

August 15, 2023

Michael D. MacCabe, P.E. Division of Environmental Remediation New York State Department of Environmental Conservation 625 Broadway Albany, NY 12233-7016

Re: Soil Vapor Extraction System Expansion Pilot Test Summary and Design

NYSDEC BCP Site No. C241219

27-10 49th Avenue, Long Island City, Queens, NY

Dear Mr. MacCabe:

Roux Environmental Engineering and Geology, D.P.C. (Roux), on behalf of Hunters Point SG, LLC (Volunteer), has prepared this Soil Vapor Extraction System (SVES) Expansion Pilot Test Summary and Design Letter Report (Report) for the property located at 27-10 49th Avenue, Long Island City, Queens, New York (Site). As per NYSDEC email correspondence on April 5, 2023, in response to the Soil Vapor Summary Letter, the NYSDEC and NYSDOH have determined that additional actions are needed to address the potential for off-Site soil vapor migration before a final remedy can be considered. To address the NYSDEC's and NYSDOH's comments, Roux has proposed the installation and operation of a SVES expansion along the northern property line adjacent to 49th Avenue.

SVES Expansion Pilot Test Summary

In accordance with the SVES Expansion Pilot Test Workplan (Workplan) submitted by Roux on May 8, 2023, a Pilot Test was performed at the Site to provide empirical data to aid in the design of the SVES Expansion and determine the potential effective radius of influence (ROI) for SVES extraction points. The Pilot Test was performed by Roux's subcontractor, EnviroTrac Environmental Services (EnviroTrac) of Yaphank, New York, under Roux supervision from July 5 to July 10, 2023. EnviroTrac's SVES Pilot Study Report is provided as Attachment 1.

As per the Workplan, one 4-inch diameter screened polyvinyl chloride (PVC) SVE point and six ½-inch diameter screened PVC monitoring points were installed to conduct the Pilot Test. During pre-clearing and drilling activities it was observed that the majority of the subgrade below the parking lot was comprised of cobbles, brick and concrete debris. This condition can present a significant level of uncertainty when trying to uniformly apply vacuum to the subgrade. However, as evidenced in the EnviroTrac Pilot Study Report, as applied vacuum and flow was increased, an increase in vacuum response throughout the network of monitoring points was observed. The Pilot Test concluded that an ROI of 30 feet was achievable with the appropriate vacuum and flow parameters applied to each SVE point.

SVES Expansion Design

The intention of the SVES Expansion Design is to provide enhanced mitigation to further prevent potential off-Site soil vapor migration. As shown in the Soil Vapor Summary Letter prepared by Roux, dated March 2, 2023, the remaining soil vapor concentrations of concern exist along the northern edge of the existing parking lot along 49th Avenue. Roux's proposed SVES Expansion Design includes four SVE points along the northern edge of the parking lot on the eastern end of the Site (including the SVE point installed during the Pilot Test).

The SVES Expansion will include the following components as shown on the attached Soil Vapor Extraction System Plan and Details drawing (Attachment 2):

- Four 4-inch diameter PVC SVE points. Each SVE points will be screened from 1.5 feet to 10 feet below grade.
- The SVE points will be interconnected via a 6-inch diameter solid PVC header pipe and will be transitioned to a 6-inch diameter steel riser pipe at the northeast corner of the building up to the adjacent roof and to the blower.
- The SVES will be connected to a 10 HP, Ametek Rotron Blower Model EN909BD72WL or approved equal.

Roux believes that the proposed SVES Expansion will provide adequate vacuum to capture and control remaining soil vapor contamination present at the Site and will therefore further mitigate the potential off-Site migration. Assessing the highest soil vapor concentration results from the most recent post-IRM sampling events, in accordance with the 'Guidance on Air Emissions of VOCs at DER Remediation Sites', it is anticipated that treatment of the discharge from the SVES Expansion will not be required. Confirmatory discharge air sampling will be collected after system start-up.

Should you have any questions or require further information regarding this Workplan, please do not hesitate to contact us.

Sincerely,

ROUX ENVIRONMENTAL ENGINEERING AND GEOLOGY, D.P.C.

David Kaiser, P.E. (NY) Senior Engineer

March M. DE (NV)

Noelle Clarke, P.E. (NY) Principal Engineer

Christopher Proce, C.S.P., P.G. (NY) Principal Hydrogeologist/Vice President

Soil Vapor Extraction System Expansion Pilot Test Summary and Design 27-10 49th Avenue, Long Island City, New York

ATTACHMENT 1

SVES Pilot Study Report

3446.0008Y114/CVRS ROUX

Soil Vapor Extraction (SVE) System Pilot Study Report

Site:

27-10 40th Avenue Long Island City, NY

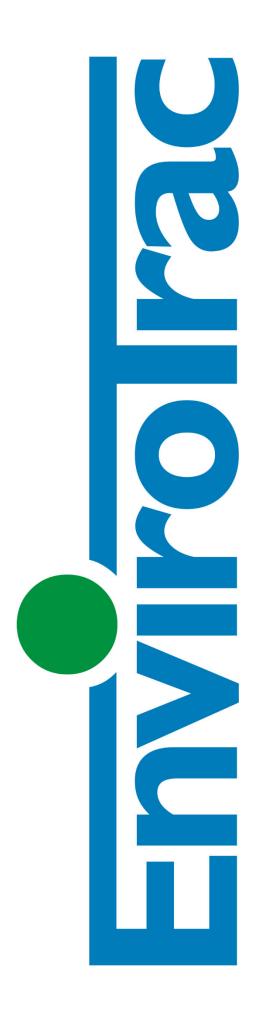
Prepared for:

