TOMAT SERVICE STATION

1815-1825 OCEAN AVENUE
BROOKLYN, NEW YORK
Block 7656 Lot 55 & 58

SITE MANAGEMENT PLAN

NYSDEC Site Number: C224217

Prepared for:
Ocean Units LLC
1274 49th Street; Suite 443
Brooklyn, NY 11219

Prepared by:
EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961

Revisions to Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date
1	10/2019	ISCO injection contingency and PFAS quarterly sampling	
2	12/2019	Changed Track 2 to Track 4; added composite cover details	

DECEMBER 2019

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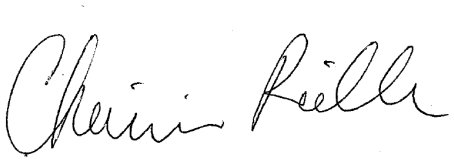
LIST OF ACRONYMS

Acronym	Definition
AS	Air Sparging
ASP	Analytical Service Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
COC	Certificate of Completion
DER	Division of Environmental Remediation
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
EWP	Excavation Work Plan
HASP	Health and Safety Plan
IC	Institutional Control
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
O&M	Operations and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RSO	Remedial System Optimization
SCO	Soil Cleanup Objective
SMP	Soil Management Plan
SCG	Standards, Criteria and Guidelines
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank

CERTIFICATIONS

I, Chawinie Reilly, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).



12/2/19

Date Signature

EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan:

Site Identification:	Site No: C224217
	Tomat Service Station
Site Address:	1815-1825 Ocean Avenue, Brooklyn NY

Institutional Controls:	1. The property may be used for restricted residential, commercial, and industrial uses;
	2. The remedial party or site owner must complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);
	3. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
	4. Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
	5. All ECs must be operated and maintained as specified in this SMP;
	6. All ECs must be inspected at a frequency and in a manner defined in the SMP.
	7. Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
	8. All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
	9. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
	10. Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;

Site Identification: Site No: C224217

Tomat Service Station

Site Address: 1815-1825 Ocean Avenue, Brooklyn NY

	11. Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
Engineering Controls:	1. Air Sparge / Soil Vapor Extraction System 2. In-Situ Chemical Oxidation Treatment 3. Cover System

Inspections:	**Frequency**
1. Air Sparge System / Soil Vapor Extraction System	Monthly for the first 3 months and then quarterly thereafter
2. Cover System	Annually
Monitoring:	**Frequency**
1. Air Sparge System / Soil Vapor Extraction System 2. Quarterly Groundwater Monitoring	Monthly for the first 3 months and then quarterly thereafter
Maintenance:	**Frequency**
Air Sparge / Soil Vapor Extraction System: 1. Blower Maintenance 2. Replacement of GAC units 3. Drain moisture separator and dispose of collected liquid	 As needed As needed

Reporting:	**Frequency**
1. Groundwater Data	Quarterly
2. AS/SVE Reporting Data and Discharge Monitoring	Monthly for the first 3 months and then quarterly thereafter

3. Periodic Review Report	Annually

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan.

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for Tomat Service Station located in Brooklyn, New York (hereinafter referred to as the "Site"). The site location map can be found in **Figure 1**. The Site is currently in the New York State (NYS) Brownfield Cleanup Program (BCP) Site No. C224217, which is administered by New York State Department of Environmental Conservation (NYSDEC).

Ocean Units LLC entered into a Brownfield Cleanup Agreement (BCA) on June 29, 2015 with the NYSDEC to remediate the Site. **Figure 2** shows the Site Layout. The boundaries of the Site are more fully described in the metes and bounds site description that is part of the Environmental Easement (**Attachment A**).

After completion of the remedial work, some contamination was left at this Site, which is hereafter referred to as "remaining contamination". Institutional and Engineering Controls (ICs/ECs) have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC, and recorded with the Kings County Clerk, requires compliance with this SMP and all ECs and ICs placed on the site.

This SMP was prepared to manage remaining contamination at the Site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC);
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and the BCA (Index #C224217-06-15; Site No. 224217) for the Site, and thereby subject to applicable penalties.

All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the Site is provided as **Attachment B** of this SMP.

This SMP was prepared by Environmental Business Consultants (EBC), on behalf of Ocean Units LLC, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the Site.

1.2 Revisions

Revisions to this SMP shall be proposed in writing to the NYSDEC Project Manager. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements; upgrades to or shut-down of a remedial system; post-remedial removal of contaminated sediment or soil; or other significant change to Site conditions. In accordance with the Environmental Easement for the Site, NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by the property owner to NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the BCA, 6NYCRR Part 375 and/or Environmental Conservation Law.

- 7-day advance notice of any field activity associated with the remedial program.
- 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan.
- Notice within 48-hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.
- Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the Site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the Brownfield Cleanup Agreement (BCA), and all approved work plans and reports, including this SMP.
- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to NYSDEC.

The table below, includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of Site-related contact information is provided in **Attachment B**.

Notifications*

Name	**Contact Information**
NYSDEC Project Manager: Richard Mustico	(518) 402-9647; Richard.mustico1@dec.ny.gov
NYSDEC Chief: Jane O'Connell	718-482-4599; Jane.Oconnell@dec.ny.gov
NYSDEC Site Control: Kelly Lewandowski	518-402-9553; kelly.lewandowski@dec.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The Site is located in at 1815 - 1825 Ocean Avenue, in Brooklyn, Kings County, New York and is identified as Block 7656 and Lots 55 and 58 on the Brooklyn Tax Map (**Figure 1 -** Site Location Map). The Site is an approximately 0.38-acre area located on the east side of Ocean Avenue. The Site is bounded by a multi-family residential apartment building (Block 7656, Lot 42 – 1801 Ocean Avenue) to the north, a multi-family residential apartment building (Block 7656, Lot 61 – 1833 Ocean Avenue) to the south, single-family residential buildings (Block 7656, Lots 13, 14, 17, 19 and 21 – 1452-1466 East 21st Street Avenue) to the east and Ocean Avenue to the west (see **Figure 2** - Site Layout Map). The boundaries of the site are more fully described in **Attachment A** –Environmental Easement.

The owner(s) of the Site parcel(s) at the time of issuance of this SMP is:

Ocean Units LLC
1274 49th Street; Suite 443
Brooklyn, New York 11219

2.2 Physical Setting

2.2.1 Land Use

The Site consists of a new 8-story residential building with a partial cellar. The Site is zoned R7A. The new apartment building is under construction and is not yet occupied.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include residential properties. The area surrounding the Site is primarily residential and includes multi-family residential buildings to the north, west and south and single-family residential buildings to the east.

2.2.2 Geology

Subsurface soil at the Site consists of a 6-inch to 1-ft layer of historic fill material at the surface, underlain by a brown silty sand with gravel. A geological cross section is shown in **Figure 3**. Site specific boring logs are provided in **Attachment C**.

2.2.3 Hydrogeology

The depth to groundwater at the Site as determined during the Remedial Investigation varied between 22.15 to 23.49 ft. below grade. Monitoring wells installed as part of the Remedial Investigation were surveyed to determine groundwater flow direction is generally toward the southwest at the Site (**Figure 4 -** Groundwater Contour Map). During remedial activities, six new monitoring wells (17GW1, 17GW2, 17GW3, 17GW4, 17GW5 and 17GW6) were installed at the Site to determine the effectiveness of the AS/SVE system. 17GW2, 17GW3, 17GW5 and 17GW6 were installed within the cellar on the west side of the site. 17GW1 and 17GW4 were installed at grade on the west side of the site. A groundwater contour map is shown in **Figure 4** and notes the direction of groundwater flow as west. Groundwater elevation data is provided in **Table 2**. Groundwater monitoring well construction logs are provided in **Attachment D**.

2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

2.3.1 Subsurface Assessment Report (Hydrotech Environmental Corp, 12/30/14)

Hydro Tech Environmental, Corp. has performed a Subsurface Assessment at the property located at 1815 Ocean Avenue, Brooklyn, New York. This assessment was conducted on behalf of Tomat Service Center Inc. based upon their request to investigate the overall soil and groundwater quality.

The assessment consisted of the performance of the installation and sampling of a series of soil probes, groundwater probes, and monitoring wells. A Hydro Tech geologist screened all soil samples in the field for organic vapors utilizing a Photoionization Detector. Select soil, groundwater, and monitoring well samples were analyzed at a State-certified laboratory for

volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). Select soil and groundwater samples were additionally analyzed for diesel range organic compounds and gasoline range organic compounds.

VOCs are present in soil samples at the groundwater interface and in the groundwater in the vicinity of a fuel oil UST located to the north of the building at concentrations exceeding their respective regulatory standards. The petroleum compounds identified in the soil and groundwater samples has been classified as #2 fuel oil, as per the fingerprint analysis obtained from the 23-25 foot soil sample.

Dissolved VOCs are also present in groundwater beneath the southern portion of the Site, to the south of gasoline tanks and pump islands, at high concentrations exceeding their regulatory standards. Total VOCs were noted to be between 4,006.6 ug/L and 6,471.7 ug/L. These findings indicate that groundwater has been impacted. Spill #1408472 is associated with the Site.

In addition, a ground penetrating radar survey (GPR) was conducted to clear sampling locations and discover any anomalies. One anomaly was identified on the north side of the interior of the site and is associated with a UST.

2.3.2 Phase II Investigation Report- 1815 Ocean Avenue, Brooklyn NY (EBC 2/25/15)

The field work portion of the investigation was performed on February 7, 2015. The work consisted of the installation of four soil borings, two permanent monitoring wells, two temporary monitoring wells, and the collection and analysis of related samples. Four soil boring locations were selected. All of the borings were advanced with Geoprobe™ direct push equipment to a depth of 25 ft. Soil was characterized as a brown slit and sand with some historic fill material mixed in from surface grade to generally 1 foot below grade with the deepest locations at approximately 6-8 feet below grade followed by a brown silt and brown coarse fine sand to the termination depth. Groundwater was encountered and is expected at approximately 17 to 22 ft. below grade.

PID readings of 130 ppm and petroleum odors were noted within the 21-25 foot interval. Petroleum odors were noted in the 21-25 foot interval. PID readings of 250 ppm and petroleum odors were noted within the 21-25 foot interval. PID readings of 200 ppm were noted within the

21-25 foot interval. Soil samples were collected from the following intervals; 0-2 feet and 22-24 feet.

EBC collected four groundwater samples from each of the characterization borings. Permanent monitoring wells were installed by advancing the borehole to the water table (approx. 17 to 22 ft. bgs) and installing a one-inch diameter PVC well 5-feet below the water table interface. Groundwater samples were collected in pre-cleaned, laboratory supplied glassware, stored in a cooler with ice and submitted to Phoenix Laboratories for analysis of VOCs by EPA Method 8260.

Deep soil and groundwater samples were analyzed for volatile organic compounds (VOCs) by USEPA method 8260. Shallow soil samples were analyzed for total lead.

Soil sample results were compared to the Unrestricted Use and Restricted Residential Use Soil Cleanup Objectives (SCOs) as presented in 6 NYCRR Part 375 Subparts 375-1 to 375-4 & 375-6. The following VOCs; 1,2,4-trimethylbenzene (maximum of 31,000 µg/Kg), 1,3,5-trimethylbenzene (maximum of 9,900 µg/Kg), m&p-Xylenes (maximum of 2,300 µg/Kg), methylene chloride (maximum of 280 µg/Kg), naphthalene (at 14,000 µg/Kg) and o-xylene (maximum of 570 µg/Kg) were detected above Unrestricted Use SCOs in samples B1 and B2. VOCs including 2-isopropyltoluene (230 µg/Kg), acetone (maximum 34 µg/Kg), ethylbenzene (maximum 480 µg/Kg), n-butylbenzene (maximum 2,700 µg/Kg), n-propylbenzene (maximum 2,100 µg/Kg), p-isopropyltoluene (maximum 600 µg/Kg), sec-butylbenzene (maximum 860 µg/Kg) were detected at trace amounts in all soil samples. Lead was detected above Unrestricted Use SCOs in shallow soil samples; at a maximum of 366 mg/kg.

Groundwater results were compared to the New York State Ambient Water Quality Standards and Guidance Values (6 NYCRR Part 703) as presented in the Technical & Operational Guidance Series (TOGS) 1.1.1 (1998). Several VOCs including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, isopropylbenzene, m&p-Xylenes, naphthalene, n-butylbenzene, n-propylbenzene, o-xylene, p-isopropyltoluene and sec-butylbenzene were reported in all of the four monitoring wells above groundwater standards. 2-isopropyltoluene was reported in one groundwater well above groundwater standards. Acetone was reported in two groundwater wells

above groundwater standards. Benzene was reported in one groundwater well above groundwater standards. Toluene was reported in two groundwater wells above groundwater standards.

Soil and groundwater samples collected in the vicinity of the USTs indicate gasoline contamination. Several gasoline related VOCs were detected above Unrestricted Use SCOs in soil samples. Lead was detected above Unrestricted Use SCOs shallow soil samples. Gasoline related VOCs were noted above groundwater standards in all groundwater samples. These results indicate that further remedial action will be required.

2.3.3 Phase II Data Summary for 1825 Ocean Avenue, Brooklyn, NY. (EBC 4/29/15)

The field work portion of the investigation was performed on April 22, 2015. The work consisted of the installation of five soil borings, three permanent monitoring wells, and the collection and analysis of related samples. Five soil boring locations were selected. Borings were advanced with Geoprobe™ direct push equipment to depths between 15 and 25 ft. Soil was characterized as a brown medium fine sand with some historic fill material mixed in from surface grade to approximately 6-8 feet below grade followed by a brown sand to the termination depth. Groundwater was encountered and is expected at approximately 23 ft. below grade.

Petroleum odors were noted in within the 20-25 foot interval. Soil samples were collected from the following intervals; 0-2 feet and 23-25 feet.

EBC collected three groundwater samples from each of the characterization borings. Permanent monitoring wells were installed by advancing the borehole to the water table (approx. 20 to 23 ft. bgs) and installing a one-inch diameter PVC well 5-feet below the water table interface. Groundwater samples were collected in pre-cleaned, laboratory supplied glassware, stored in a cooler with ice and submitted to Phoenix Laboratories for analysis of VOCs by EPA Method 8260.

Deep soil and groundwater samples were analyzed for volatile organic compounds (VOCs) by USEPA method 8260. Shallow soil samples were analyzed for SVOCs (CP51), PCBs and TAL Metals. Deep soil samples were analyzed for (VOCs) by USEPA method 8260 and SVOCs (CP51).

Soil sample results were compared to the Unrestricted Use and Restricted Residential Use Soil Cleanup Objectives (SCOs) as presented in NYSDEC CP51 Soil Cleanup Guidance (10/21/10). The following VOCs; ethylbenzene (maximum of 22,000 µg/Kg), m&p-Xylenes (maximum of 45,000 µg/Kg), naphthalene (at 27,000 µg/Kg), n-Butylbenzene (at 17,000 µg/Kg) and n-Propylbenzene (at 35,000 µg/Kg) were detected above Unrestricted Use SCOs. The following VOCs; 1, 3,5-trimethylbenzene (maximum of 70,900 µg/Kg) and 1,2,4-trimethylbenzene (maximum of 230,000 µg/Kg) were above RRSCOs. No SVOCs and PCBs were detected above UUSCOs. The following metals; copper (at 56.1 mg/Kg), mercury (at 0.32 mg/Kg) and zinc (at 193 mg/Kg) were detected above UUSCOs. Lead (at 1,860 mg/Kg) was detected above RRSCOs.

Groundwater results were compared to the New York State Ambient Water Quality Standards and Guidance Values (6 NYCRR Part 703) as presented in the Technical & Operational Guidance Series (TOGS) 1.1.1 (1998). Several VOCs including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2-Isopropyltoluene, benzene, ethylbenzene, isopropylbenzene, m&p-Xylenes, naphthalene, n-butylbenzene, n-propylbenzene, o-xylene, p-isopropyltoluene, sec-butylbenzene and toluene were reported in all of the three monitoring wells above groundwater standards.

Soil and groundwater samples collected indicate gasoline contamination. Several gasoline related VOCs were detected above Unrestricted Use and Residential Restricted SCOs in soil samples. Lead was detected above Residential Restricted SCOs in shallow soil sample. Gasoline related VOCs were noted above groundwater standards in all groundwater samples. These results indicate that further remedial action will be required. A spill was called in for this site and assigned a SPILL # 1501018.

2.3.4 Phase I Screening for 1815-1825 Ocean Avenue, Brooklyn, NY (EBC 4/30/15)

Prior to the construction of the existing improvements (circa 1950), the Site was occupied by a gas station (lot 55) and 2-story dwelling (lot 58) in the 1930's. From 1895 to 1906, the site was vacant land (lot 55) and a 2-story dwelling (lot 58).

In the 1930 Sanborn map four gasoline tanks are depicted on the west side of the Site. In the 1950-2007 Sanborn maps, five gasoline tanks are depicted on the west side of the Site.

2.3.5 Remedial Investigation Report (EBC, July 2016)

A Remedial Investigation was completed at the Site in November and December of 2015 and documented in a Remedial Investigation Report (EBC, July 2016). The goals of the Remedial Investigation were to define the nature and extent of contamination in soil, groundwater and any other impacted media; to identify the source(s) of the contamination; to assess the impact of the contamination on public health and/or the environment; and to provide information to support the development of a Remedial Action Work Plan to address the contamination.

Activities completed under the RI:

- Soil sampling and analysis for volatile and semi-volatile organic compounds (VOCs, SVOCs) in soil samples from soil boring locations;
- The installation of temporary groundwater monitoring wells;
- The collection and analysis of groundwater samples for volatile and semi-volatile organic compounds;
- Sampling for non-petroleum contaminants such as pesticides, PCBs and metals in soil and groundwater including the analysis of soil and groundwater samples; and,
- The collection and analysis of soil vapor samples for VOCs.

The results of sampling performed during this RI identified gasoline related VOCs in soil at the groundwater interface (approximately 20 to 25 feet below grade) above Restricted Residential Use SCOs in the vicinity of the two 4,000-gallon gasoline underground storage tanks located in front of the gasoline service station building on Lot 55. The contamination at the groundwater interface was found to extend to the southern area of the Site in the direction of groundwater flow.

Historic fill material is present across the Site to depths from a few inches to 1 foot below grade. The historic fill material contains metals above Restricted Residential Use SCOs.

Soil vapor sampling identified generally low levels of petroleum related volatile organic compounds (BTEX). VOCs were reported in almost all of the soil vapor samples with the highest concentrations reported in the vicinity of the 4,000-gallon gasoline and 550-gallon waste oil underground storage tanks located in front of the gasoline service station building on Lot 55.

Petroleum VOCs were detected within groundwater above NYSDEC Ambient Water Quality Standards (GQS) across the Site. The highest concentrations of gasoline related VOCs in groundwater were detected within the groundwater samples collected closest to the tank pad and immediately down gradient of the two 4,000-gallon gasoline underground storage tanks. SVOC detections above GQS were limited to polynuclear aromatic hydrocarbons (PAHs) with a 2 parts per trillion standard. Several dissolved metals were detected above GQS. The metals detected in groundwater are consistent with general groundwater quality throughout the area.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in Decision Document dated February 11, 2015 are as follows:

2.4.1 Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre- disposal/pre-release conditions, to the extent practicable.
- Prevent the discharge of contaminant to surface water.
- Remove the source of groundwater or surface water contamination.

2.4.2 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

2.4.3 Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a Site.

2.5 Remaining Contamination

2.5.1 Soil

The eastern half of the Site was excavated to a depth of approximately 1 foot below grade. The western half, which included the source area, was excavated to a depth of 12 feet. Endpoint soil samples collected following excavation indicate that soil across the Site meets Track 4 Restricted Residential Use SCOs; with the exception of deeper petroleum contamination in the western half of the site.

Soil sampling conducted during the Remedial Investigation identified petroleum contamination around three USTs (two 4,000 gallon underground storage tanks used to store gasoline and one 550-gallon underground tank used to store waste oil) was indicated in the deep soil samples along the west side of the Site. End point samples for the remaining USTs (two 250-gallon oil/water separator UST, one 550 gallon #2 fuel oil UST and three 40-gallon hydraulic lift) did not indicate any contamination. The highest concentration of gasoline related VOCs in soil were detected at the 23 to 25 ft interval near the tank pad. Remaining petroleum impacted soil is present in a 5 ft vertical zone from approximately 23-28 feet below grade, and covers an area of approximately 7,800 sf. Estimated impacted soil volume is 1,444 cy.

Table 3 and **Figure 5** summarizes the remaining soil parameters above Unrestricted Use, Protection of Groundwater or Restricted Residential Use SCOs following excavation. A geological cross section is included as **Figure 3**.

Petroleum contaminated soil from 15 feet below grade down to the water table is being remediated with an air sparge / soil vapor extraction system.

2.5.2 Groundwater

Petroleum VOCs above NYSDEC Ambient Water Quality Standards (GQS) were detected across the Site during the RI Sampling event. The highest concentrations of gasoline related VOCs in groundwater were detected within the groundwater samples collected closest to the tank pad and immediately downgradient of the tanks. SVOC detections above GQS were limited to those polynuclear aromatic hydrocarbons (PAHs) with a 2 parts per trillion standard and naphthalene. Several dissolved metals were detected above GQS. The metals detected in groundwater are consistent with general groundwater quality throughout the area.

