup.

B. Operator-Interface Terminal: The operator-interface terminal shall be programmed to provide the operator adjustable access-alarm and operation set-points as shown on the contract drawing, as well as displaying the status of all scaled 4-20 mA analog-input values.

C. Analog Process Outputs: The MCP shall contain 4-20 mA outputs to transmit the following signals to analog control-equipment:

1. VFD-400 to control B-400 motor speed via VT-300 4-20ma output-signal. A vacuum operating set-point of 0-100 in.W.C. and a dead band of ±5 in.W.C shall be used to maintain applied vacuum setting.

—END OF SECTION—