Roux 209 Shafter Street Islandia, NY 11749

Prepared by:

EnviroTrac Ltd 5 Old Dock Road Yaphank, NY 11980

August 2023



A Full Service Environmental Consulting and Contracting Firm

Soil Vapor Extraction (SVE) System Pilot Study Report 27-10 49TH Avenue, Long Island City, NY

PURPOSE

This report is intended to summarize the results of the SVE pilot study that was conducted by EnviroTrac on July 10th, 2023. The purpose of the test was to determine the feasibility of expanding the existing SSDS/SVES as a viable means of mitigation for potential off-Site soil vapor migration along the northern Site boundary. The results of this study were used to determine the feasibility of this technology, as well as determining the required operating parameters and layout for the selected system.

TECHNICAL SCOPE OF WORK PERFORMED

1. Pilot Test Equipment

For the purpose of the pilot test, EnviroTrac mobilized its mobile SVE system equipment to conduct the study at representative locations. The mobile system consists of a regenerative vacuum blower that was connected to the recently installed SVE test well. The test equipment also includes a vacuum gauge, a flow/sample port, associated piping, and discharge stack. Major system components of the mobile SSD system are described below.

Sub-Slab Depressurization Equipment:

 Extraction Blowers: Ametek Rotron Model #EN606M5ML, Regenerative Vacuum Blower (3.0 HP, 230V, 1 Phase, XP).

Max Flow: 200 SCFMMax Vac: 75 "H₂O

Additional Test Equipment

- Dwyer Instruments Handheld Air Velocity Meter Model 471B-1
- UEI Digital Manometer EM201B (0.000 20.000 "H2O)

2. Test Wells

To facilitate the pilot study, several test wells were installed onsite. These included one (1) SVE test well (PT-1) and six (6) vacuum monitoring points (VMP-1 through VMP-6), each of which was installed in the asphalt parking area located on the northeast side of the property, outside the existing building. The SVE test well was installed by a drilling sub-contractor (Aarco Environmental) and the six VMP wells were installed by hand by EnviroTrac personnel. The SVE test well, PT-1, consists of a 4-inch diameter schedule 40 PVC well that extends to a depth of 10-feet bgs, with a schedule 40 PVC, 0.20 slot well screen installed at a depth between 1 and 10 feet bgs (10-feet total). Each monitoring point consists of a 1/2-inch diameter schedule 40 PVC well that extends to a depth of approximately 5-feet bgs, with a 0.20 slot screen installed at a depth between approximately 1 and 5 feet bgs (5-feet total). For the purpose of the pilot test, the mobile test blower was connected to the top of the PVC casing of the SVE test well via a flexible hose.

SSDS TESTING METHODOLOGY

Throughout the pilot study the temporary extraction well was tested at varying operational conditions. Prior to starting the test, a flexible hose was routed from the extraction well to the mobile test blower, which was staged in the parking area near the test well. In order to monitor the sub-surface vacuum response of the test, the vacuum monitoring points were positioned during installation at varying radial distances extending outward from the SVE extraction point. During the test, the vacuum blower was configured to operate at



several different steps of increasing flow and vacuum. Throttling of the blower was carried out by making adjustments to the mobile system piping manifold control valve as well as bleeding excess flow through the system fresh air inlet valve. During each step, operating parameters such as applied flow, vacuum, and sub-slab vacuum responses were recorded. The applied extraction well flow and vacuum were measured from a monitoring port located in the extraction piping several feet above where the piping connects to the top of the extraction well. The wellhead vacuum and extraction flow rate for each step were recorded as the following:

TP-1

- Step 1 2.0 "H₂O Wellhead Vacuum, 142.3 scfm Extraction Flow Rate.
- Step 2 1.4 "H₂O Wellhead Vacuum, 127.2 scfm Extraction Flow Rate.
- Step 3 1.0 "H₂O Wellhead Vacuum, 92.6 scfm Extraction Flow Rate.
- Step 4 − 0.6 "H₂O Wellhead Vacuum, 41.6 scfm Extraction Flow Rate.
- Step 5 Blower off (to confirm effects of the existing active SSD system in parking area).

As noted, the final step of the test was conducted with the mobile test blower turned off. This was done in order to measure the effects of the existing active sub-slab depressurization system (SSDS) that was in operation during the test on the network of monitoring points. The SSDS consists of a network of lateral collection screens and piping that is installed below the asphalt parking area and connected to a roof mounted vacuum blower.

During each step vacuum influence was recorded from all monitoring points utilizing a handheld digital manometer. For each step the operating conditions were allowed to sufficiently stabilize at a steady state condition prior to the recording of any readings.

PILOT TESTING RESULTS

The field data collected during the SVE pilot test is included as Attachment 1 of this report. Flow and vacuum readings were recorded during each step of the SVE test, while vacuum influence was measured at each observation point. A copy of the pilot test data analysis, along with the associated data plots, are included in Attachments 2 and 3 of this report.