Baseline groundwater samples were collected on November 13, 2017 and indicated elevated levels of petroleum related VOCs in all wells; which was above NYSDEC Ambient Water Quality Standards (AWQS). Higher levels are noted in 17GW2 and 17GW6 which are located the former two 4,000-gallon gasoline USTs area. Total VOCs ranged from 277 µg/L in 17GW4 to 5,541 µg/L in 17GW2. **Table 4** and **Figure 6** summarize the results of the baseline groundwater samples that exceeded SCGs. Impacted groundwater is being remediated with an air sparge / soil vapor extraction system.

2.5.3 Soil Vapor

Soil vapor testing completed during the Remedial Investigation identified generally low levels of petroleum related volatile organic compounds with elevated levels of CVOCs in the western half of the Site near the north and south property line. The qualitative exposure assessment in the RI indicated a potential vapor intrusion concern for residents of the planned construction, however remediation of the source area including soil excavation and operation of the AS/SVE system was expected to greatly reduce if not eliminate this potential.

The Decision Document required that all future buildings constructed on the Site be evaluated for the potential for soil vapor intrusion (SVI). Prior to the occupancy of the building being constructed on the Site, an SVI evaluation will be performed to determine whether any mitigation measures are necessary to eliminate potential exposure to vapors in the structure.

Prior to conducting an SVI investigation or installing a mitigation system, a work plan will be developed and submitted to the NYSDEC and NYSDOH for approval. This work plan will be

developed in accordance with the most recent NYSDOH "Guidance for Evaluating Vapor Intrusion in the State of New York". Measures to be employed to mitigate potential vapor intrusion will be evaluated, selected, designed, installed, and maintained based on the SVI evaluation, the NYSDOH guidance, and construction details of the proposed structure.

Preliminary SVI sampling data will be forwarded to the NYSDEC and NYSDOH for initial review and interpretation. Upon validation, the final data will be transmitted to the agencies, along with a recommendation for follow-up action, such as mitigation. If any indoor air test results exceed NYSDOH guidelines, relevant NYSDOH fact sheets will be provided to all tenants and occupants of the property within 15 days of receipt of validated data. SVI sampling results, evaluations, and follow-up actions will also be summarized in the subsequent Periodic Review Report.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since remaining contamination exists at the Site, Institutional Controls (ICs) and Engineering Controls (ECs) are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the site. The IC/EC Plan is one component of the SMP and is subject to revision by NYSDEC.

This IC/EC plan provides:

- A description of all IC/ECs on the site;
- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (EWP) (as provided in **Attachment L**) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the site remedy, as determined by the NYSDEC.

3.2 Institutional Controls

A series of ICs is required by the Decision Document to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and (3) limit the use and development of the site to Restricted Residential use only. Adherence to these ICs on the Site is required by the Environmental Easement and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown on **Figure 7**.

These ICs are:

- The remedial party or site owner must complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);
- The property may be used for restricted residential;
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;
- Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
- All ECs must be operated and maintained as specified in this SMP;
- All ECs must be inspected at a frequency and in a manner defined in the SMP.
- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
- Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on **Figure 7**, and any potential impacts that are identified must be monitored or mitigated; and
- Vegetable gardens and farming on the Site are prohibited.

3.3 Engineering Controls

3.3.1 Air Sparge / Soil Vapor Extraction System

The RI identified petroleum impacted soil within the source areas from 23 feet to 25 feet below grade. Since excavation of the source areas were performed to a depth of 12 feet below grade, a Air Sparging / Soil Vapor Extraction (AS/SVE) system has been installed to remediate the petroleum contaminated soil from 12 feet to and within the saturated zone.

The SVE wells were constructed of 8-feet of 2-inch diameter, 0.02-inch slotted pvc well screen with approximately 1-foot of 2-inch diameter PVC riser. The wells were sealed at the surface with bentonite pellets and a 12" diameter manhole. The wellheads were completed with a compression plug for access and "Tee'd" to a 2-inch pvc ball valve to isolate the well from the system and allow flow rates to be balanced between the two extraction wells. The wells were connected to a common 4-inch diameter PVC main extraction header which was piped to a vacuum blower located in the shed on the east side of the Site. To meet these design criteria a 5 HP regenerative blower (Ametek Rotron EN707) with a moisture trap was installed.

The air sparging wells were constructed of 2.5 feet of 1-inch diameter, 0.02-inch slotted pvc well screen with approximately 21 feet of 1-inch diameter pvc riser. A morie No. 1 gravel pack was placed to approximately 6 inches above the top of the screened section followed by a hydrated bentonite plug and grouted to the grade. The wellhead was completed at the surface with a 12-inch manhole cover to accommodate the system control valve. The wellheads were completed with a compression plug for access and "Tee'd" to a 1-inch pvc globe valve. The wells were connected to a common 2-inch diameter pvc main pressure line which was connected to a rotary lobe blower (Roots URAI 32) located in an equipment shed on the east side of the Site. The air sparging system operates two alternating legs; each consisting of four injection wells. To meet these design criteria a 3 HP rotary lobe blower (Roots URAI 32) with inlet / outlet silencers and a pressure relief valve was installed.

Procedures for operating and maintaining the AS/SVE system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As built drawings, signed and sealed by a professional engineer, are included as Figure 8 and Figure 9 and in **Attachment I** – Operations

and Maintenance Manual. **Figure 8** and **Figure 9** shows the as built layout of the SVE/AS system installed at the Site.

3.3.2 In-Situ Chemical Oxidant (Isco) Treatment

Injections will be conducted at 17GW2 and 17GW6 in the event that VOC concentrations increase at these locations. These wells are around the former tank area. Injections at these locations deliver oxidant to the subsurface allowing further treatment of this area. **Figure 6** shows the well locations.

3.3.3 COVER SYSTEM

Exposure to remaining contamination at the site is prevented by a cover system placed over the site. This cover system is comprised of:

- A 6 inch thick concrete slab in the cellar (west side of the Site) underlain by 6" of gravel, underlain by residual soil.

- 10" concrete slab for the at grade area on the north side of the Site, underlain by residual soil.

- 8" of asphalt on the 1st floor parking area (east side of the Site), underlain by 6" of gravel, underlain by residual soil.

- A exposed soil cap (west side of the Site) to 12 feet, underlain by residual soil. There are three areas in this vicinity that are concrete capped; a parking entrance is capped with 7" of concrete and two walk ways in to the building which are capped with 4" of concrete.

Figure 11 presents the location of the cover systems. The Excavation Work Plan (EWP) provided in Appendix L outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4.0 of this SMP. Any work conducted pursuant to the EWP

must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and associated Community Air Monitoring Plan (CAMP) prepared for the site and provided in Appendix G and Appendix K.

3.3.4 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10.

Air Sparge/Soil Vapor Extraction System (AS/SVE)

The AS/SVE system will not be discontinued unless prior written approval is granted by the NYSDEC. In the event that monitoring data indicates that the AS/SVE system may no longer be required, a proposal to discontinue the system will be submitted by the remedial party. Conditions that may warrant discontinuing the AS/SVE system include contaminant concentrations in groundwater and/or soil that: (1) reach levels that are consistently below ambient water quality standards or the site SCGs, as appropriate; (2) have become asymptotic to a low level over an extended period of time, as accepted by the NYSDEC; or (3) the NYSDEC has determined that the AS/SVE system has reached the limit of its effectiveness. This assessment will be based in part on post-remediation contaminant levels in groundwater collected from monitoring wells located throughout the site. Systems will remain in place and operational until permission to discontinue their use is granted in writing by the NYSDEC.

In-Situ Chemical Oxidant (ISCO) Treatment

In the event that monitoring data indicates that the in-situ chemical oxidant treatment (ISCO) may no longer be required, a proposal to discontinue ISCO treatments, including the results of an impact study, will be submitted by the remedial party. Conditions that may warrant discontinuing the ISCO treatment include contaminant concentrations in groundwater that: (1) reach levels that are consistently below ambient water quality standards or the site SCGs as appropriate, (2) have become asymptotic to a low level over an extended period of time as accepted by the NYSDEC; or (3) the NYSDEC has determined that injections of chemical oxidants has reached the limit of its effectiveness. This assessment will be based in part on post-remediation contaminant levels in

groundwater collected from monitoring wells located throughout the site. Systems will remain in place and operational until permission to discontinue their use is granted in writing by the NYSDEC.

Cover System or Cap

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity.

4.0 MONITORING AND SAMPLING PLAN

4.1 General

This Monitoring and Sampling Plan (**Attachment E**) describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of site management for the site are included in the Quality Assurance Project Plan provided in **Attachment F**.

This Monitoring Plan and Sampling Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (e.g., groundwater, SVE system discharge);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs), particularly groundwater standards and Part 375 SCOs for soil; and
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment;

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Site-wide Inspection

Site-wide inspections will be performed at a minimum of once per year. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, an inspection form will be completed as provided in **Attachment H** - Site Management Forms. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that site records are up to date.

Inspections of all remedial components installed at the site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and
- If site records are complete and up to date.

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the site, verbal notice to the NYSDEC must be given by noon of the following day. In addition, an inspection of the site will be conducted

within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the site by a qualified environmental professional, as determined by the NYSDEC. Written confirmation must be provided to the NYSDEC within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

At a minimum, the site cover system will be inspected annually for cracks and defects. If the cover system is broken, the owner will be notified to repair these issues. A complete list of components to be inspected is provided in the Inspection Checklist, provided in **Attachment H.**

4.3 ISCO Monitoring and Sampling

4.3.1 ISCO Monitoring

Monitoring of the ISCO treatment is on a quarterly basis, as identified in the ISCO Monitoring Requirements and Schedule (see below). Modification to the frequency or sampling requirements will require approval from the NYSDEC. A visual inspection of the monitoring wells will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when an emergency occurs that is deemed likely to affect the operation of the system. ISCO system components to be monitored include, but are not limited to, the components included are below.

ISCO Monitoring Requirements and Schedule

ISCO System Component	Monitoring Parameter	Monitoring Schedule
Monitoring Wells (applicable to 17GW2 and 17GW6 only)	Condition, PID Screen, Depth to water, depth to bottom.	Quarterly

A complete list of components to be inspected is provided in the Inspection Checklist, provided in **Attachment H** - Site Management Forms. If the monitoring wells have been damaged, lost, or

require redevelopment, maintenance and repair, as per the Operation and Maintenance Plan, is required immediately.

4.3.2 ISCO Treatment Sampling

Following oxidant application, groundwater samples will be collected from monitoring wells on a quarterly basis as noted in Section 4.5 below.

4.4 AS/SVE Monitoring and Sampling

4.4.1 AS/SVE System Monitoring

Monitoring of the AS/SVE system will be performed on a monthly basis for the first 3 months and then a quarterly basis thereafter, as identified in AS/SVE Monitoring Requirements and Schedule (see below). Modification to the frequency or sampling requirements will require approval from the NYSDEC. A visual inspection of the complete AS/SVE system will be conducted during each monitoring event and groundwater sampling event. Unscheduled inspections and/or sampling may take place when a suspected failure of the AS/SVE system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. AS/SVE system components to be monitored include, but are not limited to, the components included in table below.

AS/SVE Monitoring Requirements and Schedule

AS/SVE System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
Regenerative Blower	Flow Rate	TBD	Monthly for the first three months and then quarterly thereafter
Rotary Lobe Blower	Flow Rate	TBD	Monthly for the first three months and then quarterly thereafter
Activated Carbon Drums	Expiration date, damage, labeling	-	Monthly for the first three months and then quarterly thereafter
Plumbing	Cracks, damage, labeling	-	Monthly for the first three months and then quarterly thereafter

A complete list of components to be inspected is provided in the Inspection Checklist, provided in **Attachment H**- Site Management Forms. If any equipment readings are not within their specified operation range, any equipment is observed to be malfunctioning or the system is not performing within specifications; maintenance and repair, as per the Operation and Maintenance Plan (**Attachment I**), is required immediately.

An SVI evaluation will be performed to determine whether any mitigation measures are necessary to eliminate potential exposure to vapors in the structure. Prior to conducting an SVI investigation or installing a mitigation system, a work plan will be developed and submitted to the NYSDEC and NYSDOH for approval. This work plan will be developed in accordance with the most recent NYSDOH "Guidance for Evaluating Vapor Intrusion in the State of New York".

4.4.2 AS/SVE System Sampling

Samples shall be collected from the AS/SVE system monthly for the first 3 months and then quarterly thereafter. The system influent (before carbon), between the carbon canisters and discharge (after carbon) will be field screened with a photo-ionization detector. Air samples will be collected from the SVE influent (before carbon) and system effluent (after carbon) and will be submitted to a NYSDOH certified environmental laboratory for analysis of VOCs by USEPA method TO15. Groundwater samples will be analyzed for VOCs, PFAs and 1,4 dioxane. The sampling location, required analytical parameters and schedule are provided in the Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Remedial System Sampling Requirements and Schedule

Sampling Location	**Field Screening Parameters PID**	**Parameters** VOCs (USEPA TO15)	**Parameters** PFAs (USEPA 537 Modified)	**Parameters** 1,4 dioxane (USEPA 8270 SIM)	**Parameters** VOC (USEPA 8260C)	**Schedule**
SVE Influent (before carbon)	X	X				Monthly for the first 3 months then quarterly thereafter

Sampling Location	**Field Screening Parameters PID**	**Parameters** VOCs (USEPA TO15)	**Parameters** PFAs (USEPA 537 Modified)	**Parameters** 1,4 dioxane (USEPA 8270 SIM)	**Parameters** VOC (USEPA 8260C)	**Schedule**
Between Carbon Canisters	X					Monthly for the first 3 months then quarterly thereafter
SVE Discharge (after carbon)	X	X				Monthly for the first 3 months then quarterly thereafter
17GW1, 17GW2, 17GW3, 17GW4, 17GW5 and 17GW6			X	X	X	Quarterly

Detailed sample collection and analytical procedures and protocols are provided in **Attachment E** - Field Sampling Plan and **Attachment F** – Quality Assurance Project Plan.

Please refer to the Operations and Maintenance Manual in **Attachment I**, for additional sampling procedures.

4.5 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from the groundwater monitoring wells (17GW1, 17GW2, 17GW3, 17GW4, 17GW5 and 17GW6) on a quarterly basis. Sampling locations, required analytical parameters and schedule are provided in the Remedial System Sampling Requirements and Schedule below. Modifications to the frequency or sampling require approval from the NYSDEC.

Post Remediation Sampling Requirements and Schedule

Sampling Location	**Analytical Parameters** VOCs (EPA 8260C)	**Analytical Parameters** PFAs (EPA 537 Modified)	**Analytical Parameters** 1,4 dioxane (EPA 8270 SIM)	**Schedule**

17GW1	X	X	X	Quarterly
17GW2	X	X	X	Quarterly
17GW3	X	X	X	Quarterly
17GW4	X	X	X	Quarterly
17GW5	X	X	X	Quarterly
17GW6	X	X	X	Quarterly

Detailed sample collection and analytical procedures and protocols are provided in **Table 2; Sample Collection and Analysis Protocols** of **Attachment F** – Quality Assurance Project Plan.

4.5.1 Groundwater Sampling

Groundwater monitoring will be performed quarterly to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

The network of monitoring wells has been installed to monitor upgradient, on-site and downgradient groundwater conditions at the site. The network of on-site wells has been designed based on the following criteria:

- Whether ECs continue to perform as designed;

The Monitoring Well Construction Details table below summarizes the wells identification number, as well as the purpose, location, depths, diameter and screened intervals of the wells. As part of the groundwater monitoring, six (17GW1, 17GW2, 17GW3, 17GW4, 17GW5 and 17GW6) on-site wells are sampled to evaluate the effectiveness of the remedial system.

Monitoring Well Construction Details

Monitoring Well ID	Well Location	Coordinates (longitude/ latitude)	Well Diameter (inches)	Casing Length	Depth Below Surface	Screen Top (below ground)	Screen Bottom (below ground)
17GW1(at grade)	On Site	-73.954583°W 40.617693° N	1	20 feet	29 feet	20 feet	30 feet

17GW2 (in cellar)	On Site	-73.954588 °W 40.617504 ° N	1	20 feet	17 feet	10 feet	20 feet
17GW3(in cellar)	On Site	-73.954562 °W 40.617397 ° N	1	20 feet	17 feet	10 feet	20 feet
17GW4 (at grade)	On Site	-73.954617°W 40.617343° N	1	20 feet	29 feet	20 feet	30 feet
17GW5(in cellar)	On Site	-73.954432°W 40.617352° N	1	20 feet	17 feet	10 feet	20 feet
17GW6(in cellar)	On Site	-73.954617°W 40.617615° N	1	20 feet	17 feet	10 feet	20 feet

Monitoring well construction logs are included in **Attachment D** of this document. Monitoring well locations and groundwater contours are noted in **Figure 4.**

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced, if an event renders the wells unusable.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC.

The sampling frequency may only be modified with the approval of the NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC.

Deliverables for the groundwater monitoring program are specified in Section 7.0 – Reporting Requirements.

4.5.2 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in **Attachment H** - Site Management Forms. Other observations (e.g., groundwater monitoring well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the site-specific Field Sampling Plan provided as **Attachment E** of this document.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

The Operation and Maintenance Plan (**Attachment I**) provides a brief description of the measures necessary to operate, monitor and maintain the mechanical components of the remedy selected for the site. This Operation and Maintenance Plan:

- Includes the procedures necessary to allow individuals unfamiliar with the Site to operate and maintain the AS/SVE system;
- Will be updated periodically to reflect changes in site conditions or the manner in which the AS/SVE system is operated and maintained.

Further details regarding the Operation and Maintenance of the AS/SVE system are provided in **Attachment I - Operation and Maintenance Manual**. A copy of this Operation and Maintenance Manual, along with the complete SMP, is maintained at the site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of this SMP.

5.2 Remedial System (or other Engineering Control) Performance Criteria

The SVE system consists of a 5-hp regenerative blower (Rotron EN707) with a particulate filter and vapor trap connected to two 2 inch diameter PVC wells installed to a depth of 23 feet below sidewalk grade. Prior to discharge, the soil vapor extracted from the SVE well passes through drums containing vapor-phase granular activated carbon. The 5-hp regenerative blower operates at all times, and should be operating within an air flow rate range of 110 CFM.

The Air Sparge system consists of a 3-hp rotary lobe blower (Roots URAI 32) with inlet / outlet silencers and a pressure relief valve connected to eight 1 inch diameter PVC well installed to a depth of 12.5 feet below the water table. The air sparging system has two alternating legs; each consisting of four injection wells. A timer is being used to regulate a three-way, electrically-actuated valve which will cycle each leg on a 3 day basis. The 3-hp rotary lobe blower should be operating within an air flow rate range of 7 CFM.

5.3 Operation and Maintenance of the Air Sparge / Soil Vapor Extraction (AS/SVE) System

Cut-sheets and as-built drawings for the air sparge / soil vapor extraction system are provided in **Attachment I** - Operations and Maintenance Manual. The air sparging system will need to be adjusted in response to changes in water level. Such changes will either increase or decrease the amount of pressure needed to overcome the water column and maintain optimal operating conditions. The SVE portion of the system does not require periodic adjustment since the extraction wells are properly balanced. A visual inspection of the complete system will be conducted during each monitoring event. If the 5-hp regenerative blower or the 3-hp rotary lobe blower fails, the blowers shall not be serviced or repaired at the Site. The unit will need to be removed and rebuilt or serviced by the manufacture or a manufacture representative, or replaced with equivalent equipment.

5.3.1 System Start-Up and Testing

The system is currently installed and operating. A start-up test of the AS/SVE system was performed on 12/18/17, and the system was placed in normal operating mode on the same date.

The system testing described below will be conducted if, in the course of the AS / SVE system lifetime, the system goes down or significant changes are made to the system and the system must be restarted. If the 5-hp regenerative blower or the 3-hp rotary lobe blower fails, the blowers shall not be serviced or repaired at the Site., The unit will need to be removed and rebuilt or serviced by the manufacture or a manufacture representative or replaced with a new/rebuilt 5-hp regenerative blower or the 3-hp rotary lobe blower. Following installation of the new or rebuilt 5-hp regenerative blower or the 3-hp rotary lobe blower, the following items should be inspected to ensure proper operation:

1) Check all exposed/visible piping for evidence of damage, cracks, or leaks.
2) Turn the SVE blower on and off to ensure the start box is functioning properly and then leave blower on;
3) Record vacuum reading at the SVE blower;
4) Record vacuum readings at each extraction wellhead;

5) Balance the vacuum between the two extraction wells by adjusting the ball valves;
6) Take PID readings before, in-between and after carbon vessels;
7) Turn the AS blower on and off to ensure the start box is functioning properly and then leave blower on;
8) Determine which leg of the system is on and adjust the air pressure at each wellhead to 10 -15% above that required to overcome the water column in the well (break-out pressure).
9) Toggle the three-way valve to the second leg and repeat step 7 on the wells connected to the second leg of the system.

5.3.2 Routine System Operation and Maintenance

The air sparging system will need to be adjusted in response to changes in water level. Such changes will either increase or decrease the amount of pressure needed to overcome the water column and maintain optimal operating conditions. The SVE system is not adjustable and the regenerative blower shall not be serviced or repaired at the Site.