In order to determine the performance requirements at each of the proposed full scale SVE extraction points, the pilot test data is used to generate a semi-logarithmic plot of sub-slab vacuum response vs. distance. From this plot the effective Radius of Influence (ROI) of each of the test steps of the pilot study is determined by finding the radial distance where a best fit logarithmic line plot of the data intersects the line y = 0.10 "H₂O vacuum response. However, for this test it was determined that due to several factors, a curve of this nature could not be generated for this data set. As seen in Figure 1, the measured vacuum influence does not diminish as you move laterally away from the extraction well. This is most likely due to several reasons including the subsurface soil conditions as well as the operation of the SSDS. During drilling activities, for both the SVE test well and the VMPs, a significant amount of debris (cobbles, brick, broken concrete) was noted at each location as each bore hole was advanced vertically. I some locations this was noted for the extent of the entire bore hole depth. Conditions such as this provide a significant amount of uncertainty in the ability of the sub-surface soils to provide optimal distribution of the applied vacuum throughout the test area. However, based on the results of the collected data, there is clear evidence that as the applied vacuum is increased, an increase in vacuum response throughout the network of VMPs is noted.

CONCLUSIONS AND RECOMENDATIONS

Based on the results tabulated, the pilot testing performed demonstrates that a full scale SVE system can serve as an effective means of mitigating the potential for off-Site soil vapor migration. If a target ROI of 30 feet is selected for each proposed extraction point, it was determined that a minimum vacuum of 2.0 "H₂O and an air flow rate of 143 CFM would need to be applied at each point in the full scale system. Appropriate consideration will be addressed concerning the number and spacing of the extraction points. It should also be noted that due to less than ideal subsurface conditions, careful monitoring of any full scale system should



be carried out to maximize radial vacuum coverage from each extraction point. Additional consideration should be given for the full scale system regarding vacuum/pressure losses through system piping and components, progressive losses from fouling of filters, and overall efficiency of the selected vacuum blower.

Recommended Design Parameters (each extraction well) – Warehouse:

Target Radius of Influence (ROI): 30 feet
 Applied Vacuum: 2.0 "H₂O
 Applied Flow Rate: 143 CFM

FIGURES

1. Site Plan with Test Locations

ATTACHMENTS

- 1. PT-1: Pilot Test Data Field Measurements
- 2. PT-1: SSD Test Data Analysis
- 3. PT-1: Plot: SSD Vacuum Response vs. Monitoring Point Radial Distance
- 4. Test Blower(s) Specifications

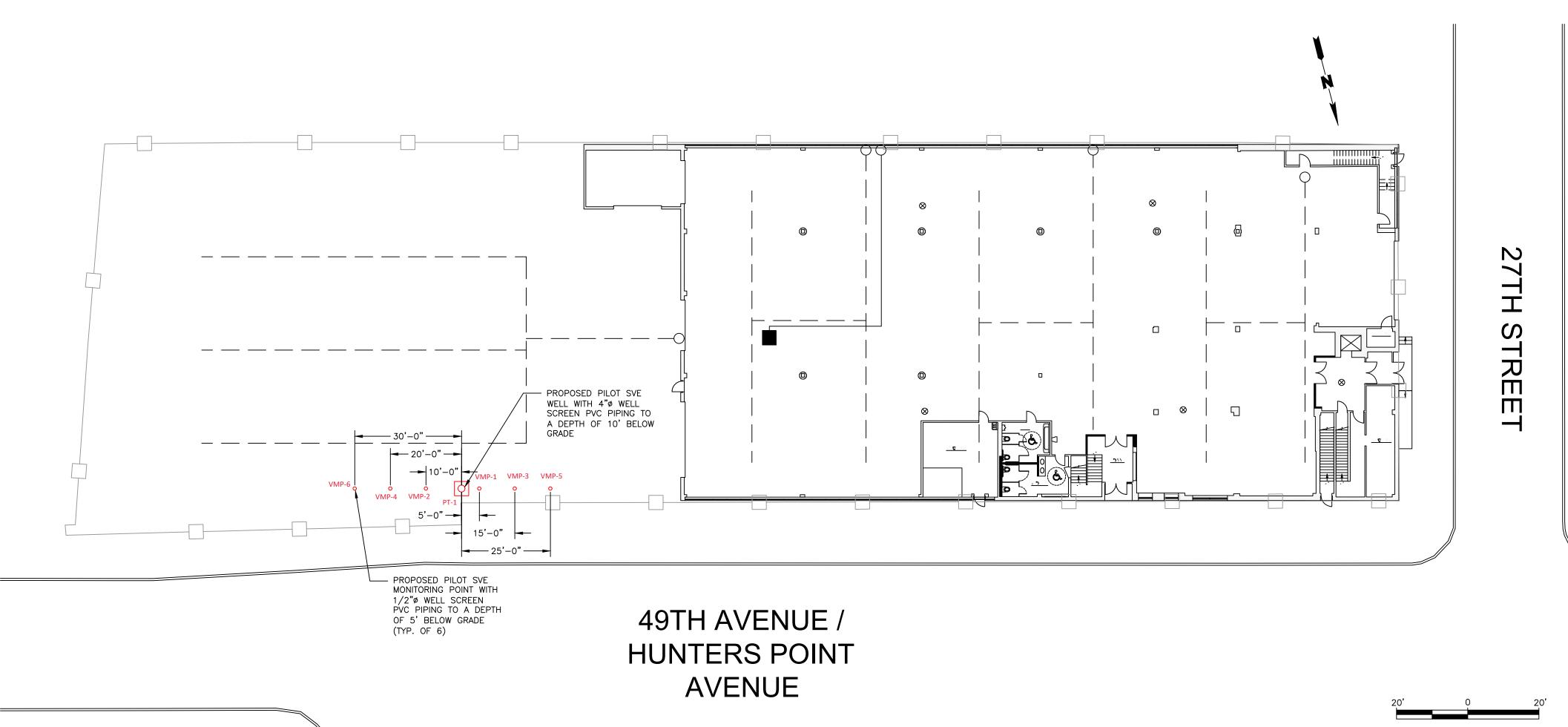
REFERENCES

- 1. ASTM E1465-08a "Standard Practice for Radon Control Options for the Design and Construction of New Low-Rise Residential Buildings"
- 2. New York State Department of Environmental Conservation, (NYSDEC), DER-10 "Technical Guidance for Site Investigation and Remediation"