A visual inspection of the complete system will be conducted during each monitoring event. AS / SVE system components to be monitored include, but are not limited to, the following:

- Vacuum blower; AS Blower;
- General system piping.
- Vacuum gauges at blower.
- Pressure relief valve.
- Control switches.
- PID Readings from influent line, between carbon drums and at the discharge stack.

The adjustment procedures for the dual leg air sparging system are as follows:

Method 1 (if sparging lines are not air tight and there is access to each sparge point wellhead):

1. Turn off sparge blower
2. Check actuator valve to determine which leg is in the "ON" cycle.

3. Take depth to water readings & total depth (if not known) at each sparge point.
4. Determine displacement pressure & operating pressure for each point according to following example: Displacement pres. (psi) = ((T.D. - DTW) - 2.4) x 0.43302, Operating pres. (psi) = Disp. pres. x 1.15 (for 15% over)
5. Turn on sparge blower and adjust each point (on leg 1) to calc. operating pressure.
6. Switch actuator valve to second leg and adjust each point (on leg 2) to calc. operating pressure.
7. Return actuator valve to original position.
8. Record vacuum/pressure readings at vent wells and observation wells. Balance out vacuum at SVE wells. Take PID readings at SVE emission stack.

Method 2 (if lines are air tight):

1. Close off air supply (globe valve) to first sparge point in system. Watch pressure gauge and wait for stabilization (approx. 4-4.5 psi for a 10 foot water column). Stabilization psi = displacement psi. Calculate operating psi as described above.
2. Perform procedures 6, 7 and 8 as detailed above.

Air samples will initially be collected on a monthly basis to evaluate the performance of the system during the first 3 months of operation going to quarterly thereafter. PID readings will be collected from three locations: system influent (before carbon), between the carbon canisters and from the system discharge (after carbon). Air samples will be collected from the system influent and system effluent and submitted to a NYSDOH certified environmental laboratory for analysis of VOCs by USEPA method TO15. Periodic sampling of the soil vapor discharge after the drums containing vapor-phase granular activated carbon will determine if breakthrough has occurred and the drums need to be replaced. To minimize time the system is turned off, new drums should be ready to install when removing/disconnecting the spent drums.

A copy of an Operations and Maintenance Manual specific to the remedial systems is provided in **Attachment I**, which provides further detail on the above. In addition, Section 1.2 and associated summary table in the O&M plan provides details on routine maintenance and Section 2.3 of the O&M plan provides a list of system parts which may require replacement in the future.

5.3.3 Non-Routine Operation And Maintenance

Non-routine maintenance is expected if any component of the system is damaged or fails. During each inspection, the system will be checked for structural integrity. Component damage or failure includes a broken valve, damaged pipe, or blower malfunction. Additionally, if a hissing sound is noted within the cellar area, this could be a sign of extraction line damage. In any case of component damage or failure, the system should be shut off and repairs/replacements should be made. The owner should contact AMC Engineering with any issues.

The system will not be restarted until all repairs are made. When the repairs are completed, the system should be started up as listed above.

A building superintendent will be trained to inspect the system daily for proper operation and the superintendent will notify trained repair personnel if the system goes down or is not operating property.

5.3.4 System Monitoring Devices and Alarms

The air sparge soil vapor extraction system does not utilize any system monitoring devices/alarms. The 5-hp regenerative blower (SVE) or the 3-hp rotary lobe blower (AS) operate continuously. In the event the blower fails, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the air sparge soil vapor extraction system will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Remedial System Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that the NYSDEC or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focuses on overall site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to site operations to increase efficiency, cost effectiveness and remedial time frames. Green remediation technology and principals will be considered when performing the RSO.

6.2 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessments provide information so that the site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

This section provides a summary of vulnerability assessments that will be conducted for the site during periodic assessments, and briefly summarizes the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding.

The Site is located in the southern portion of Brooklyn, NY. It is located at an elevation of 25 feet above the National Geodetic Vertical Datum (NGVD), or approximately 25 feet above sea level. According to the FEMA Flood Map, this site is not located within a flood hazard area. The Site is served by the NYC Municipal sewer system and the completed building will meet all NYC building codes for drainage. There is no potential for erosion, high wind, electricity, spill/containment release.

6.3 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section of the SMP provides a summary of any green remediation evaluations to be completed for the Site during site management, and as reported in the Periodic Review Report (PRR).

6.3.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at

any time that the Project Manager feels appropriate (e.g. during significant maintenance events or in conjunction with storm recovery activities).

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities. Reporting of these modifications will be presented in the PRR. A PRR will be submitted annually and will discuss quantification of waste generation, energy usage, emissions, water usage, land and ecosystems. The green remediation forms are included in Attachment H Site Management Forms.

6.3.2 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site and use of consumables in relation to visiting the Site in order to conduct system checks and/or collect samples and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

As part of this effort, consideration shall be given to:

- Reduced site visits and system checks;
- Coordination/consolidation of activities to maximize foreman/labor time; and
- Use of mass transit for site visits, where available.

6.3.3 Metrics and Reporting

As discussed in Section 7.0 and as shown in **Attachment H** – Site Management Forms, information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits; a set of metrics has been developed.

7.0 REPORTING REQUIREMENTS

7.1 Site Management Reports

All site management inspection, maintenance and monitoring events will be recorded on the appropriate site management forms provided in **Attachment H**. These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of the table below and summarized in the Periodic Review Report.

Schedule of Interim Monitoring/Inspection Reports

Task/Report	**Reporting Frequency***
Periodic Review Report	Annually, or as otherwise determined by the Department
Groundwater Data	Quarterly
AS/SVE Inspections, AS/SVE Reporting Data and Discharge Monitoring	Monthly for the first 3 months and then quarterly thereafter

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC.

All interim monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);

- Type of samples collected (e.g. groundwater, SVE discharge, etc);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and

- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html

7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the Department beginning sixteen (16) months after the Certificate of Completion (COC) is issued. After submittal of the initial Periodic Review Report, the next PRR shall be submitted annually to the Department or at another frequency as may be required by the Department. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site described in **Attachment A** – Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.
- Results of the required annual site inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends.

- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.
- A Site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the site-specific RAWP, ROD or Decision Document;
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
  - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored;
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan;
  - Trends in contaminant levels in the affected media will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document.
  - The overall performance and effectiveness of the remedy; and
- A performance summary for all treatment systems at the site during the calendar year, including information such as:
  - The number of days the system operated for the reporting period;
  - The average, high, and low flows per day;
  - The contaminant mass removed;
  - A description of breakdowns and/or repairs along with an explanation for any significant downtime;
  - A description of the resolution of performance problems;
  - Alarm conditions;

- Trends in equipment failure;
- A summary of the performance, effluent and/or effectiveness monitoring; and
- Comments, conclusions, and recommendations based on data evaluation.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a qualified environmental professional or Professional Engineer licensed to practice in New York State will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

"*For each institutional or engineering control identified for the site, I certify that all of the following statements are true:*

- *The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*

- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*
- *No new information has come to my attention, including groundwater monitoring data from wells located at the site, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and*
- *The assumptions made in the qualitative exposure assessment remain valid.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner/Remedial Party or Owner's/Remedial Party's Designated Site Representative] (and if the site consists of multiple properties): *[I have been authorized and designated by all site owners/remedial parties to sign this certification] for the site."*

The signed certification will be included in the Periodic Review Report.
The Periodic Review Report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located and the NYSDOH Bureau of Environmental Exposure Investigation. The Periodic Review Report may need to be submitted in hard-copy format, as requested by the NYSDEC project manager.

7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a Corrective Measures Work Plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC.

7.4 Remedial Site Optimization Report

In the event that an RSO is to be performed (see Section 6.3) upon completion of an RSO, an RSO report must be submitted to the Department for approval. A general outline for the RSO report is provided in **Attachment J**. The RSO report will document the research/ investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model and present recommendations. RSO recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, HASPs etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located, Site Control and the NYSDOH Bureau of Environmental Exposure Investigation.

8.0 REFERENCES

6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

AMC Engineering, Remedial Action Work Plan for 1815-1825 Ocean Avenue Brooklyn, NY, April 2017.

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation".

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

Environmental Business Consultants Phase II Investigation Report, 1815 Ocean Avenue, Brooklyn NY, February 25, 2015

Environmental Business Consultants, Phase II Data Summary, 1825 Ocean Avenue, Brooklyn, NY, April 29, 2015

Environmental Business Consultants, Phase I Screening for 1815-1825 Ocean Avenue, Brooklyn, NY, April 30, 2015

Environmental Business Consultants, Remedial Investigation Report, 1815-1825 Ocean Avenue Brooklyn, NY, July, 2016

Hydrotech Environmental Corp, Subsurface Assessment Report, December 30, 2014

TABLES

Table 1 - Notifications*

Name	Contact Information
NYSDEC Project Manager: Jeffrey Dyber	(518) 402-9621; jeffrey.dyber@dec.ny.gov
NYSDEC Chief: Jane O'Connell	718-482-4599; Jane.Oconnell@dec.ny.gov
NYSDEC Site Control: Kelly Lewandowski	518-402-9553; kelly.lewandowski@dec.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

Table 2
Tomat Service Station
1815 - 1825 Ocean Avenue
Brooklyn, NY
Groundwater Elevation Data

SAMPLE ID	Date	Total Depth (ft)	Diameter (in)	Construction Materials	Screen Length (ft)	DTW (ft below ground)	DTP	Survey Reading (ft) From Top of Casing	GW ELV(ft Above Sea Level)
17GW1	11/10/2017	30	1	PVC	10.00	22.5	-	25.15	2.65
17GW2	9/1/2017	20	1	PVC	10.00	10.97	-	14.71	3.74
17GW3	9/1/2017	20	1	PVC	10.00	10.86	-	15.7	4.84
17GW4	10/16/2017	30	1	PVC	10.00	22.00	-	25.70	3.7
17GW5	9/1/2017	20	1	PVC	10.00	10.97	-	16.75	5.78
17GW6	9/1/2017	20	1	PVC	10.00	10.79	-	15.85	5.06

Table 3
Tomat Service Station
1815 - 1825 Ocean Avenue, Brooklyn, NY
Remaining Parameters in Soil Avobe Track 1 Soil Cleanup Objectives

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives*	NYSDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	NYSDEC Part 375.6 Industrial Soil Cleanup Objectives*	Range in Exceedances	Frequency of Detection	Remaining RI Sample Results													
						B1	B2	B1	B2	15B1	15B2	15B3	15B9	15B10	15B11	15B15	15B17	15B18	15B19
						2/6/2015	2/6/2015	4/22/2015	4/22/2015	11/6/2015	11/6/2015	11/9/2015	11/6/2015	11/6/2015	11/6/2015	11/6/2015	11/6/2015	11/6/2015	11/6/2015
						(22-24')	(22-24')	(23-25')	(23-25')	(23-25')	(23-25')	(23-25')	(23-25')	(23-25')	(23-25')	(23-25')	(23-25')	(23-25')	(23-25')
Sample Results in ug/kg																			
1,2,4-Trimethylbenzene	3,600	52,000	380,000	16,000 - 640,000	13	**31,000**	**22,000**	**9,400**	**230,000**	**640,000**	**220,000**	**130,000**	**120,000**	**99,000**	**45,000**	**30,000**	**16,000**	**170,000**	**61,000**
1,3,5-Trimethylbenzene	8,400	52,000	380,000	9,600 - 200,000	9	**9,900**	**9,600**	-	**70,000**	**200,000**	**72,000**	**36,000**	**16,000**	-	-	-	-	**22,000**	**23,000**
Acetone	50	100,000	1,000,000	51 - 390	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	1,000	41,000	780,000	1,800 - 150,000	10	-	-	-	**22,000**	**150,000**	**43,000**	**11,000**	**14,000**	**14,000**	**3,400**	**1,800**	-	**10,000**	**2,100**
m&p-Xylenes	260	100,000	1,000,000	560 - 550,000	11	-	-	**2,200**	**45,000**	**550,000**	**130,000**	**8,300**	**18,000**	**15,000**	**690**	**2,000**	**560**	**7,100**	**9,900**
Methylene chloride	50	100,000	1,000,000	280	2	**280**	**280**	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	12,000	100,000		18,000 - 120,000	6	-	-	-	**27,000**	**120,000**	**39,000**	-	**18,000**	**27,000**	-	-	-	**22,000**	-
n-Butylbenzene	12,000	100,000		13,000 - 28,000	3	-	-	-	**17,000**	**28,000**	-	-		**13,000**	-	-	-	-	-
n-Propylbenzene	3,900	100,000	1,000,000	9,000 - 77,000	9	-	-	-	**35,000**	**77,000**	**30,000**	**24,000**	**14,000**	**26,000**	**12,000**	-	-	**19,000**	**9,000**
o-Xylene	260	100,000	1,000,000	8,700 - 93,000	2	-	-	-	-	**93,000**	**8,700**	-	-	-	-	-	-	-	-
Toluene	700	100,000	1,000,000	6,300	1	-	-	-	-	**6,300**	-	-	-	-	-	-	-	-	-
Sample Results in ug/kg																			
Indeno(1,2,3-cd)pyrene	500	500	11,000	520	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	12,000	100,000	1,000,000	4,900 - 74,000	2	-	-	-	**4,900**	**74,000**	-	-	-	-	-	-	-	-	-
Sample Results in mg/kg																			
Chromium	30	180	6,800	31.5	1	-	-			-	-	-	-	-	-	-	-	-	-
Lead	63	400	3,900	83.2 - 700	2	-	-			-	-	-	-	-	-	-	-	-	-
Nickel	30	310	10,000	31.9 - 87.6	22	-	-			-	-	-	-	-	-	-	-	-	-

Notes:

* - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

RL - Laboratory Reporting Limit

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC Industrial SCO Guidance Value

Table 3
Tomat Service Station
1815 - 1825 Ocean Avenue, Brooklyn, NY
Remaining Parameters in Soil Avobe Track 1 Soil Cleanup Objectives

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives*	NYSDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	NYSDEC Part 375.6 Industrial Soil Cleanup Objectives*	Range in Exceedances	Frequency of Detection	End Point Sample Results														
						EP 13	EP 15	EP 17	EP 17A	EP 17B	EP 19	EP 20	EP 21	EP 22	EP 23	EP 26	EP 33	EP 34	EP 34	EP 35
						3/7/2017	3/23/2017	3/23/2017	4/272017	6/29/2017	5/19/2017	5/19/2017	5/10/2017	6/6/2017	7/17/2017	6/30/2017	5/10/2017	5/10/2017	6/6/2017	1/13/2017
						2'	2'	2'	2.5'	3'	12.5'	12.5'	12.5'	12.5'	12.5'	12.5'	12.5'	12.5'	13'	9'
Sample Results in ug/kg																				
1,2,4-Trimethylbenzene	3,600	52,000	380,000	16,000 - 640,000	13	-		-	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	8,400	52,000	380,000	9,600 - 200,000	9	-		-	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	50	100,000	1,000,000	51 - 390	8	-		-	**87**	-	**53**	-	**81**	-	-	-	**390**	-	-	**270**
Ethylbenzene	1,000	41,000	780,000	1,800 - 150,000	10	-		-	-	-	-	-	-	-	-	-	-	-	-	-
m&p-Xylenes	260	100,000	1,000,000	560 - 550,000	11	-		-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	50	100,000	1,000,000	280	2	-		-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	12,000	100,000		18,000 - 120,000	6	-		-	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	12,000	100,000		13,000 - 28,000	3	-		-	-	-	-	-	-	-	-	-	-	-	-	-
n-Propylbenzene	3,900	100,000	1,000,000	9,000 - 77,000	9	-		-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	260	100,000	1,000,000	8,700 - 93,000	2	-		-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	700	100,000	1,000,000	6,300	1	-		-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Results in ug/kg																				
Indeno(1,2,3-cd)pyrene	500	500	11,000	520	1	-		-	**520**	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	12,000	100,000	1,000,000	4,900 - 74,000	2	-		-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Results in mg/kg																				
Chromium	30	180	6,800	31.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	63	400	3,900	83.2 - 700	2	**83.2**	-	**700**	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	30	310	10,000	31.9 - 87.6	22	-	**44.3**	**48**	**42.1**	**58.7**	**59.4**	**87.6**	**38.1**	**31.9**	**60.2**	**48.8**	**42.7**	**62.2**	**34.4**	-

Notes:

* - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

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COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives*	NYSDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	NYSDEC Part 375.6 Industrial Soil Cleanup Objectives*	Range in Exceedances	Frequency of Detection	Sidewall Samples Results								
						SW 1	SW 2	SW 4	SW 6	SW 7	SW 10	SW 11	SW 12	SW 13
						5/17/2017	5/17/2017	5/17/2017	6/20/2017	5/17/2017	7/17/2017	7/17/2017	7/17/2107	5/17/2017
						8'	8'	8'	8'	8'	8'	8'	8'	8'
Sample Results in ug/kg														
1,2,4-Trimethylbenzene	3,600	52,000	380,000	16,000 - 640,000	13	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	8,400	52,000	380,000	9,600 - 200,000	9	-	-	-	-	-	-	-	-	-
Acetone	50	100,000	1,000,000	51 - 390	8	-	**51**	**52**	-	-	-	-	-	**170**
Ethylbenzene	1,000	41,000	780,000	1,800 - 150,000	10	-	-	-	-	-	-	-	-	-
m&p-Xylenes	260	100,000	1,000,000	560 - 550,000	11	-	-	-	-	-	-	-	-	-
Methylene chloride	50	100,000	1,000,000	280	2	-	-	-	-	-	-	-	-	-
Naphthalene	12,000	100,000		18,000 - 120,000	6	-	-	-	-	-	-	-	-	-
n-Butylbenzene	12,000	100,000		13,000 - 28,000	3	-	-	-	-	-	-	-	-	-
n-Propylbenzene	3,900	100,000	1,000,000	9,000 - 77,000	9	-	-	-	-	-	-	-	-	-
o-Xylene	260	100,000	1,000,000	8,700 - 93,000	2	-	-	-	-	-	-	-	-	-
Toluene	700	100,000	1,000,000	6,300	1	-	-	-	-	-	-	-	-	-
Sample Results in ug/kg														
Indeno(1,2,3-cd)pyrene	500	500	11,000	520	1	-	-	-	-	-	-	-	-	-
Naphthalene	12,000	100,000	1,000,000	4,900 - 74,000	2	-	-	-	-	-	-	-	-	-
Sample Results in mg/kg														
Chromium	30	180	6,800	31.5	1	-	-	-	-	-	-	-	-	**31.5**
Lead	63	400	3,900	83.2 - 700	2	-	-	-	-	-	-	-	-	-
Nickel	30	310	10,000	31.9 - 87.6	22	**63.2**	**68.3**	**36.2**	**43.9**	**34.6**	**34.5**	**47.6**	**53.5**	**63.1**

Notes:

* - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

RL - Laboratory Reporting Limit

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Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC Industrial SCO Guidance Value

Table 4
Tomat Service Station
1815 - 1825 Ocean Avenue, Brooklyn, NY
Baseline Groundwater Sample Results

COMPOUND	NYSDEC Ambient Water Quality Standards (AWQS)	Range in Exceedances	Frequency of Detection	2017 Groundwater Samples Before Start Up					
				17GW1	17GW2	17GW3	17GW4	17GW5	17GW6
				11/13/2017	11/13/2017	11/13/2017	11/16/2017	11/13/2017	11/13/2017
Sample Results in ug/kg									
1,2,4-Trimethylbenzene	5	240 - 2,300	6	**560**	**2,100**	**1,600**	**240**	**390**	**2,300**
1,3,5-Trimethylbenzene	5	27 - 480	5	**69**	**480**	**190**	-	**27**	**420**
Benzene	1	7 - 12	2	-	**7**	**12**	-	-	-
Ethylbenzene	5	46 - 1,400	5	**320**	**1,400**	**470**	-	**46**	**1,200**
Isopropylbenzene	5	12 - 81	6	**39**	**81**	**71**	**12**	**50**	**72**
Naphthalene	10	150 - 450	5	**190**	**450**	**210**	-	**150**	**410**
n-Butylbenzene	5	9.4 - 23	5	**9.4**	**13**	**10**	-	**15**	**23**
n-Propylbenzene	5	25 - 210	6	**81**	**210**	**160**	**25**	**140**	**180**
o-Xylene	5	140 - 740	3	-	**740**	**180**	-	-	**140**
p-Isopropyltoluene	5	5.5 - 9.2	4	-	**7.7**	**5.5**	-	**8.4**	**9.2**
sec-Butylbenzene	5	5.4 - 14	5	**5.4**	**12**	**9.5**	-	**9.8**	**14**
Toluene	5	5.1 - 40	3	-	**40**	**25**	-	-	**5.1**

Notes:

* - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

RL - Laboratory Reporting Limit

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 5 – AS/SVE Monitoring Requirements and Schedule

AS/SVE System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
Regenerative Blower	Flow Rate	TBD	Monthly for the first three months and then quarterly thereafter
Rotary Lobe Blower	Flow Rate	TBD	Monthly for the first three months and then quarterly thereafter
Activated Carbon Drums	Expiration date, damage, labeling	-	Monthly for the first three months and then quarterly thereafter

Table 6- Remedial System Sampling Requirements and Schedule

Sampling Location	**Field Screening Parameters PID**	**Parameters** VOCs (USEPA TO15)	**Parameters** PFAs (USEPA 537 Modified)	**Parameters** 1,4 dioxane (USEPA 8270 SIM)	**Parameters** VOC (USEPA 8260C)	**Schedule**
SVE Influent (before carbon)	X	X				Monthly for the first 3 months then quarterly thereafter
Between Carbon Canisters	X					Monthly for the first 3 months then quarterly thereafter
SVE Discharge (after carbon)	X	X				Monthly for the first 3 months then quarterly thereafter
17GW1, 17GW2, 17GW3, 17GW4, 17GW5 and 17GW6			X	X	X	Quarterly

Table 7- Post Remediation Sampling Requirements and Schedule

Sampling Location	**Analytical Parameters** VOCs (EPA 8260C)	**Analytical Parameters** PFAs (EPA 537 Modified)	**Analytical Parameters** 1,4 dioxane (EPA 8270 SIM)	**Schedule**
17GW1	X	X	X	Quarterly
17GW2	X	X	X	Quarterly
17GW3	X	X	X	Quarterly
17GW4	X	X	X	Quarterly
17GW5	X	X	X	Quarterly
17GW6	X	X	X	Quarterly

Table 8 – Monitoring Well Construction Details

Monitoring Well ID	Well Location	Coordinates (longitude/ latitude)	Well Diameter (inches)	Casing Length	Depth Below Surface	Screen Top (below ground)	Screen Bottom (below ground)
17GW1(at grade)	On Site	-73.954583°W 40.617693° N	1	20 feet	29 feet	20 feet	30 feet
17GW2 (in cellar)	On Site	-73.954588 °W 40.617504 ° N	1	20 feet	17 feet	10 feet	20 feet
17GW3(in cellar)	On Site	-73.954562 °W 40.617397 ° N	1	20 feet	17 feet	10 feet	20 feet
17GW4 (at grade)	On Site	-73.954617°W 40.617343° N	1	20 feet	29 feet	20 feet	30 feet
17GW5(in cellar)	On Site	-73.954432°W 40.617352° N	1	20 feet	17 feet	10 feet	20 feet
17GW6(in cellar)	On Site	-73.954617°W 40.617615° N	1	20 feet	17 feet	10 feet	20 feet

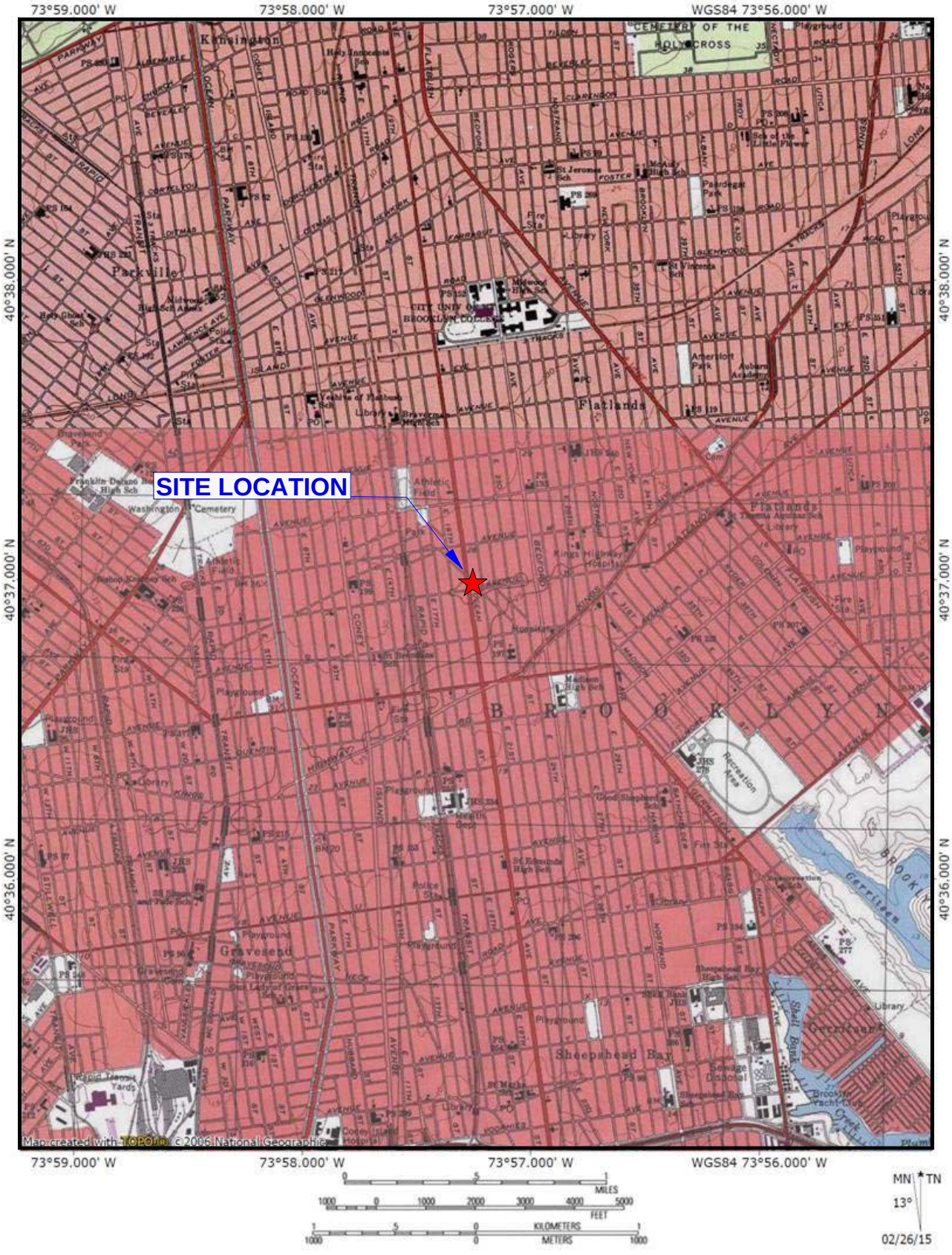
Table 9 – Schedule of Interim Monitoring/Inspection Reports

Task/Report	**Reporting Frequency***
Periodic Review Report	Annually, or as otherwise determined by the Department
Groundwater Data	Quarterly
AS/SVE Inspections, AS/SVE Reporting Data and Discharge Monitoring	Monthly for the first 3 months and then quarterly thereafter

Table 10- ISCO Monitoring Requirements and Schedule

ISCO System Component	Monitoring Parameter	Monitoring Schedule
Monitoring Wells (applicable to 17GW2 and 17GW6 only)	Condition, PID Screen, Depth to water, depth to bottom.	Quarterly

FIGURES

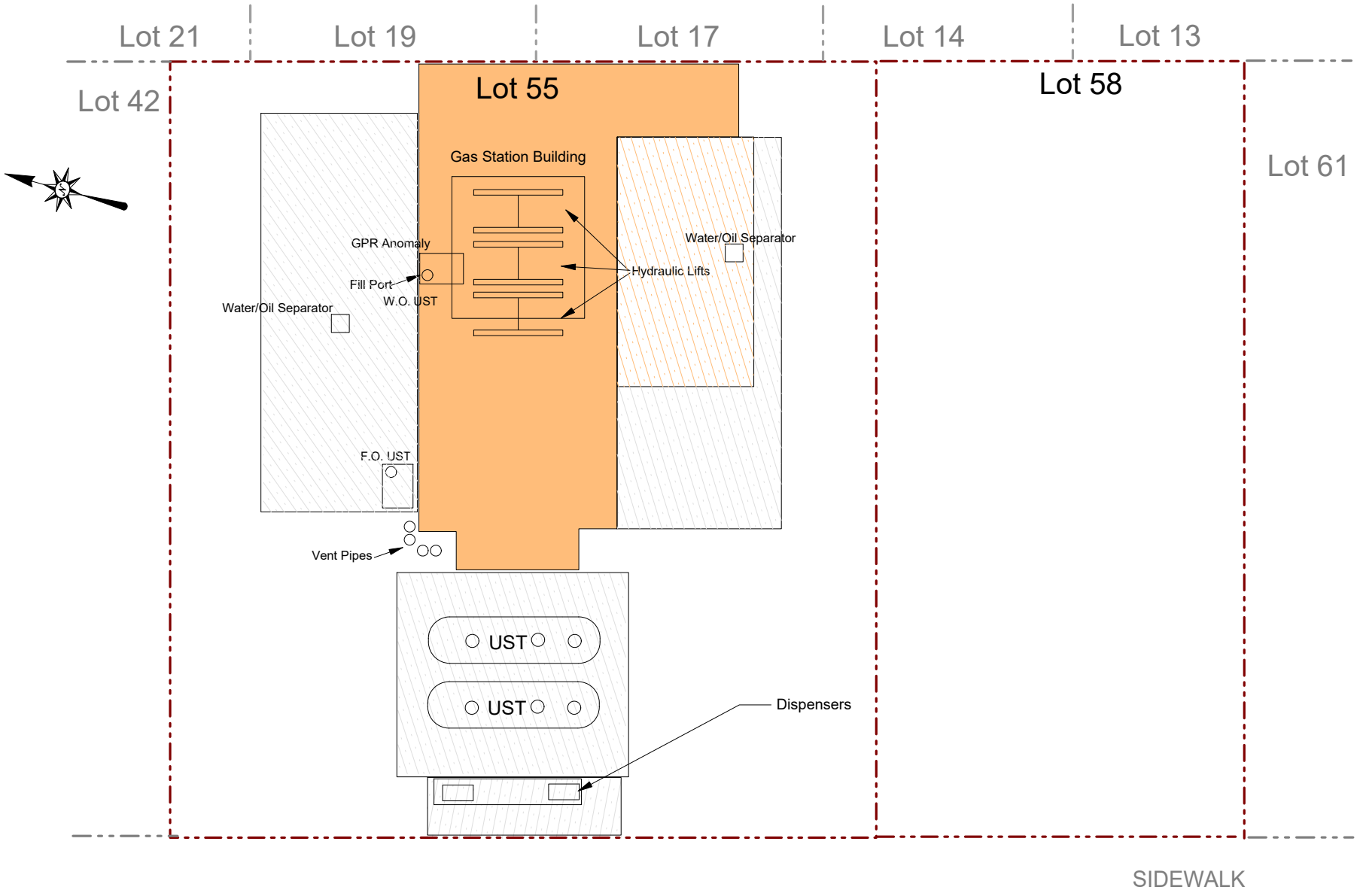


USGS Central Park, NY Quadrangle 1995, Contour Interval = 10 feet

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
Phone 631.504.6000
Fax 631. 924 .2870

TOMAT SERVICE STATION
1815-1825 OCEAN AVENUE, BROOKLYN, NY

FIGURE 1 SITE LOCATION MAP



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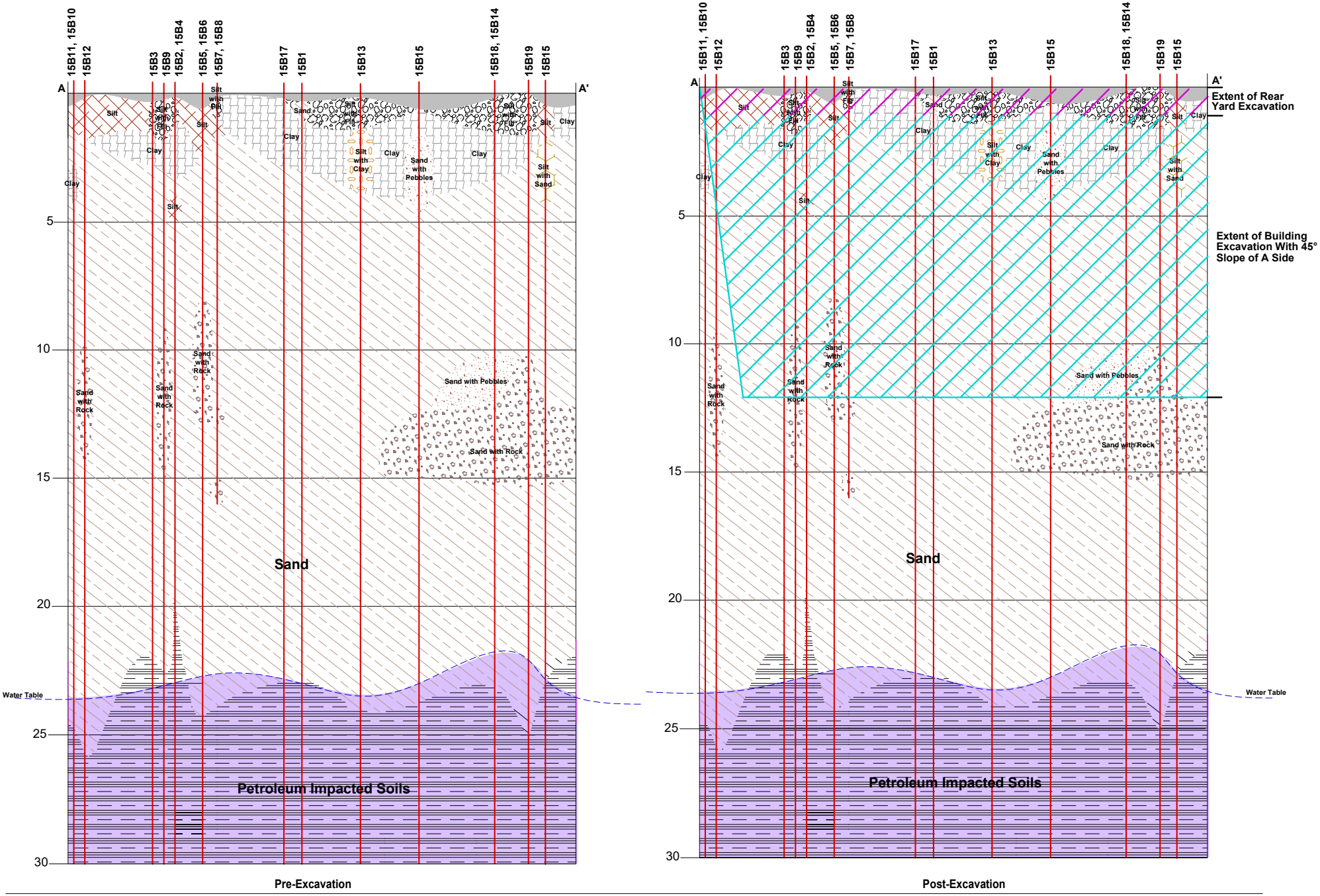
Phone 631.504.6000
Fax 631. 924 .2870

Figure No. 2

Site Name: TOMAT SERVICE STATION
Site Address: 1815-1825 OCEAN AVENUE, BROOKLYN, NY
Drawing Title: SITE LAYOUT MAP



KEY:
Property Boundary
15Bx RI Boring Location

SCALE:
0 10 25
Scale: 1 inch = 25 feet

Vertical Exaggeration 5X A = Lot 42 A' = Lot 61

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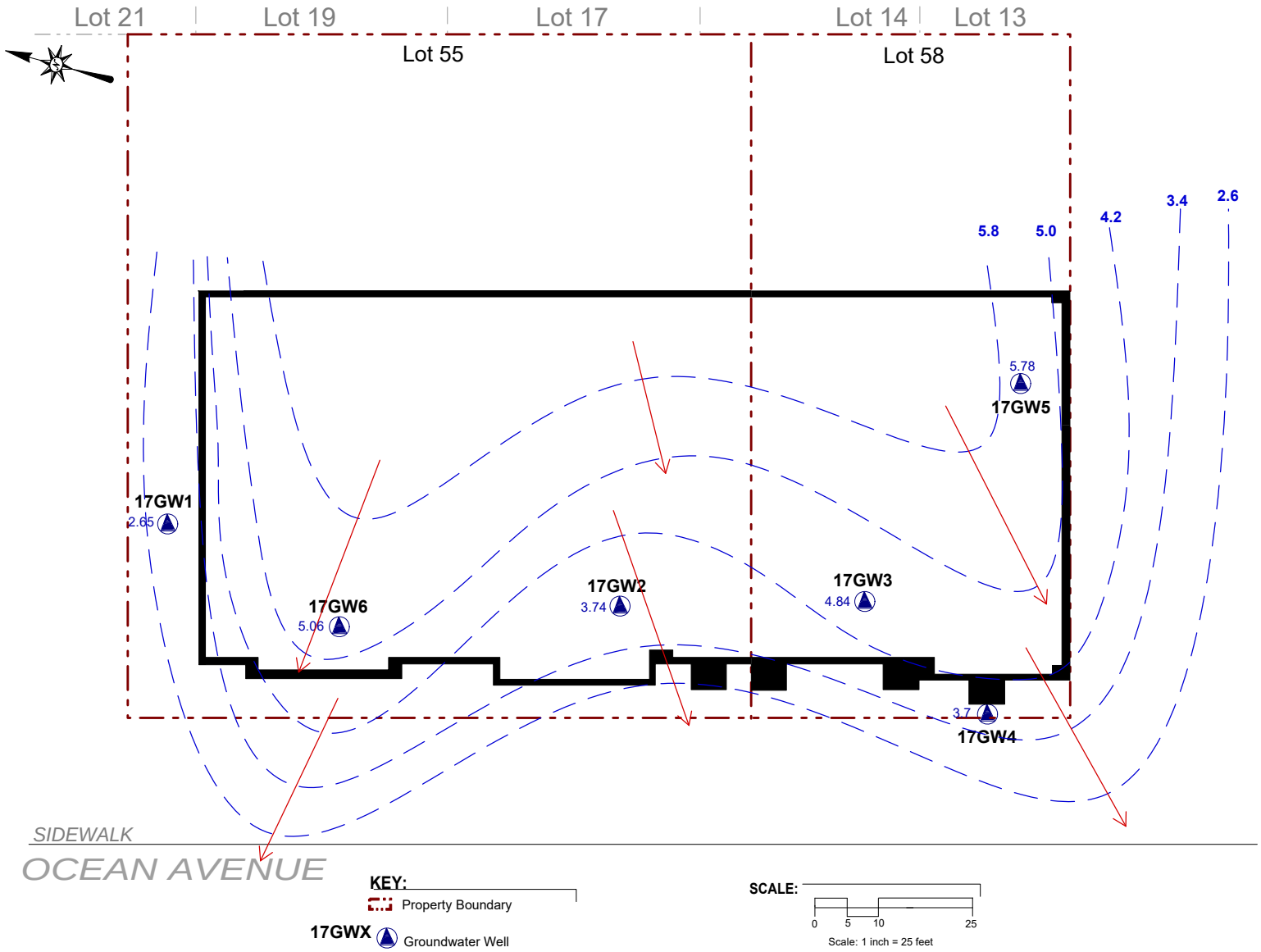
Fax 631. 924 .2870

Figure No. 3

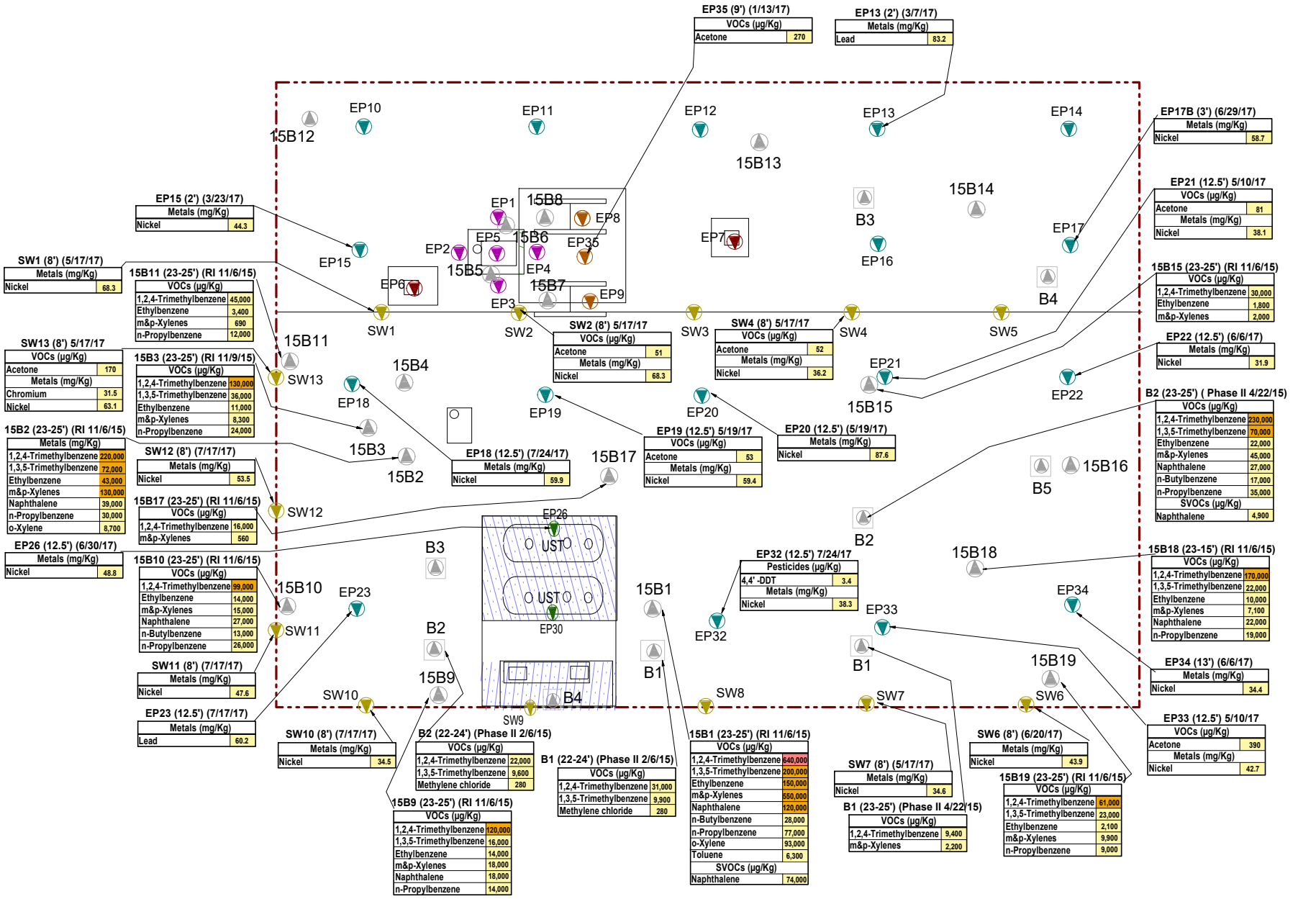
Site Name: TOMAT SERVICE STATION
Site Address: 1815-1825 OCEAN AVENUE, BROOKLYN, NY
Drawing Title: GEOLOGICAL CROSS SECTION