FIGURES





ATTACHMENTS



						Soil Vapor I	Extraction (SVE) F	Pilot Test Data					
	ame: 27-10 49th Ave Long Island City, NY				Extraction Well		Location						
Test Date:	Date: 7/10/2023				PT-1		Exterior Asphalt Parking Area						
Personnel:	rsonnel: JAL/VAC												
					Observation Well	Observation Well	Observation Well	Observation Well	Observation Well	Observation Well VMP-6	Observation Well	Observation Well	Observation Well
Weather:	eather: 85 Cloudy			VMP-1 *Distance (ft)	VMP-2 *Distance (ft)	VMP-3 *Distance (ft)	VMP-4 *Distance (ft)	VMP-5 *Distance (ft)	*Distance (ft)	*Distance (ft)	*Distance (ft)	*Distance (ft)	
					Distance (II)	10'	Distance (II)	20'	Distance (II)	30'	Distance (II)	Distance (II)	Distance (II)
DI M 1.1	M-IIII1VIII00	0	Fl (f)	Valve	o Vacuum "H₂0	Vacuum "H ₂ 0	Vacuum "H₂0	Vacuum "H ₂ 0	Vacuum "H ₂₁	Vacuum "H ₂₂	Vacuum "H ₂₃	Vacuum "H ₂₃	\/aa
	Well Head Vac "H20	_	Flow (scfm)	Valve							vacuum "H ₂₃	vacuum "H ₂₃	Vacuum "H ₂₃
EN606 - 3HP	2.0	16	142.3		0.055	0.061	0.049	0.058	0.059	0.057			
	1.4	12.0	127.2		0.048	0.050	0.041	0.051	0.043	0.054			
	1.0	8.0	92.6		0.040	0.047	0.033	0.046	0.037	0.039			
	0.6	4.0	41.6		0.022	0.024	0.030	0.028	0.019	0.020			
Blower Off	-	-	-		0.013	0.015	0.020	0.017	0.015	0.016			
	-									_	-		
Comment / Not	tes:												

* Distance measured from Test Point to each Monitoring Point

NM = Not Measured

Summary of SVE Pilot Test 27-10 49th Avenue

Long Island City, NY

SSD Analysis

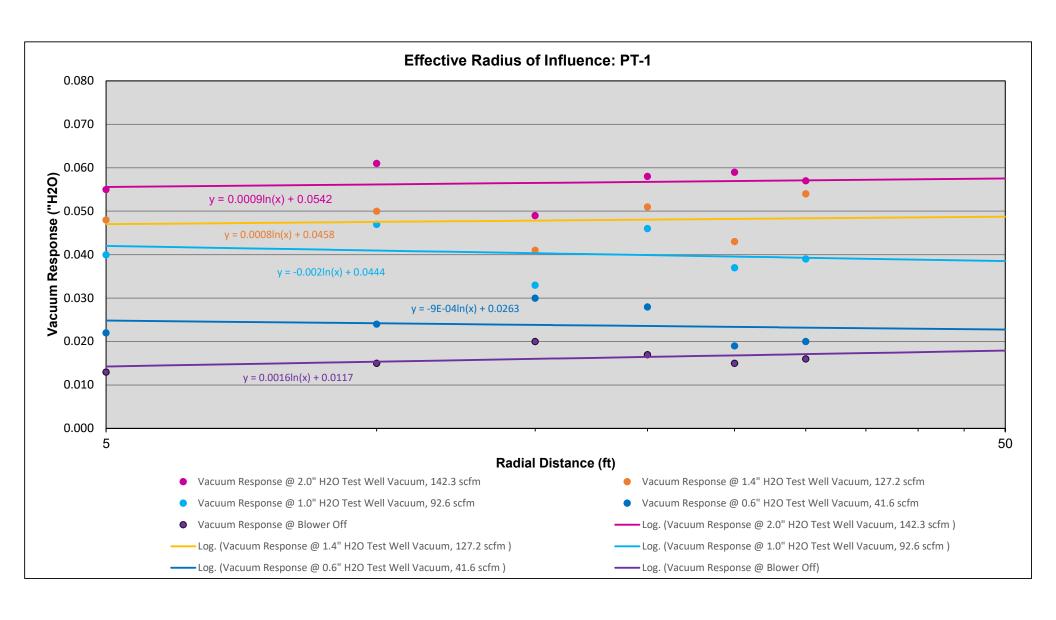
Test Date: 7/10/2023

EnviroTrac - JAL/VAC

Performed By: Extraction Point: PT-1 Test Duration (min.): 2.0 hr Wellhead Vacuum ("H2O): 2.0 to 0.0 Wellhead Flow (scfm): 142.3 to 0.0

PT-1

Radial Distance (ft.)	Vacuum Response @ 2.0" H2O Test Well Vacuum, 142.3 scfm	Vacuum Response @ 1.4" H2O Test Well Vacuum, 127.2 scfm	Vacuum Response @ 1.0" H2O Test Well Vacuum, 92.6 scfm	Vacuum Response @ 0.6" H2O Test Well Vacuum, 41.6 scfm	Vacuum Response @ Blower Off
5	0.055	0.048	0.040	0.022	0.013
10	0.061	0.050	0.047	0.024	0.015
15	0.049	0.041	0.033	0.030	0.020
20	0.058	0.051	0.046	0.028	0.017
25	0.059	0.043	0.037	0.019	0.015
30	0.057	0.054	0.039	0.020	0.016



EN/CP 606 Explosion-Proof Regenerative Blower

FEATURES

- · Manufactured in the USA
- · Maximum flow: 200 SCFM
- Maximum pressure: 75 IWG
- Maximum vacuum: 75 IWG
- · Standard motor: 3.0 HP, explosion-proof
- Cast aluminum blower housing, cover, impeller & manifold; cast iron flanges (threaded); teflon lip seal
- UL & CSA approved motor with permanently sealed ball bearings for explosive gas atmospheres Class I Group D minimum
- · Sealed blower assembly
- Quiet operation within OSHA standards

MOTOR OPTIONS

- International voltage & frequency (Hz)
- Chemical duty, high efficiency, inverter duty or industry-specific designs
- Various horsepowers for application-specific needs

BLOWER OPTIONS

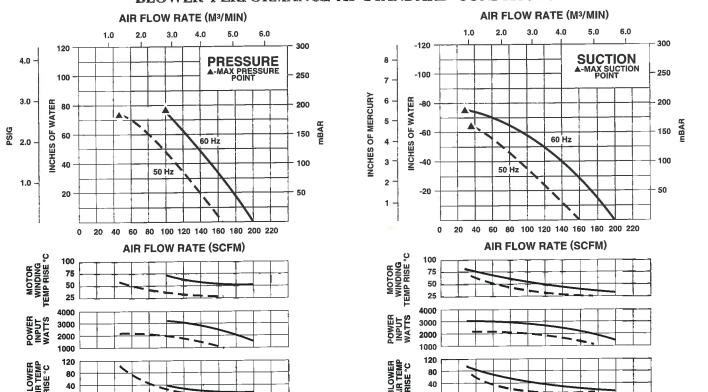
- Corrosion resistant surface treatments & sealing options
- · Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

ACCESSORIES (See Catalog Accessory Section)

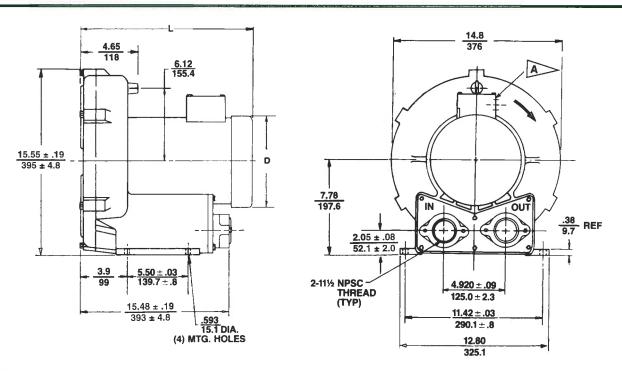
- · Flowmeters reading in SCFM
- Filters & moisture separators
- · Pressure gauges, vacuum gauges & relief valves
- Switches air flow, pressure, vacuum or temperature
- External mufflers for additional silencing
- Air knives (used on blow-off applications)

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BLOWER PERFORMANCE AT STANDARD CONDITIONS



EN/CP 606 Explosion-Proof Regenerative Blower



DIMENSIONS: $\frac{IN}{MM}$ TOLERANCES: $.XX \pm \frac{.1}{2.5}$ (UNLESS OTHERWISE NOTED)