AMC Engineeting, PLLC
18-36 42nd Street
Astoria, NY 11105

Figure No. **4**

Site Name: TOMAT SERVICE STATION
Site Address: 1815-1825 OCEAN AVENUE, BROOKLYN, NY
Drawing Title: GROUNDWATER CONTOUR MAP



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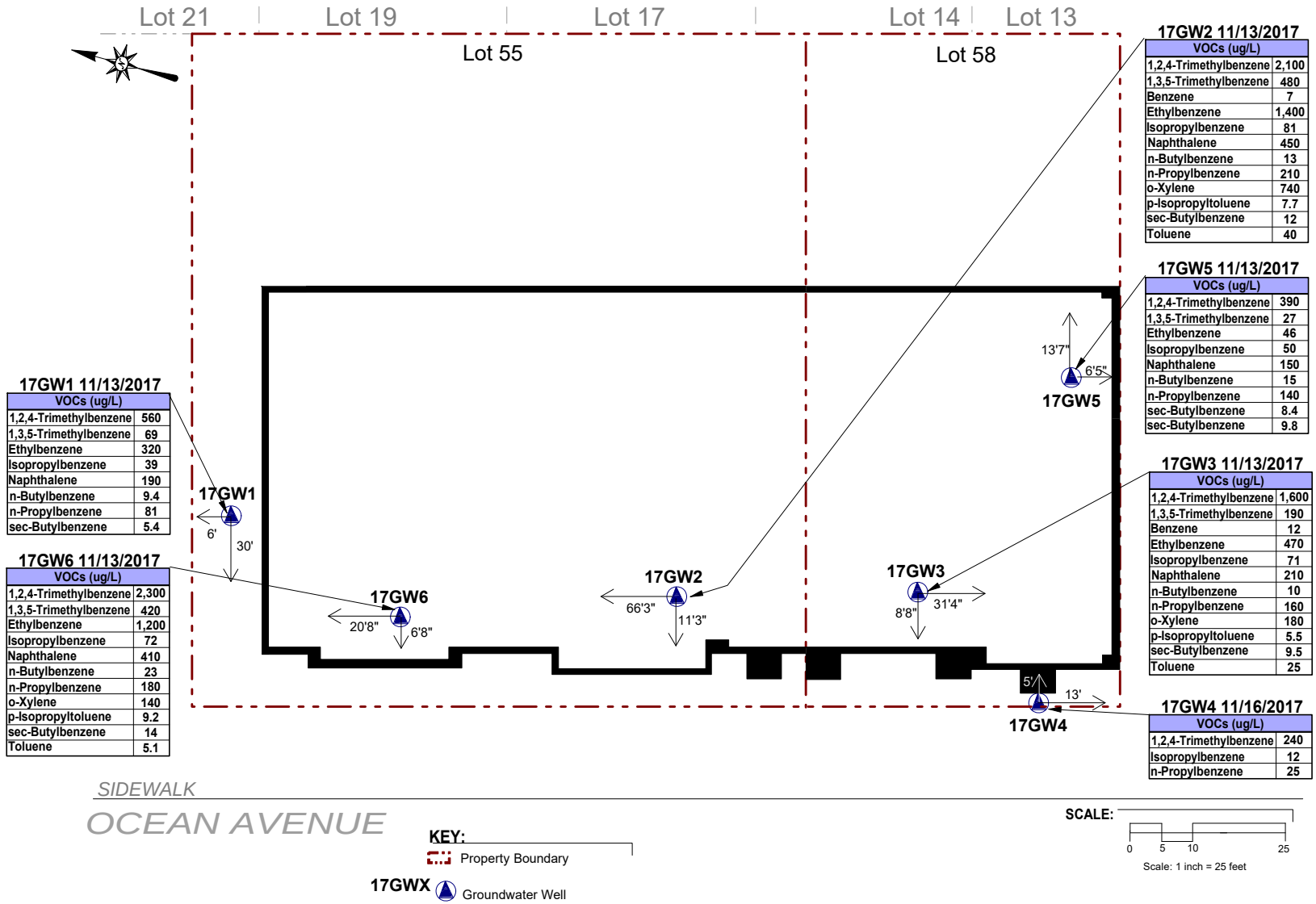
Phone 631.504.6000
Fax 631. 924 .2870

Figure No. 5

Site Name: TOMAT SERVICE STATION
Site Address: 1815-1825 OCEAN AVENUE, BROOKLYN, NY
Drawing Title: REMAINING PARAMETERS IN SOIL ABOVE SCOs



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Astoria, NY 11105

Figure No. **6**

Site Name: TOMAT SERVICE STATION
Site Address: 1815-1825 OCEAN AVENUE, BROOKLYN, NY
Drawing Title: GROUNDWATER SAMPLE RESULTS

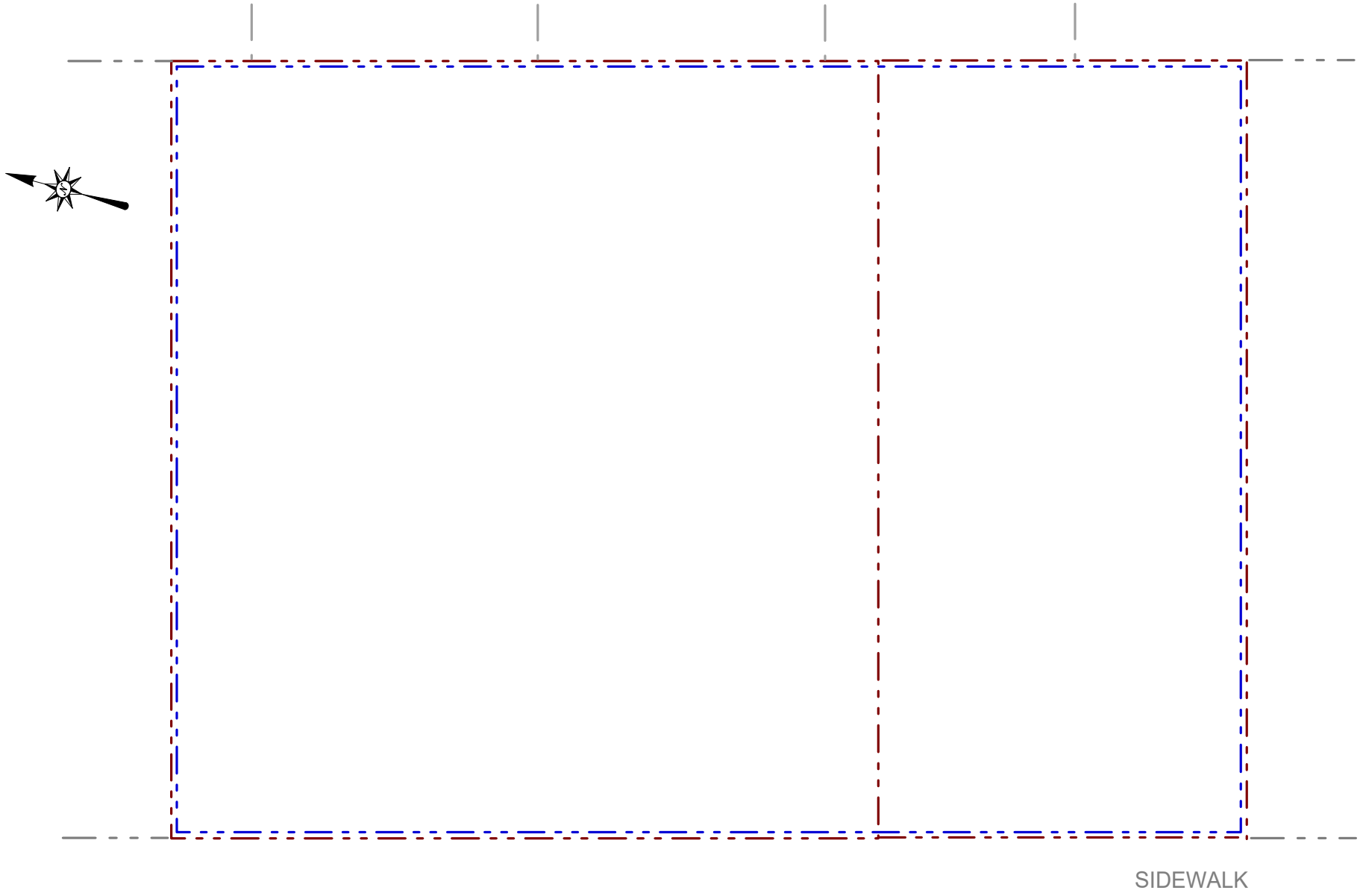

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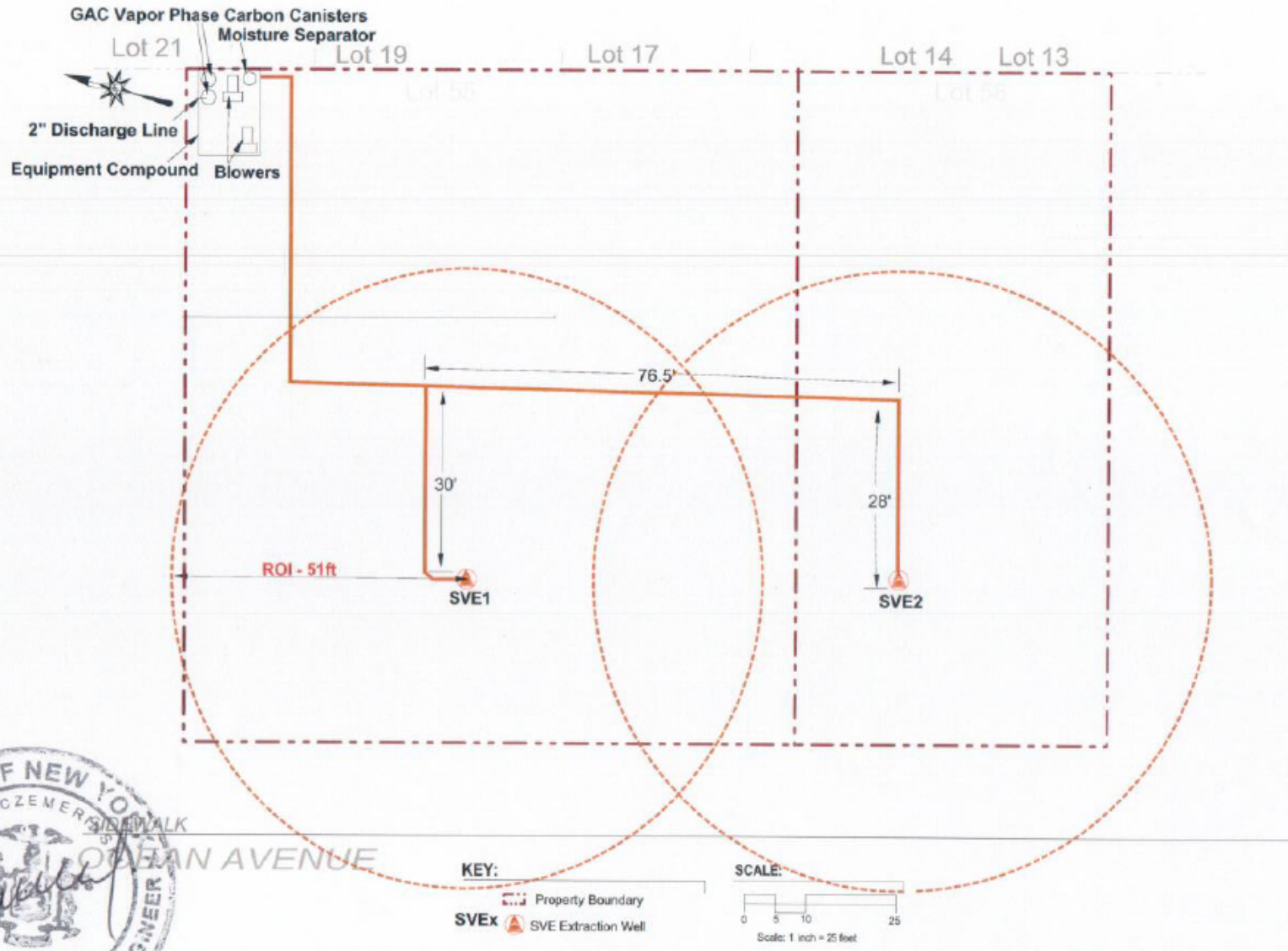
Figure No. 7

Site Name: TOMAT SERVICE STATION
Site Address: 1815-1825 OCEAN AVENUE, BROOKLYN, NY
Drawing Title: INSTITUTIONAL CONTROLS BOUNDARIES



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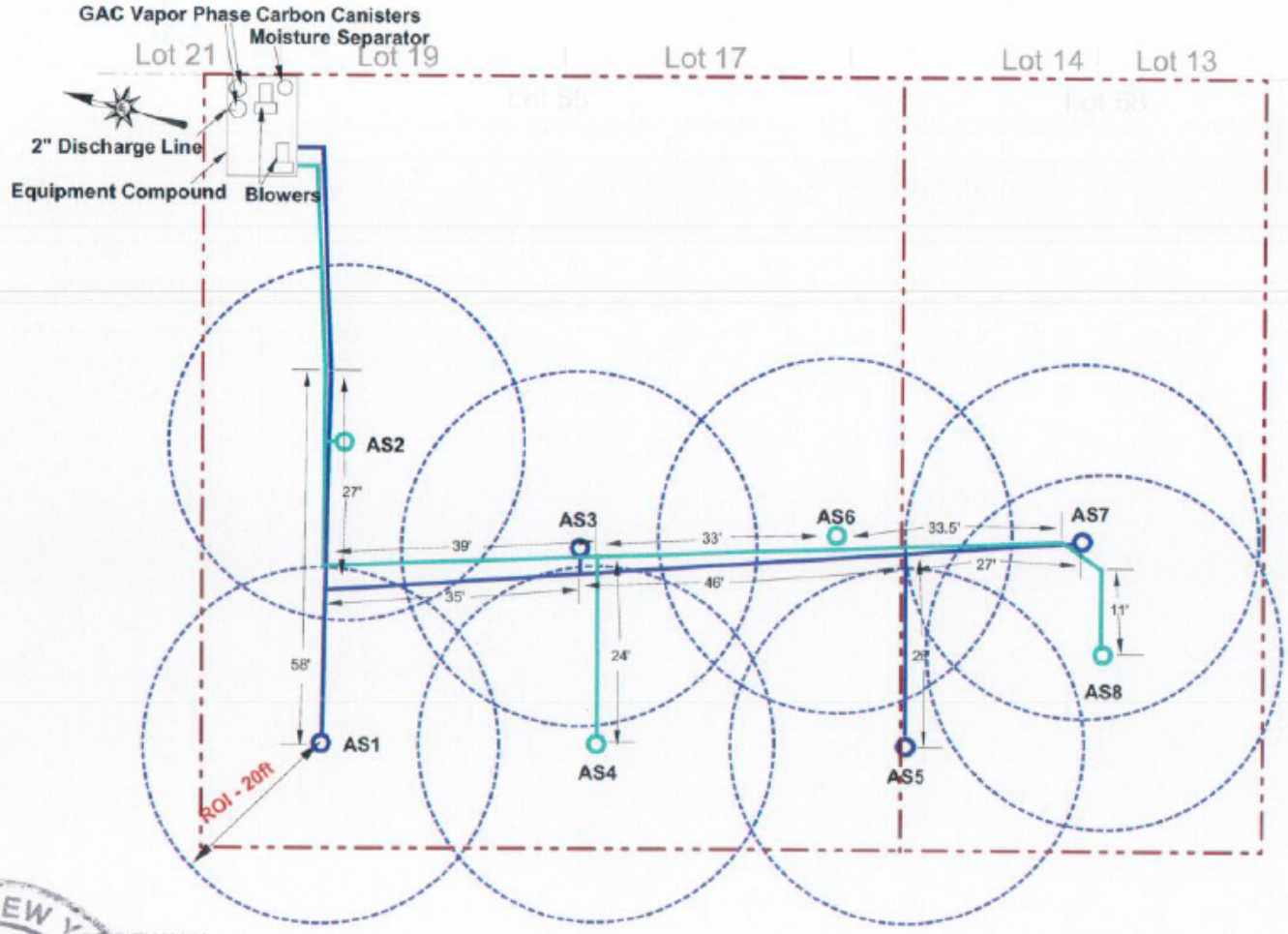
Astoria, NY 11105

Figure No. 8

Site Name: TOMAT SERVICE STATION
Site Address: 1815-1825 OCEAN AVENUE, BROOKLYN, NY
Drawing Title: SOIL VAPOR EXTRACTION SYSTEM LAYOUT



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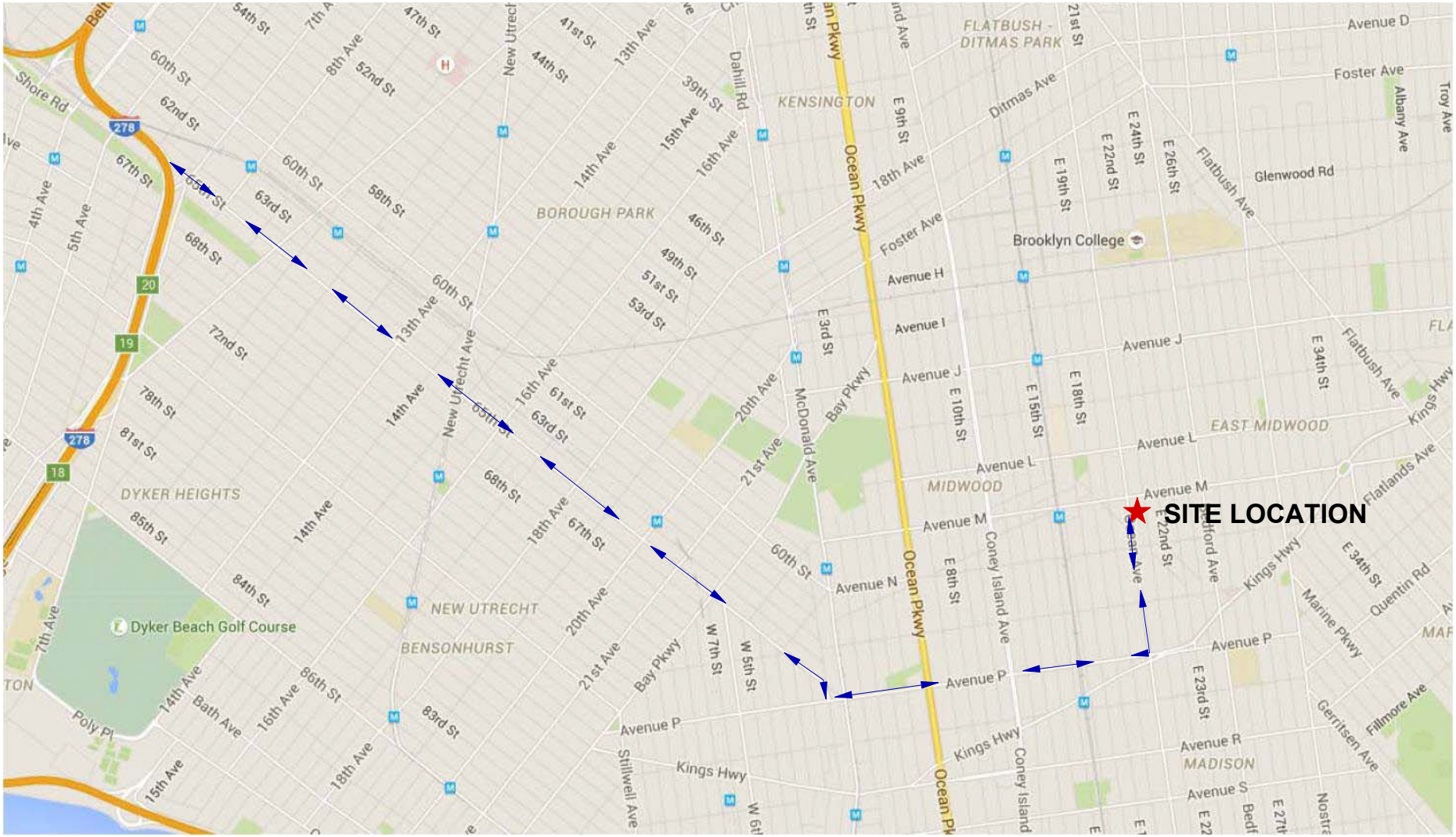
18-36 42nd Street
Astoria, NY 11105