MODEL	L (IN) ± .3	L (MM) ± 8	D (IN) ± .1	D(MM) ±3		
EN/CP606M72ML	17.89	454	7.2	182		
EN/CP606M5ML	19.9	505	8.5	216		

A 0.75" NPT CONDUIT CONNECTION

SPECIFICATIONS

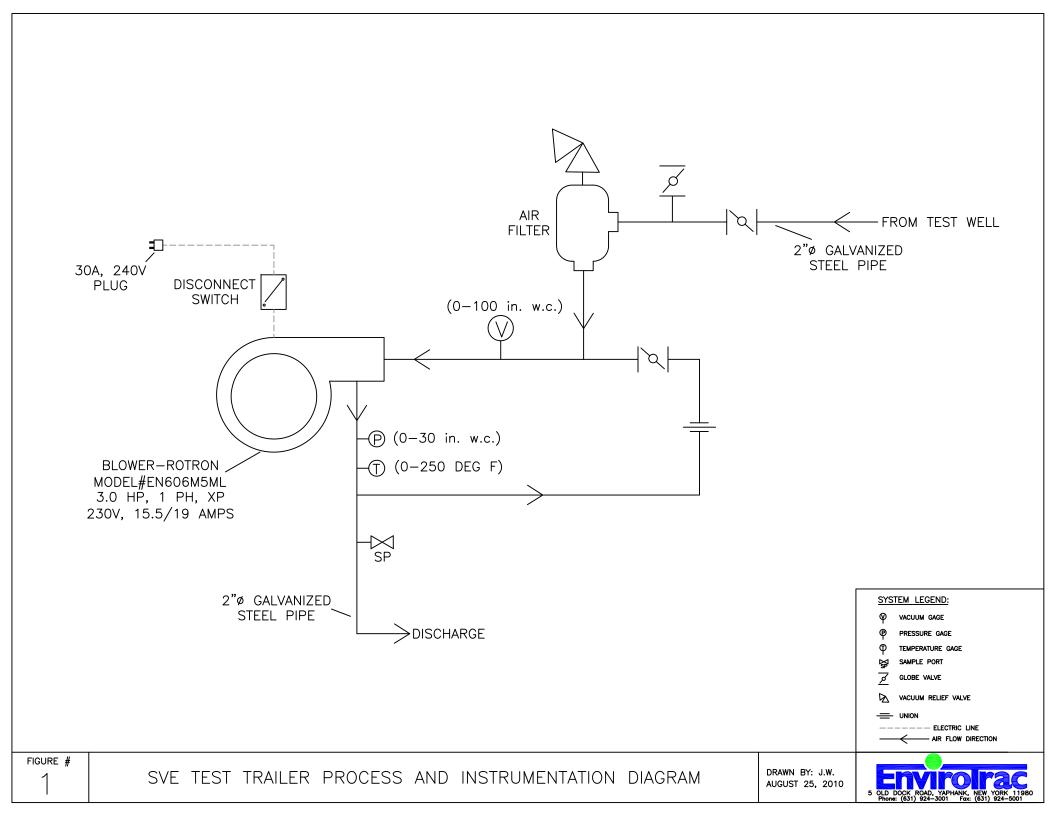
				,			
MODEL	EN606M5ML	EN606M72ML		EN606M86ML	CP606FU5MLR	CP606FU72MLR	
Part No.	038538	038536		038437	_	038972	
Motor Enclosure - Shaft Material	Explosion-proof – CS	Explosion-proof – CS		Explosion-proof – CS	Chem XP - SS	Chem XP - SS	
Horsepower	3.0	3.	0	3.0	Same as	Same as	
Phase - Frequency 1	Single - 60 Hz	Three - 60 Hz		Three - 60 Hz	EN606M5ML –	EN606M72ML -	
Voltage 1	208-230	208-230	460	575	038538	038536	
Motor Nameplate Amps	15.5-14.5	7.8-7.4	3.7	3.0	except add	except add	
Max. Blower Amps 3	19	7.6	3.8	3.1	Chemical	Chemical	
Inrush Amps	94-88	60-54	27	26	Processing	Processing	
Starter Size	1	0	0	0	(CP)	(CP)	
Service Factor	1.0	1.0		1.0	features	features	
Thermal Protection 2	Class B - Pilot Duty	Class B -	Pilot Duty	Class B - Pilot Duty	from catalog	from catalog	
XP Motor Class - Group	I-D, II-F&G	I-D, II-F&G		I-D, II-F&G	inside front cover	inside front cover	
Shipping Weight	130 lb (59 kg)	106 lb (48 kg)		106 lb (48 kg)	inside nont cover	maide nont cover	

¹ Rotron motors are designed to handle a broad range of world voltages and power supply variations. Our dual voltage 3 phase motors are factory tested and certified to operate on both: 208-230/415-460 VAC-3 ph-60 Hz and 200-220/400-440 VAC-3 ph-50 Hz. Our dual voltage 1 phase motors are factory tested and certified to operate on both: 104-115/208-230 VAC-1 ph-60 Hz and 100-110/200-220 VAC-1 ph-50 Hz. All voltages above can handle a ±10% voltage fluctuation. Special wound motors can be ordered for voltages outside our certified range.

2 Maximum operating temperature: Motor winding temperature (winding rise plus ambient) should not exceed 140°C for Class F rated motors or 120°C for Class B rated motors. Blower outlet air temperature should not exceed 140°C (air temperature rise plus inlet temperature). Performance curve maximum pressure and suction points are based on a 40°C inlet and ambient temperature. Consult factory for inlet or ambient temperatures above 40°C.

3 Maximum blower amps corresponds to the performance point at which the motor or blower temperature rise with a 40°C inlet and/or ambient temperature reaches the maximum operating temperature.

Specifications subject to change without notice. Please contact factory for specification updates.

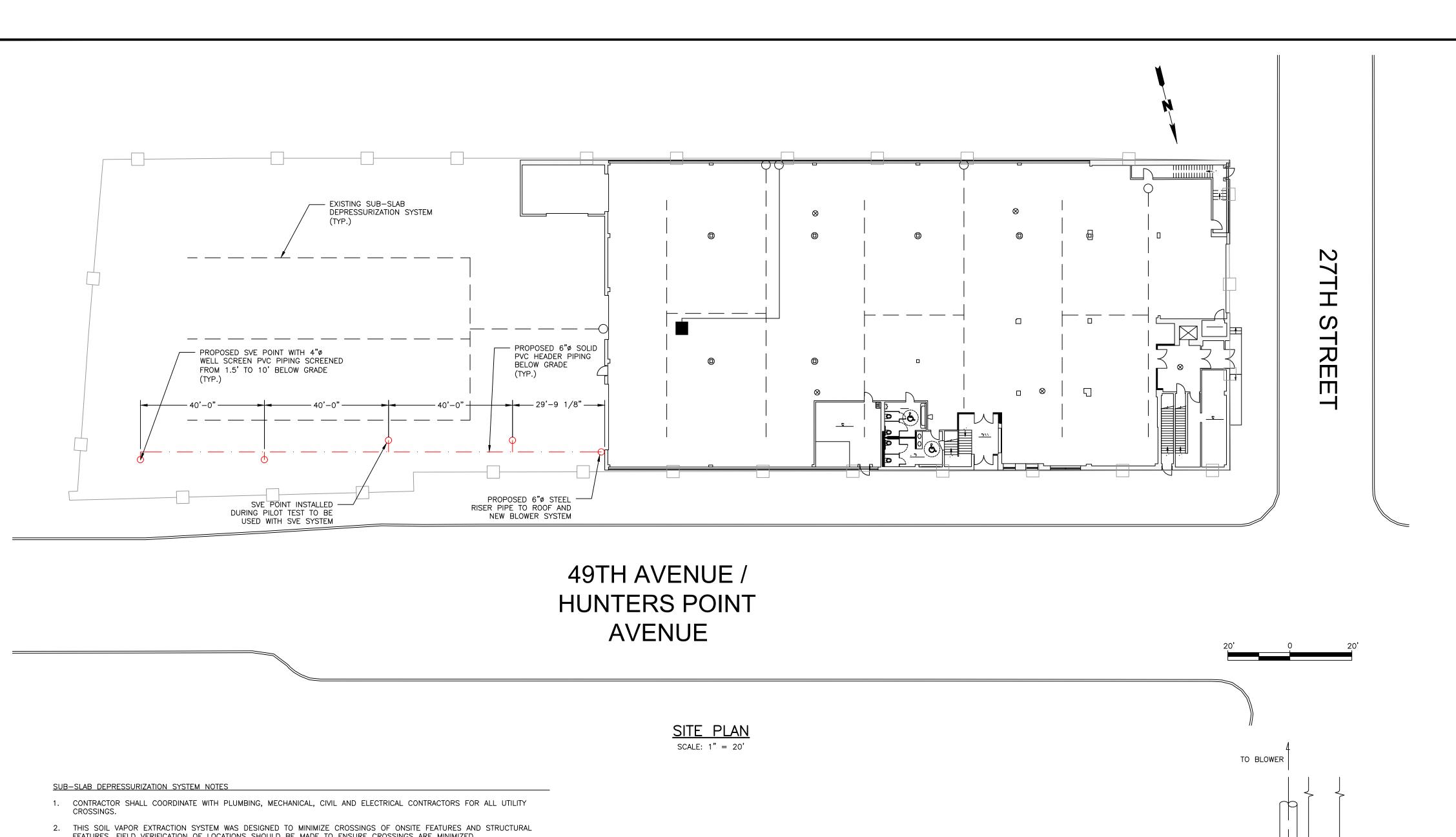


Soil Vapor Extraction System Expansion Pilot Test Summary and Design 27-10 49th Avenue, Long Island City, New York