Figure No. 9

Site Name: TOMAT SERVICE STATION
Site Address: 1815-1825 OCEAN AVENUE, BROOKLYN, NY
Drawing Title: AIR SPARGE SYSTEM LAYOUT



Key:

Truck Route to/from the Site

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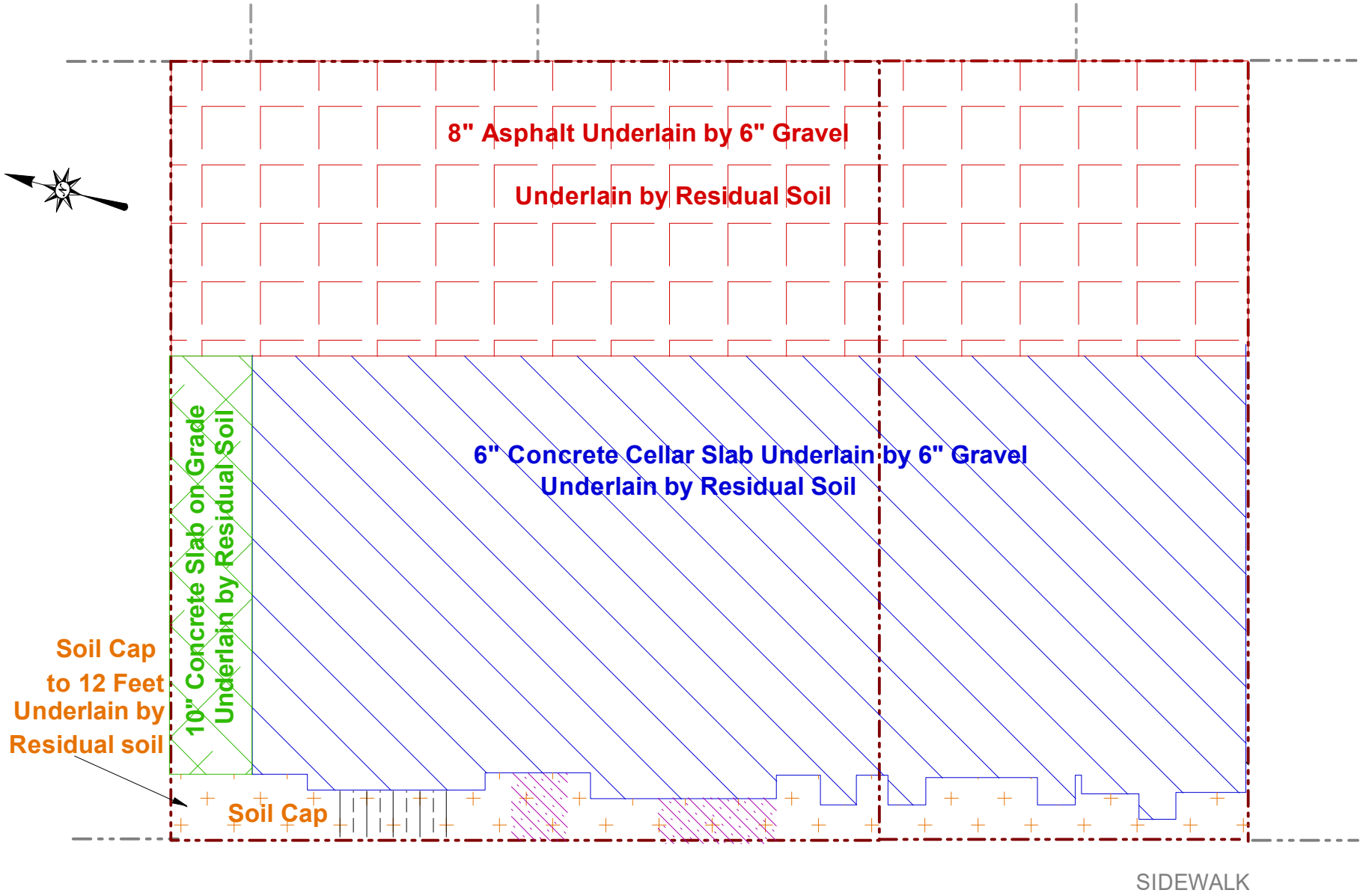
Phone 631.504.6000
Fax 631. 924 .2870

Figure No. **10**

Site Name:	TOMAT SERVICE STATION
Site Address:	1815 - 1825 OCEAN AVENUE, BROOKLYN, NY
Drawing Title:	TRUCK ROUTE



EBC
Environmental Business Consultants
Phone 631.504.6000
Fax 631. 924 .2870

Figure No. 11

Site Name: TOMAT SERVICE STATION
Site Address: 1815-1825 Ocean Avenue, Brooklyn, NY
Drawing Title: Site Cover System

ATTACHMENT A
Environmental Easement / Notice / Deed Restriction

NYC DEPARTMENT OF FINANCE
OFFICE OF THE CITY REGISTER

This page is part of the instrument. The City Register will rely on the information provided by you on this page for purposes of indexing this instrument.The information on this page will control for indexing purposes in the event of any conflict with the rest of the document.

2017102300467001001EEC49

RECORDING AND ENDORSEMENT COVER PAGE **PAGE 1 OF 10**

Document ID: 2017102300467001 Document Date: 09-11-2017 Preparation Date: 10-23-2017
Document Type: EASEMENT
Document Page Count: 9

PRESENTER:
RIVERSIDE ABSTRACT LLC
3839 FLATLANDS AVE #208 - RA-REC-35108
BROOKLYN, NY 11234
718-252-4200
REC@RSABSTRACT.COM

RETURN TO:
RIVERSIDE ABSTRACT LLC
3839 FLATLANDS AVE #208 - RA-REC-35108
BROOKLYN, NY 11234
718-252-4200
REC@RSABSTRACT.COM

PROPERTY DATA

Borough	Block	Lot		Unit	Address
BROOKLYN	7656	55	Entire Lot		1815-1825 OCEAN AVENUE

Property Type: OTHER

Borough	Block	Lot		Unit	Address
BROOKLYN	7656	58	Entire Lot		1825 OCEAN AVENUE

Property Type: OTHER

CROSS REFERENCE DATA

CRFN_____ *or* DocumentID_____ *or* _____ Year_____ Reel____ Page_____ *or* File Number_____

PARTIES

GRANTOR/SELLER:
OCEAN UNITS LLC
1274 49TH STREET, SUITE 443
BROOKLYN, NY 11219

GRANTEE/BUYER:
NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 BROADWAY
ALBANY, NY 12233

FEES AND TAXES

Mortgage :

Mortgage Amount:	$	0.00
Taxable Mortgage Amount:	$	0.00
Exemption:		
TAXES: County (Basic):	$	0.00
City (Additional):	$	0.00
Spec (Additional):	$	0.00
TASF:	$	0.00
MTA:	$	0.00
NYCTA:	$	0.00
Additional MRT:	$	0.00
TOTAL:	$	0.00
Recording Fee:	$	85.00
Affidavit Fee:	$	0.00

Filing Fee: $ 100.00
NYC Real Property Transfer Tax: $ 0.00
NYS Real Estate Transfer Tax: $ 0.00

RECORDED OR FILED IN THE OFFICE OF THE CITY REGISTER OF THE CITY OF NEW YORK
Recorded/Filed 10-23-2017 15:03
City Register File No.(CRFN): **2017000389474**

City Register Official Signature

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 11th day of September, 2017, between Owner(s) Ocean Units, LLC, having an office at 1274 49th Street, Suite 443, Brooklyn, New York 11219, County of Kings, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 1815 – 1825 Ocean Avenue in the City of New York, County of Kings and State of New York, known and designated on the tax map of the New York City Department of Finance as tax map parcel number: Block 7656 Lots 55 and 58, being the same as that property conveyed to Grantor by deed dated February 5, 2016 and recorded in the City Register of the City of New York as CRFN # 2016000055871. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.379 +/- acres, and is hereinafter more fully described in the Land Title Survey dated June 5, 2017 prepared by Ramzan Alli, L.L.S. of NY Land Surveyor P.C., which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is

extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: C224217-06-15, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement")

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation

pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved b the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: C224217
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail

and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

Remainder of Page Intentionally Left Blank

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

Ocean Units, LLC:

By: _____

Print Name: Joseph Banda

Title: Member Date: 7/17/17

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF)

SHALOM H. GOTTLIEB
Notary Public - State of New York
No. 01GO6287696
Qualified in Kings County
My Commission Expires August 19, 2017

On the 17th day of July, in the year 2017, before me, the undersigned, personally appeared Joseph Banda, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____ Shalom H. Gottlieb
Notary Public - State of New York
No. 01GO6287696
Qualified in Kings Co.
Commission Expires 8-19-17

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Robert W. Schick, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 11 day of September in the year 2017 before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 2018

SCHEDULE "A" PROPERTY DESCRIPTION

ALL that certain plot, piece and parcel of land situate, lying and being in the Borough of Brooklyn, County of Kings, State of New York, bounded and described as follows:

BEGINNING at the point on the Easterly side of Ocean Avenue, distant 280 feet Southerly from the corner formed by the intersection of the Easterly side of Ocean Avenue and the Southerly side of Avenue "M";

RUNNING THENCE Easterly parallel with the Avenue "M", 110 feet;

THENCE Southerly parallel with Ocean Avenue, 150 feet 6 inches;

THENCE Westerly parallel with Avenue "M", 110 feet to the Easterly side of Ocean Avenue;

THENCE Northerly along the Easterly side of Ocean Avenue, 150 feet 6 inches to the point or place of BEGINNING.

Said area being approximately 16,500 square feet or 0.379 acres.

Said premises being commonly known as 1825 Ocean Avenue, Brooklyn, New York

ATTACHMENT B
Site Contacts

LIST OF SITE CONTACTS

Name	**Phone/Email Address**
Site Owner and Remedial Party Ocean Units LLC Joseph Banda	 (718) 972-9830 jb@rancocap.com
Qualified Environmental Professional Environmental Business Consultants Charles Sosik	 631.504.6000 CSosik@ebcincny.com
NYSDEC DER Project Manager Richard Mustico	 518-402-9647 Richard.mustico1@dec.ny.gov
NYSDEC Chief Jane O'Connell	 718-482-4599 Jane.Oconnell@dec.ny.gov
NYSDEC DER Section Chief Guy Bobersky	 518-402-9621 guy.bobersky@dec.ny.gov
Remedial Party Attorney Schnapf LLC Lawrence Schnapf	 212-876-3189 Larry@SchnapfLaw.com

ATTACHMENT C
Soil Boring Logs - November 2015

Geologic Boring Log Details

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

B1 Boring Log

Location: Performed on the south side of the fill station.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		Not Detected	Well Specifications
Date Started: 2/6/2015	Date Completed: 2/6/2015			None
Completion Depth: 25 Feet	Geologist Kevin Waters			

B1 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0 to 5	34		0.0	7"-Black asphalt, coarse sand with gravel concrete 4"- Concrete 12"- Brown silt 11"- Brown coarse - fine sand with gravel
	5 to 10	29		0.0	29"- Brown coarse - fine sand some gravel
	10 to 15	26		0.0	26"- Brown coarse - fine sand some gravel
	15 to 20	24		0.0	24"- Brown coarse - fine sand some gravel
	20 to 25	26		130.0	20"- Brown coarse - fine sand 6"- Grey coarse-fine sand, Petroleum odor **Retained soil sampleB1(22-24')*

Geologic Boring Log Details

ENVIRONMENTAL BUSINESS CONSULTANTS

B2 Boring Log

Location: Performed on the northern side of the filling station, to the west of B3.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		21.5 Feet	Well Specifications
Date Started: 2/6/2015	Date Completed: 2/6/2015			None
Completion Depth: 25 Feet	Geologist Kevin Waters			

B2 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0				
	to 5	30		0.0	8"- Dark brown/black coarse sand w/ rock and gravel 22"- Brown coarse-fine sand with rock @ 19-21" some silt and glass at 15" (fill material) **Retained soil sample B2(0-2')*
	to 10	32		0.0	32"- Brown coarse-fine sand Rock at 7-9"
	to 15	60		0.0	60"- Brown coarse-fine sand with some rock
	to 20	26		0.0	26"- Brown coarse-fine sand Rock at 0-5"
	to 25	36		0.0	24'- Brown coarse-fine sand 12"- Grey coarse-fine sand, Petroleum odor **Retained soil sample B2(22-24')*

Geologic Boring Log Details

ENVIRONMENTAL BUSINESS CONSULTANTS

B3 Boring Log

Location: Performed on the northern side of the fill station, to the east of B2.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		22 feet	Well Specifications
Date Started: 2/6/2015	Date Completed: 2/6/2015			None
Completion Depth: 25 Feet	Geologist Kevin Waters			

B3 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0				
	to 5	35		0.0	8"- Dark brown/black sand 17"- Brown silt 10"- Brown sand **Retained soil sample B3(0-2')*
	to 10	34		0.0	34"- Brown sand Rock at 15-16"
	to 15	27		0.0	27"- Brown sand Rock at 20"
	to 20	34		0.0	34"- Brown sand with gravel
	to 25	35		250.0	26"- Brown sand, Water table at 21" 9"- Grey coarse sand Petroleum odor **Retained soil sample B3(22-24')*

Geologic Boring Log Details

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

B4 Boring Log

Location: Performed on the West side of the Filling Station.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		21.5 Feet	Well Specifications
Date Started: 2/6/2015	Date Completed: 2/6/2015			None
Completion Depth: 25 Feet	Geologist Kevin Waters			

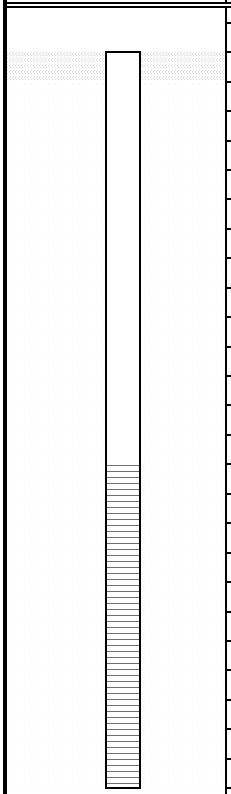
B4 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0				
	to 5	29		0.0	18"- Brick and concrete 11"- Brown coarse-fine sand w/ rock **No fill, Brick to native soil*
	to 10	32		0.0	32"- Brown coarse-fine sand Rock at 7-8"
	to 15	38		0.0	38"- Brown coarse-fine sand
	to 20	27		0.0	27"- Brown coarse-fine sand
	to 25	35		200.0	17"-Brown sand, Water at 17" 18"- Dark brown sand **Retained soil sample B4(22-24')*

Geologic Boring Log Details

ENVIRONMENTAL BUSINESS CONSULTANTS

B1 Boring Log

Location: Northwest corner of the site currently used as paved parking space.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1825 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	33 ft amsl
Drilling Company: C^2 Environmental	Method: Geoprobe		22.5 Feet	Well Specifications
Date Started: 4/22/2015	Date Completed: 4/22/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Robert Bennett			

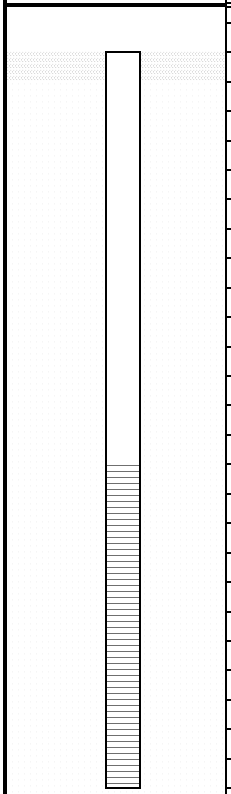
B1 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0 to 5	30"		ND*	0-15" - FILL - Black/brown sandy gravelly silt with asphalt fragments (no odor) 15-30" - Brown F-M sand (no odor) **Retained soil sample B1(0-2')*
	5 to 10	40"		ND*	0-40" - Brown F-M sand (no odor)
	10 to 15	35"		ND*	0-35" - Brown gravelly F-M sand (no odor)
	15 to 20	38"		ND*	0-38" - Brown F-M sand with trace amounts of gravel (no odor)
	20 to 25	40"		ND*	0-30" - Brown F-M sand with trace amounts of gravel (no odor) 30-40" - Wet, gray stained F-M sand with a strong suspect odor **Retained soil sample B1(23-25')*

Geologic Boring Log Details

ENVIRONMENTAL BUSINESS CONSULTANTS

B2 Boring Log

Location: North side of the site currently used as paved parking space			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1825 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	33 Feet amsl
Drilling Company: C^2 Environmental	Method: Geoprobe		23 Feet	Well Specifications
Date Started: 4/22/2015	Date Completed: 4/22/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Robert Bennett			

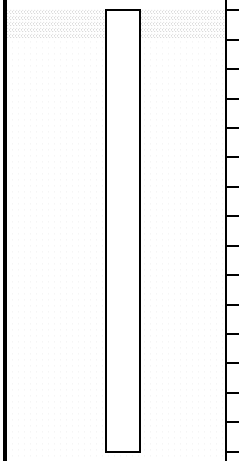
B2 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0 to 5	24"		ND*	0-12" - FILL - Brown silt with asphalt fragments and compacted ash (no odor) 12-24" - Brown gravelly F-M sand (no odor) **Retained soil sample B2 (0-2')*
	5 to 10	36"		ND*	0-36" - Brown F-M sand with trace amount of gravel (no odor)
	10 to 15	30"		ND*	0-30" - Brown F-M sand with trace amount of gravel (no odor)
	15 to 20	38"		ND*	0-38" - Brown F-M sand with trace amount of gravel (no odor)
	20 to 25	30"		ND*	0-15" - Brown F-M sand with trace amount of gravel (no odor) 15-30" - Wet, gray stained F-M sand with a strong suspect odor **Retained soil sample B2 (23-25)*

Geologic Boring Log Details

ENVIRONMENTAL BUSINESS CONSULTANTS

B3 Boring Log

Location: Northeast corner of the site currently used as paved parking space			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1825 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	35 Feet amsl
Drilling Company: C^2 Environmental	Method: Geoprobe		Not Detected	Well Specifications
Date Started: 4/22/2015	Date Completed: 4/22/2015			1" PVC
Completion Depth: 15 Feet	Geologist: Robert Bennett			

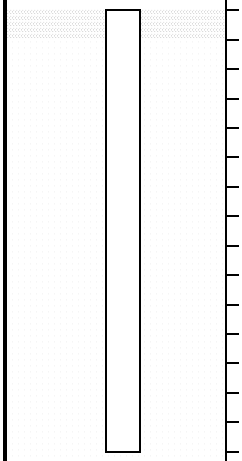
B3 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0				
	to	24"		ND*	0-6" - crushed asphalt (paving material) 6-24" - FILL - Dark brown silty/gravelly F-C sand with crushed asphalt and compacted ash (no odor) **Retained soil sample B3 (0-2')*
	5				
	to	42"		ND*	0-42" - Brown F-M sandy silt (no odor)
	10				
	to	35"		ND*	0-35" - Brown gravelly M-C sand (no odor) **Retained soil sample B3 (13-15')*
	15				

Geologic Boring Log Details

ENVIRONMENTAL BUSINESS CONSULTANTS

B4 Boring Log

Location: Southeast corner of the site currently used as paved parking space			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1825 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	34 Feet amsl
Drilling Company: C^2 Environmental	Method: Geoprobe		Not Detected	Well Specifications
Date Started: 4/22/2015	Date Completed: 4/22/2015			1" PVC
Completion Depth: 15 Feet	Geologist: Robert Bennett			

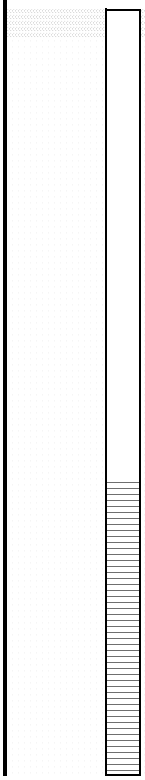
B4 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0				
	to 5	35"		ND*	0-6" FILL - Black/brown F-M sand with asphalt fragments and compacted ash (no odor) 6-35" Brown F-M sand (no odor) **Retained soil sample B4 (0-2')*
	to 10	40"		ND*	0-40"- Brown gravelly F-M sand (no odor)
	to 15	32"		ND*	0-32" - Brown gravelly F-M sand (no odor) **Retained soil sample B4 (13-15')*

Geologic Boring Log Details

ENVIRONMENTAL BUSINESS CONSULTANTS

B5 Boring Log

Location: Middle of the south side of the site currently used as paved parking space			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1825 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	34 Feet amsl
Drilling Company: C^2 Environmental	Method: Geoprobe		Not Detected	Well Specifications
Date Started: 4/22/2015	Date Completed: 4/22/2015			1" PVC
Completion Depth: 15 Feet	Geologist: Robert Bennett			