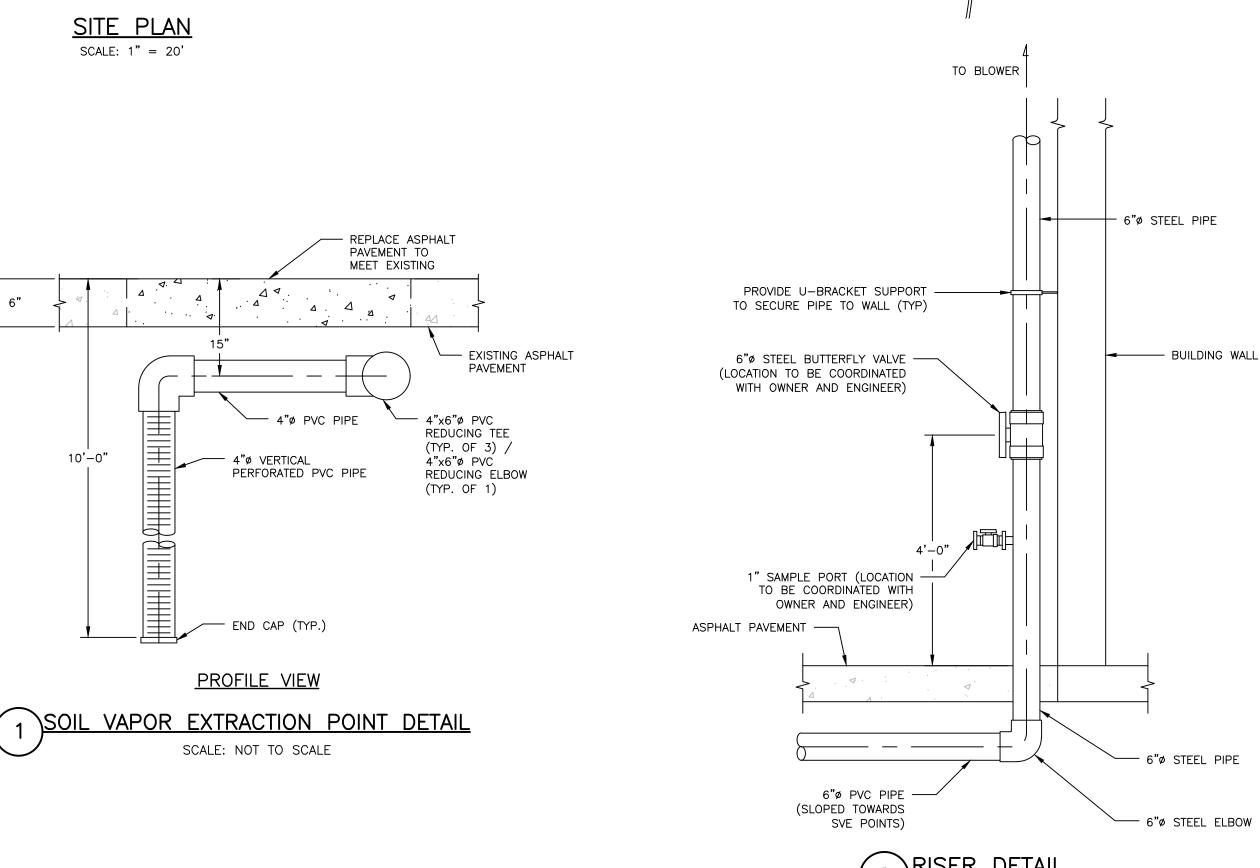
ATTACHMENT 2

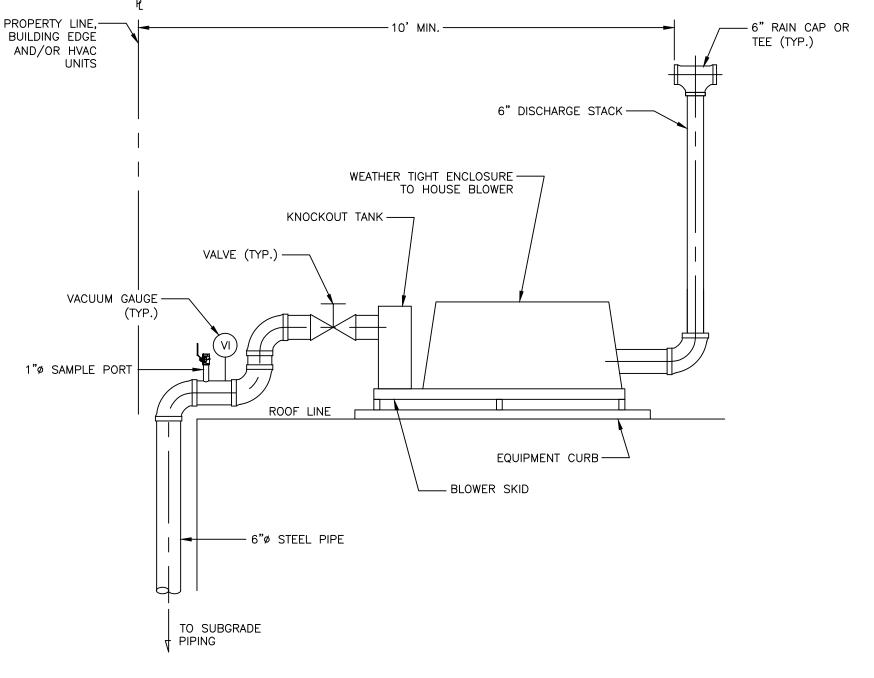
Soil Vapor Extraction System Plan and Details Drawing

3446.0008Y114/CVRS ROUX



FEATURES. FIELD VERIFICATION OF LOCATIONS SHOULD BE MADE TO ENSURE CROSSINGS ARE MINIMIZED.





BLOWER NOTES

- 1. PROVIDE ELECTRICAL/CONTROL CONDUIT TO BLOWERS. COORDINATE WITH ELECTRICAL CONTRACTOR.
- 2. ELECTRICAL CONDUIT SHALL BE SIZED FOR 230/460 VOLT, THREE PHASE, 60 HZ, FOR THE BLOWER MOTOR.
- 3. SVES VENT EXHAUST SHALL BE OFFSET A MINIMUM OF 10 FEET FROM PROPERTY LINES, BUILDING EDGES, HVAC/AIR INTAKES, OPERABLE OPENINGS AND ANY OUTDOOR RECREATIONAL SPACES IN ACCORDANCE WITH NYC PLUMBING CODE CHAPTER 9 VENTS.
- 4. THE BLOWER SHALL BE A 10.0 HP, AMETEK ROTRON MODEL EN909BD72WL OR APPROVED EQUAL.
- 5. THE BLOWER SHALL BE PROVIDED WITH A WEATHER TIGHT ENCLOSURE GASHO ALUMINUM CUSTOM ENCLOSURE OR APPROVED EQUAL.
- 6. THE BLOWER SKID SHALL INCLUDE A WEATHER TIGHT ENCLOSURE, KNOCKOUT TANK (WITH HIGH LEVEL ALARM), VACUUM RELIEF VALVE, LOW VACUUM SWITCH, GAUGES, AND INTERCONNECTING PIPING/FITTINGS.
- 7. A CONTROL PANEL SHALL BE PROVIDED WITH THE BLOWER SKID. THE CONTROL PANEL SHALL HAVE GREEN OPERATING LIGHTS AND RED ALARM LIGHTS. THE CONTROL PANEL SHALL HAVE AN ALARM FOR WATER LEVEL IN KNOCKOUT TANK, LOW VACUUM AND NO POWER. THE ALARM SIGNAL SHALL BE SENT TO AN APPROPRIATE LOCATION IN THE PROPOSED BUILDING (I.E., SUPERINTENDENT'S OFFICE) AND SHALL ALSO BE AUDIBLE. THE ALARM SHALL BE A MCMASTER-CARR SIGNAL LIGHT WITH AUDIBLE ALARM (PART NO. 5753T71) OR APPROVED EQUAL.
- 8. PROVIDE ALL NECESSARY PIPE SUPPORTS FOR RISERS FROM THE ASPHALT PAVEMENT TO THE BLOWER ON THE ROOF.





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(631) 232-2600

PROJECT FOR: Engineering and Geology, D.P.C. 209 SHAFTER STREET ISLANDIA NEW YORK 11749

27-10 49TH AVENUE, QUEENS, NY NYSDEC BCP SITE NO. C241219

HUNTERS POINT SG, LLC 10 W FOREST AVENUE, ENGLEWOOD, NJ SOIL VAPOR EXTRACTION SYSTEM PLAN AND DETAILS

DRAWING 1 OF 1