B5 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0 to 5	40"		ND*	0-6" - FILL - Black/brown silty gravelly sand with asphalt fragments and compacted ash (no odor) 6-25" - Brown silt (no odor) 25-40" - Brown gravelly silty F-M sand (no odor) **Retained soil sample B5 (0-2')*
	5 to 10	35"		ND*	0-35" - Brown F-M sand (no odor)
	10 to 15	20"		ND*	0-18" - Brown F-M sand (no odor) 18-20" - Sandy gravel with crushed rock (no odor) **Retained soil sample B5 (13-15')*
	15 to 20	NA		ND*	
	20 to 25	NA		ND*	

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B1 Boring Log

Location: Located immediately south of the fueling station.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		23'	Well Specifications
Date Started: 11/9/2015	Date Completed: 11/9/2015			1" PVC
Completion Depth: 30 Feet	Geologist: Greg Swirson			

15B1 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0				
	to 5	32		0.0	3" - Asphalt 3" - Brown sand 13" - Brown clay 13" - Brown sand
	to 10	32		0.0	32" - Brown sand
	to 15	31		0.0	31" - Brown sand
	to 20	31		0.0	31" - Brown sand
	to 25	29		1,756	17" - Brown sand 12" - Stained wet black sand, petroleum odor **Retained soil sample 15B1(23-25')*
	to 30	0		0.0	No recovery

Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B2 Boring Log

Location: Located on the west side of the UST on the exterior of the auto repair shop.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		23 Feet	Well Specifications
Date Started: 11/9/2015	Date Completed: 11/9/2015			1" PVC
Completion Depth: 35 Feet	Geologist: Greg Swirson			

15B2 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0				
	to 5	30		0.0	5" - Brown silt with brick 7" - Brown silt 18" - Brown clay and silt **Retained soil sample 15B2 (0-2')*
	to 10	30		0.0	30" - Brown sand
	to 15	28		0.0	28" - Brown sand
	to 20	28		0.0	28" - Brown sand
	to 25	27		722.3	25" - Brown sand 2" - Black stained sand, petroleum odor
	to 30	35		1,146	15" - Black stained sand, petroleum odor 20" - Brown sand, petroleum odor **Retained soil sample B2 (23-25)*
	to 35	0			No recovery

Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B3 Boring Log

Location: Located on the north side of the UST on the exterior of the auto repair shop.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		Not Detected	Well Specifications
Date Started: 11/10/2015	Date Completed: 11/9/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Greg Swirson			

15B3 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0				
	to 5	32		0.0	2" - Concrete 7" - Brown silt with brick 10" - Brown clay 13" - Brown sand
	to 10	20		0.0	20" - Brown sand
	to 15	35		0.0	35" - Brown sand
	to 20	29		0.0	29" - Brown sand
	to 25	31		725.4	29" - Brown sand 2" - Black stained sand, petroluem odor **Refusal at 25'* **Retained soil sample 15B3 (23-25')*

Notes:

F-M = fine to medium, in reference to the grain size of sand
F-C = fine to coarse, in reference to the grain size of sand
M-C = medium to course, in reference to the grain size of sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B4 Boring Log

Location: Located on the east side of the UST on the exterior of the auto repair shop.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		Not Detected	Well Specifications
Date Started: 11/9/2015	Date Completed: 11/9/2015			1" PVC
Completion Depth: 30 Feet	Geologist: Greg Swirson			

15B4 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0				
	to 5	31		0.0	2" - Concrete 8" - Brown silt with brick 12" - Clay 9" - Brown sand
	to 10	31		0.0	31" - Brown sand
	to 15	27		0.0	27" - Brown sand
	to 20	8		0.0	8" - Brown sand
	to 25	27		584.5	22" - Brown sand 5" - Stained black sand, petroleum odor **Retained soil sample 15B4 (23-25')*
	to 30	0			No recovery

Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B5 Boring Log

Location: Located immediately west of UST located inside the auto repair shop.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		23'	Well Specifications
Date Started: 11/12/2015	Date Completed: 11/12/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Greg Swirson			

15B5 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0 to 4	22		0.0	1" - Concrete 7" - Brown silt 14" - Brown sand
	4 to 8	26		0.0	26" - Brown sand
	8 to 12	30		0.0	16" - Brown sand 14" - Brown sand with rock
	12 to 16	24		0.0	24" - Brown sand
	16 to 20	33		0.0	33" - Brown sand
	20 to 24	26		0.0	26" - Brown sand **Retained soil sample 15B5 (22-24')*

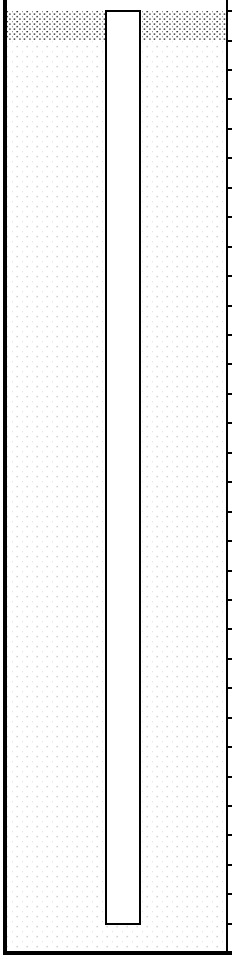
Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B6 Boring Log

Location: Located immediately east of UST located inside the auto repair shop.		Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY	Date / DTW	Ground Elevation
		Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe	23'	Well Specifications
Date Started: 11/12/2015	Date Completed: 11/12/2015		1" PVC
Completion Depth: 25 Feet	Geologist: Greg Swirson		

15B6 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0 to 4	24"		0.0	2" - Concrete 8" - Brown silt 14" - Brown sand
	4 to 8	30"		0.0	30" - Brown sand
	8 to 12	24"		0.0	24" - Brown sand with rock
	12 to 16	16"		0.0	16" - Brown sand
	16 to 20	33"		0.0	33" - Brown sand
	20 to 24	28"		0.0	28" - Brown sand **Retained soil sample 15B6 (22-24')*

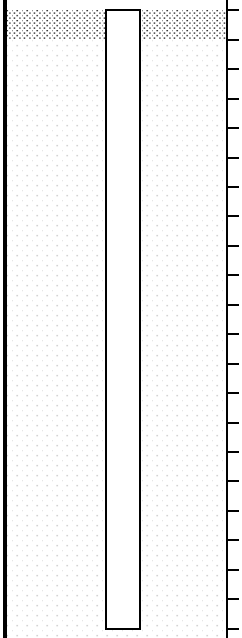
Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

ENVIRONMENTAL BUSINESS CONSULTANTS

15B7 Boring Log

Location: Located southwest of UST located inside the auto repair shop.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		Not Detected	Well Specifications
Date Started: 11/12/2015	Date Completed: 11/12/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Greg Swirson			

15B7 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0 to 4	24		0.0	1" - concrete 7" - Brown silt with fill material 14" - Brown sand **Retained soil sample 15B7 (0-1')*
	4 to 8	28		0.0	28" - Brown sand **Retained soil sample 15B7 (6-8')*
	8 to 12	5		0.0	5" - Brown sand
	12 to 16	28		0.0	14" - Brown sand 14" - Brown silt with rock **Retained soil sample 15B7 (13-15')*

Notes:

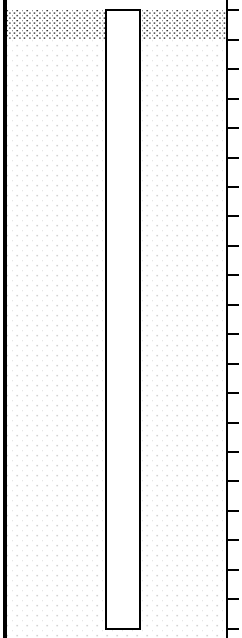
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

ENVIRONMENTAL BUSINESS CONSULTANTS

15B8 Boring Log

Location: Located southeast of UST located inside the auto repair shop.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		Not Detected	Well Specifications
Date Started: 11/12/2015	Date Completed: 11/12/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Greg Swirson			

15B8 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0 to 4	24		0.0	1" - Concrete 8" - Brown silt 15" - Brown sand
	4 to 8	28		0.0	28" - Brown sand
	8 to 12	30		0.0	30" - Brown sand with rock
	12 to 16	30		0.0	30" - Brown sand **Retained soil sample 15B8 (13-15')*

Notes:

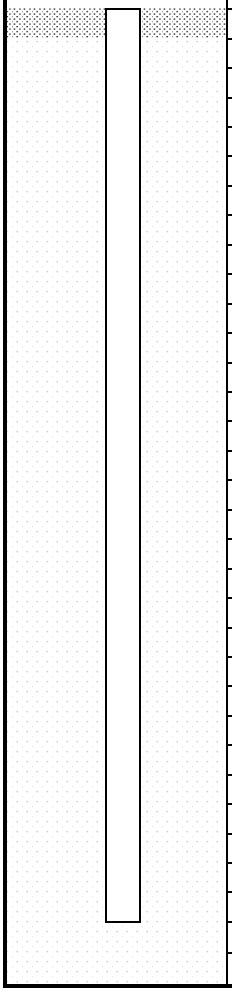
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B9 Boring Log

Location: Located near the northwest corner of the filling station, south of 15B10.		Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY	Date / DTW	Ground Elevation
		Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe	Not Detected	Well Specifications
Date Started: 11/9/2015	Date Completed: 11/9/2015		1" PVC
Completion Depth: 30 Feet	Geologist: Greg Swirson		

15B9 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0 to 5	30		0.0	1" - Asphalt 9" - Brown sand with brick 8" - Clay 12" - Brown sand **Retained soil sample 15B9 (0-1')*
	5 to 10	31		0.0	31" - Brown sand
	10 to 15	32		0.0	32" - Brown sand with rock **Retained soil sample 15B9 (10-12')*
	15 to 20	26		0	26" - Brown sand
	20 to 25	33		1246	25" - Brown sand 8" - Stained black sand, petroleum odor **Retained soil sample 15B9 (23-25')*
	25 to 30	32		17.2	13" - Stained gray sand 19" - Brown sand

Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B10 Boring Log

Location: Located in the northwest corner of the site.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		23	Well Specifications
Date Started: 11/9/2015	Date Completed: 11/9/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Greg Swirson			

15B10 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0 to 5	32		0.0	3"- Asphalt 6" - Brown sand with brick 8" - Brown clay 15" - Brown sand **Retained soil sample 15B10 (2-3')*
	5 to 10	32		0.0	32" - Brown sand
	10 to 15	31		0.0	31" - Brown sand **Retained soil sample 15B10 (10-12')*
	15 to 20	29		0.0	29" - Brown sand
	20 to 25	30		717.4	25" - Brown sand 5" - Stained black sand, petroleum odor **Retained soil sample 15B10 (23-25')*

Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B11 Boring Log

Location: Located on the north edge of the lot, midway between 15B10 and 15B12.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		24'	Well Specifications
Date Started: 11/9/2015	Date Completed: 11/9/2015			1" PVC
Completion Depth: 30 Feet	Geologist: Greg Swirson			

15B11 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0 to 5	32		0.0	3" - Asphalt 8" - Brown sand 21" - Brown clay **Retained soil sample 15B11 (2-3')*
	5 to 10	30		0.0	30" - Brown sand
	10 to 15	27		0.0	27" - Brown sand **Retained soil sample 15B11 (10-12')*
	15 to 20	20		0.0	20" - Brown sand
	20 to 25	38		1,039	32" - Brown sand 6" - Stained lack sand, petroleum odor **Retained soil sample 15B11 (23-25')*
	25 to 30	28		173.2	3" - Black stained sand, petroleum odor 25" - Brown sand, slight odor

Notes:

F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B12 Boring Log

Location: Located in the northeast corner of the Site.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		Not Detected	Well Specifications
Date Started: 11/9/2015	Date Completed: 11/9/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Greg Swirson			

15B12 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0 to 5	30		0.0	2: - Concrete 8" - Dark brown silt 20" - Brown silty sand **Retained soil sample 15B12 (0-1')*
	5 to 10	33		0.0	33" - Brown sand
	10 to 15	28		0.0	28" - Brown sand with rock **Retained soil sample 15B12 (10-12')*
	15 to 20	26		0.0	26" - Brown sand
	20 to 25	30		0.0	30" - Brown sand **Retained soil sample 15B12 (23-25')*

Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B13 Boring Log

Location: Located south of the auto repair building, near the southwest corner of the northern lot.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		23'	Well Specifications
Date Started: 11/9/2015	Date Completed: 11/9/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Greg Swirson			

15B13 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0 to 5	32		0.0	2" - Concrete 9" - Brown silt with brick 11" - Brown silt and clay 10" - Brown sand **Retained soil sample 15B13 (0-1')*
	5 to 10	38		0.0	38" - Brown sand
	10 to 15	30		0.0	30" - Brown sand **Retained soil sample 15B13 (10-12')*
	15 to 20	27		0.0	27" - Brown sand
	20 to 25	30		0.0	20" - Brown sand 8" - Wet brown sand 2" - Stained gray sand **Retained soil sample 15B13 (23-25')*

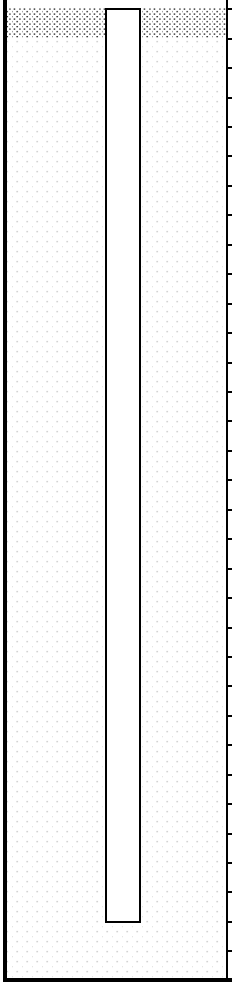
Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B14 Boring Log

Location: Located on the west side of the south lot.		Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY	Date / DTW	Ground Elevation
		Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe	Not Detected	Well Specifications
Date Started: 11/6/2015	Date Completed: 11/6/2015		1" PVC
Completion Depth: 30 Feet	Geologist: Greg Swirson		

15B14 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0 to 5	35		0.0	10" - Brown silt with fill material 12" - Brown clay 13" - Brown sand **Retained soil sample 15B14 (0-1')*
	5 to 10	37		0.0	37" - Brown sand
	10 to 15	33		0.0	22"- Brown sand with pebbles 11" - Sand and rock **Retained soil sample 15B14 (10-12')*
	15 to 20	27		0.0	27" - Brown sand
	20 to 25	33		175.2	20" - Brown sand 6" - Wet brown sand 4" - Stained black sand 3" - Brown sand **Retained soil sample 15B14 (23-25')*
	25 to 30	33		0.0	33" - Wet brown sand

Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B15 Boring Log

Location: Located on the north side of the south lot, 50' from the west site boundary.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		23	Well Specifications
Date Started: 11/6/2015	Date Completed: 11/6/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Greg Swirson			

15B15 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0 to 5	26		0.0	3' - Asphalt 5" - Clay 18" - Brown sand with pebbles **Retained soil sample 15B15 (2-3')*
	5 to 10	35		0.0	35" - Brown sand
	10 to 15	30		0.0	30" - Brown sand with rock **Retained soil sample 15B15 (10-12')*
	15 to 20	35		0.0	35" - Brown sand
	20 to 25	29		572.3	13" - Brown sand 6" - Wet brown sand 10" - Stained black sand, petroleum odor

Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B16 Boring Log

Location: Located on the south edge of the south lot, between 15B14 and 15B19			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		Not Detected	Well Specifications
Date Started: 11/6/2015	Date Completed: 11/6/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Greg Swirson			

15B16 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0 to 5	27		0.0	3" - Asphalt 8" - Brown silt 16" - Brown silty sand **Retained soil sample 15B16 (2-3')*
	5 to 10	35		0.0	35" - Brown sand
	10 to 15	26		0.0	16" - Brown sand 10" - Brown sand with rock **Retained soil sample 15B16 (10-12')*
	15 to 20	33		0.0	33" - Brown sand
	20 to 25	27		1,267	12" - Brown sand 7" - Wet brown sand 8" - Black stained sand, petroleum odor **Retained soil sample 15B16 (23-25')*

Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B17 Boring Log

Location: Located toward the southwest area of the auto repair shop and the southeast area of the pumping station.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		23'	Well Specifications
Date Started: 11/6/2015	Date Completed: 11/6/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Greg Swirson			

15B17 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0 to 5	30		0.0	2" - Concrete 12" - Brown clay 16" - Brown sand **Retained soil sample 15B17 (0-1')*
	5 to 10	36		0.0	36" - Brown sand
	10 to 15	28		0.0	28" - Brown sand **Retained soil sample 15B17 (10-12')*
	15 to 20	24		0.0	24" - Brown sand
	20 to 25	33		1,324	23" - Brown sand 10" - Black stained sand, petroleum odor **Retained soil sample 15B17 (23-25')*

Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

15B18 Boring Log

Location: Located on the south lot, northwest of 15B16.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		Not Detected	Well Specifications
Date Started: 11/6/2015	Date Completed: 11/6/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Greg Swirson			

15B18 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0 to 5	34		0.0	2" - Asphalt 4" - Brick 13" - Brown clay 15" - Brown sand **Retained soil sample 15B18 (2-3')*
	5 to 10	38		0.0	38" - Brown sand
	10 to 15	17		0.0	17" - Brown sand **Retained soil sample 15B18 (10-12')*
	15 to 20	34		0.0	34" - Brown sand
	20 to 25	33		435.0	21" - Brown sand 12" - Black stained sand, petroleum odor **Retained soil sample 15B18 (23-25')*

Notes:
F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

Geologic Boring Log Details

ENVIRONMENTAL BUSINESS CONSULTANTS

15B19 Boring Log

Location: Located in the southwest corner of the Site.			Depth to Water (ft. from grade.)	Site Elevation Datum
Site Name: ROC1502	Address: 1815 Ocean Avenue, Brooklyn, NY		Date / DTW	Ground Elevation
			Groundwater depth	
Drilling Company: C^2 Environmental	Method: Geoprobe		Not Detected	Well Specifications
Date Started: 11/6/2015	Date Completed: 11/6/2015			1" PVC
Completion Depth: 25 Feet	Geologist: Greg Swirson			

15B19 (NTS)	DEPTH (ft below grade)	SAMPLES Recovery (in.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0 to 5	40		0.0	12" - concrete 8" - Brown clay 20" - Brown sand **Retained soil sample 15B19 (0-2')*
	5 to 10	36		0.0	36" - Brown sand
	10 to 15	29		0.0	29" - Brown sand and rocks **Retained soil sample 15B19 (13-15')*
	15 to 20	8		0.0	8" - Brown sand
	20 to 25	8		0.0	8" - Brown sand

Notes:

F-M = fine to medium, in reference to the grain size of a sand
amsl = above mean sea level
ppm = parts per million
ND* = PID was malfunctioning during this investigation and accurate readings could not be determined

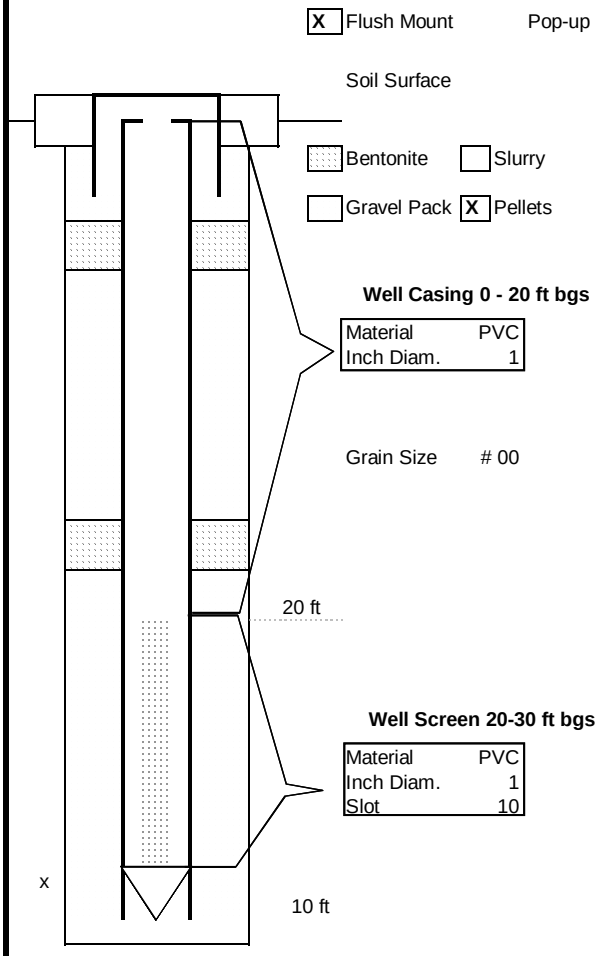
ATTACHMENT D
Well Construction Logs
Injection, SVE & Monitoring

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG

17MW1

ENVIRONMENTAL BUSINESS CONSULTANTS



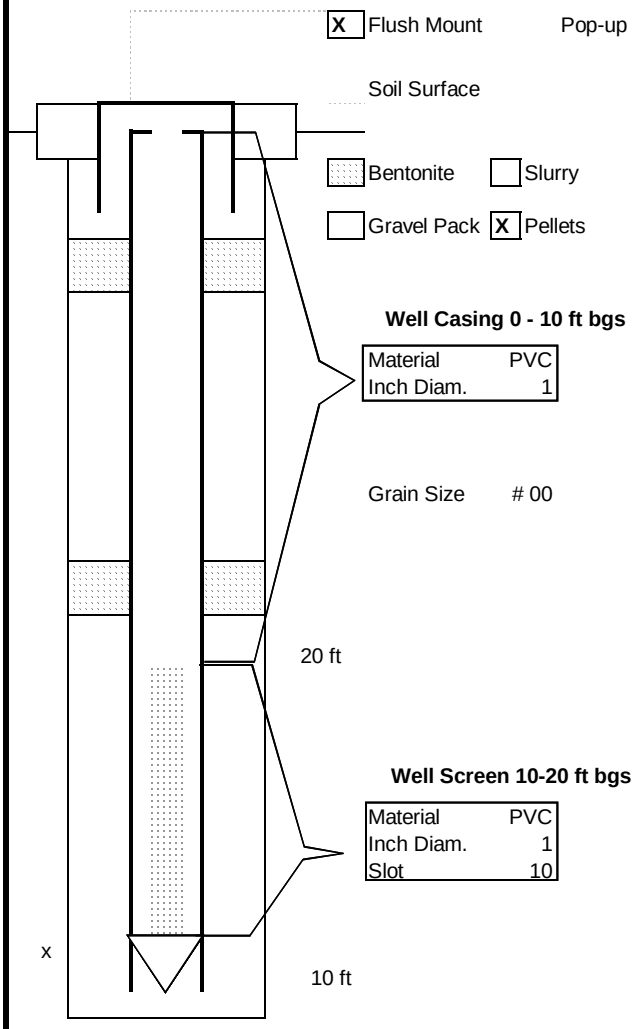
Note: Drawing is not to scale.
Depths are given in feet below land surface.

Monitoring Well No.:	17MW1
Project:	Former Tomat Service Station
	1815 Ocean Ave,Brooklyn,NY
Depth to Groundwater:	22.5ft Date: 11/10/2017
Installation Depth:	30 ft
Survey Point Elevation:	N/A
Installation Date:	November 10, 2017
Drilling Contractor:	C2 Environmental
Installation Method:	Geoprobe - Hollow Stem Auger
Water Removed During Development:	N/A
Hydrogeologist:	Honpong Lau
Company Name:	EBC

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG

17MW2



Note: Drawing is not to scale.
Depths are given in feet below land surface.

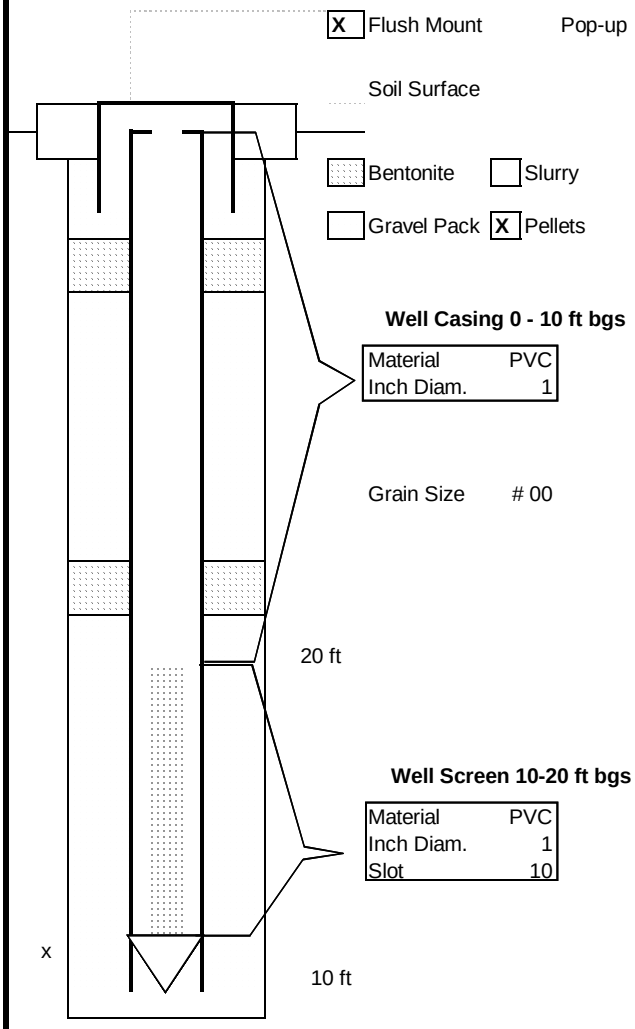
Monitoring Well No.:	17MW2
Project:	Former Tomat Service Station
	1815 Ocean Ave,Brooklyn,NY
Depth to Groundwater:	10.97ft Date: 9/1/2017
Installation Depth:	20 ft
Survey Point Elevation:	N/A
Installation Date:	September 1, 2017
Drilling Contractor:	C2 Environmental
Installation Method:	Geoprobe - Hollow Stem Auger
Water Removed During Development:	N/A
Hydrogeologist:	Honpong Lau
Company Name:	EBC

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG

17MW3

ENVIRONMENTAL BUSINESS CONSULTANTS



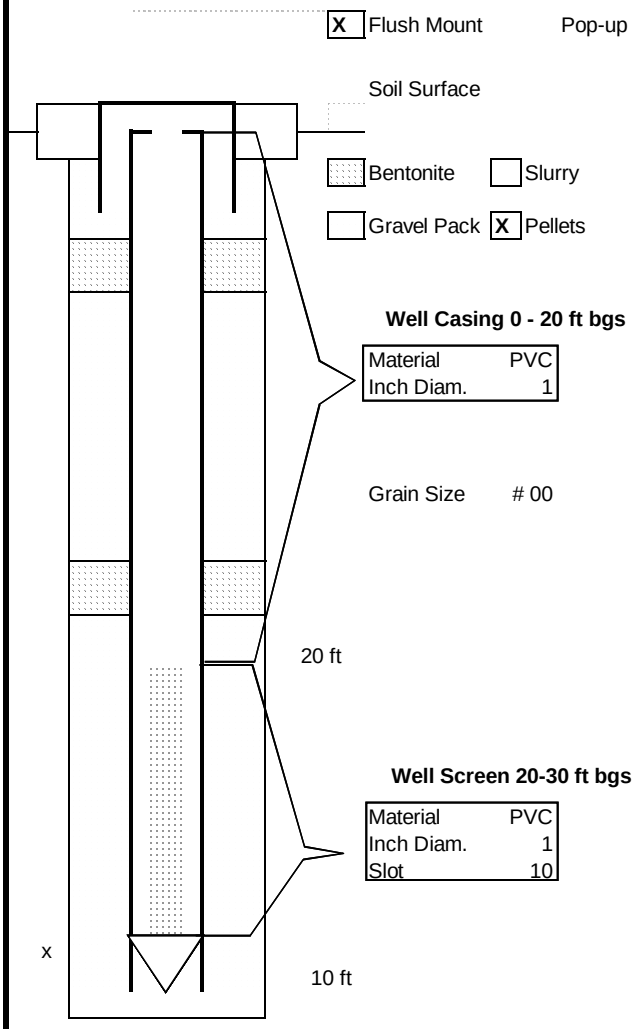
Note: Drawing is not to scale.
Depths are given in feet below land surface.

Monitoring Well No.:	17MW3
Project:	Former Tomat Service Station
	1815 Ocean Ave,Brooklyn,NY
Depth to Groundwater:	10.86ft Date: 9/1/2017
Installation Depth:	20 ft
Survey Point Elevation:	N/A
Installation Date:	September 1, 2017
Drilling Contractor:	C2 Environmental
Installation Method:	Geoprobe - Hollow Stem Auger
Water Removed During Development:	N/A
Hydrogeologist:	Honpong Lau
Company Name:	EBC

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG

17MW4



Note: Drawing is not to scale.
Depths are given in feet below land surface.

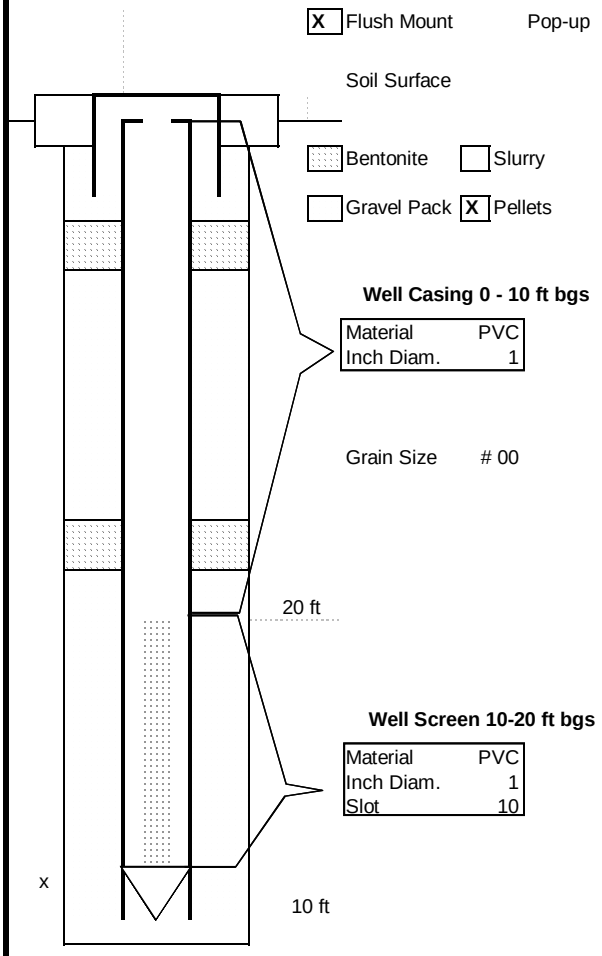
Monitoring Well No.:	17MW4
Project:	Former Tomat Service Station
	1815 Ocean Ave,Brooklyn,NY
Depth to Groundwater:	22ft Date: 10/16/2017
Installation Depth:	30 ft
Survey Point Elevation:	N/A
Installation Date:	October 16, 2017
Drilling Contractor:	C2 Environmental
Installation Method:	Geoprobe - Hollow Stem Auger
Water Removed During Development:	N/A
Hydrogeologist:	Honpong Lau
Company Name:	EBC

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG

17MW5

ENVIRONMENTAL BUSINESS CONSULTANTS



Note: Drawing is not to scale.
Depths are given in feet below land surface.

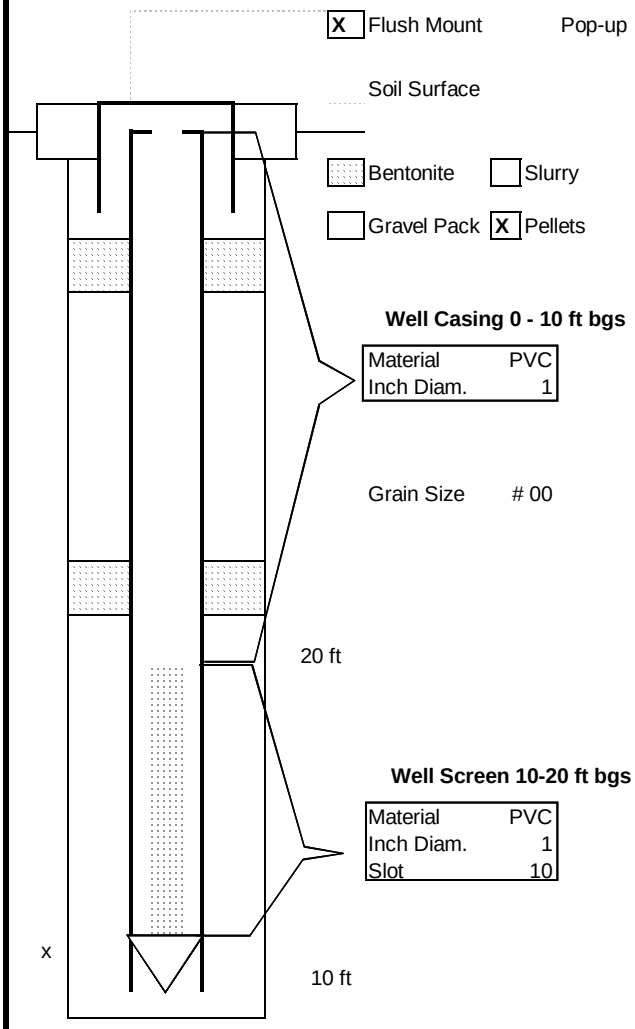
Monitoring Well No.:	17MW5
Project:	Former Tomat Service Station
	1815 Ocean Ave,Brooklyn,NY
Depth to Groundwater:	10.97ft Date: 9/1/2017
Installation Depth:	20 ft
Survey Point Elevation:	N/A
Installation Date:	September 1, 2017
Drilling Contractor:	C2 Environmental
Installation Method:	Geoprobe - Hollow Stem Auger
Water Removed During Development:	N/A
Hydrogeologist:	Honpong Lau
Company Name:	EBC

GROUNDWATER MONITORING WELL

CONSTRUCTION LOG

17MW6

ENVIRONMENTAL BUSINESS CONSULTANTS



Note: Drawing is not to scale.
Depths are given in feet below land surface.

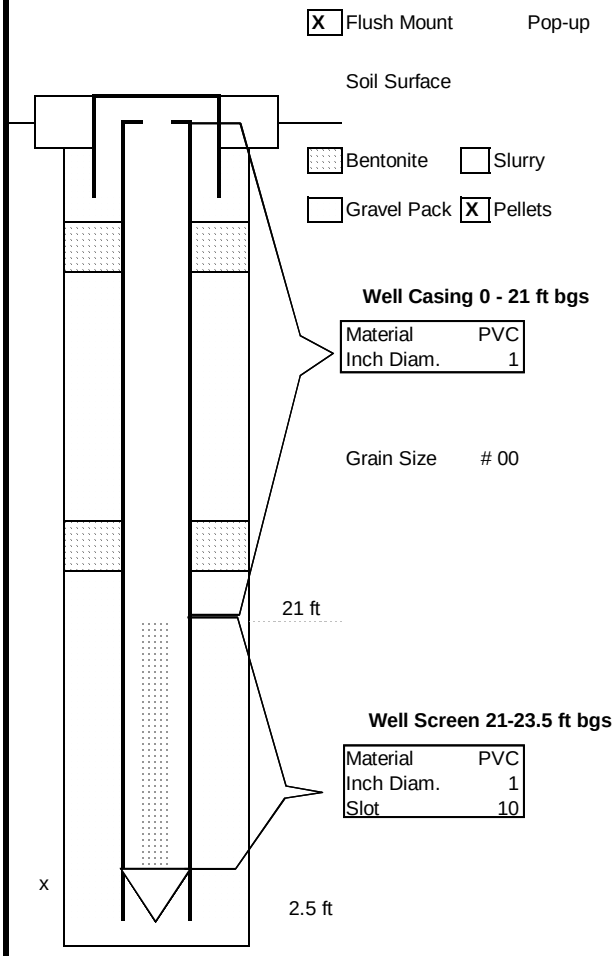
Monitoring Well No.:	17MW6
Project:	Former Tomat Service Station
	1815 Ocean Ave,Brooklyn,NY
Depth to Groundwater:	10.79ft Date: 9/1/2017
Installation Depth:	20 ft
Survey Point Elevation:	N/A
Installation Date:	September 1, 2017
Drilling Contractor:	C2 Environmental
Installation Method:	Geoprobe - Hollow Stem Auger
Water Removed During Development:	N/A
Hydrogeologist:	Honpong Lau
Company Name:	EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

AIR SPARGING WELL

CONSTRUCTION LOG

AS1



Note: Drawing is not to scale.
Depths are given in feet below land surface.

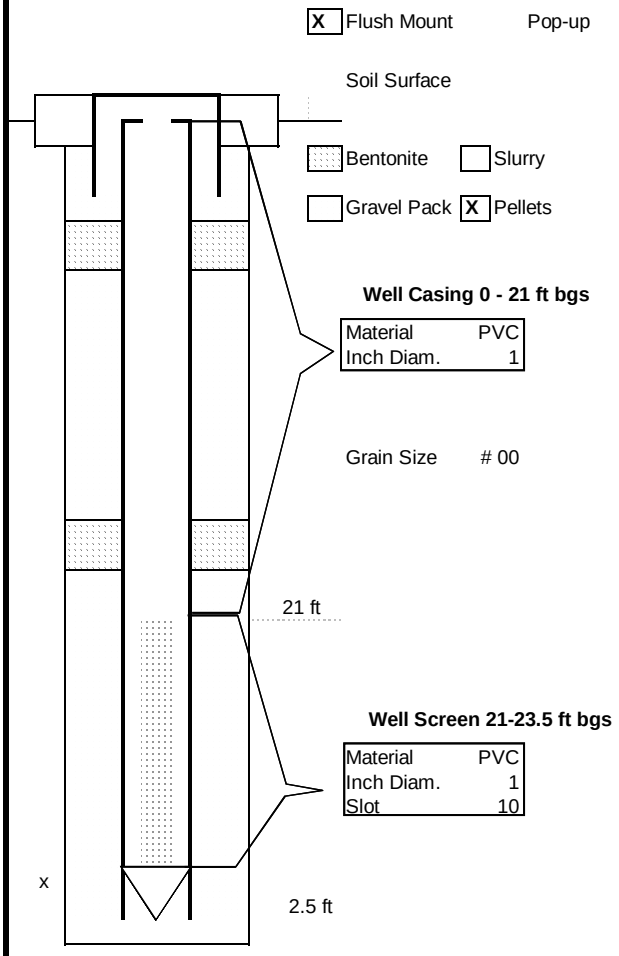
Monitoring Well No.:	AS1
Project:	Former Tomat Service Station
	1815 Ocean Ave,Brooklyn,NY
Depth to Groundwater:	10.8 ft Date: 9/1/2017
Installation Depth:	23.5 ft
Survey Point Elevation:	N/A
Installation Date:	September 1, 2017
Drilling Contractor:	C2 Environmental
Installation Method:	Geoprobe - Hollow Stem Auger
Water Removed During Development:	N/A
Hydrogeologist:	Honpong Lau
Company Name:	EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

AIR SPARGING WELL

CONSTRUCTION LOG

AS2



Note: Drawing is not to scale.
Depths are given in feet below land surface.

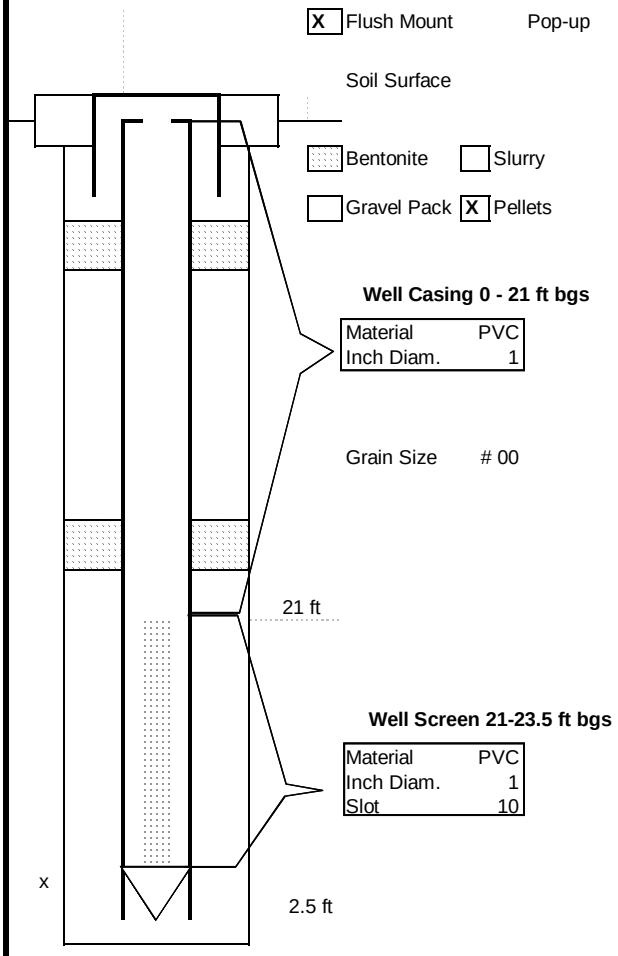
Monitoring Well No.:	AS2		
Project:	Former Tomat Service Station		
	1815 Ocean Ave,Brooklyn,NY		
Depth to Groundwater:	10.8 ft	Date:	9/5/2017
Installation Depth:	23.5 ft		
Survey Point Elevation:	N/A		
Installation Date:	September 5, 2017		
Drilling Contractor:	C2 Environmental		
Installation Method:	Geoprobe - Hollow Stem Auger		
Water Removed During Development:	N/A		
Hydrogeologist:	Jeremy Rosenberg		
Company Name:	EBC		

ENVIRONMENTAL BUSINESS CONSULTANTS

AIR SPARGING WELL

CONSTRUCTION LOG

AS3



Note: Drawing is not to scale.
Depths are given in feet below land surface.

Monitoring Well No.: AS3

Project: Former Tomat Service Station

1815 Ocean Ave,Brooklyn,NY

Depth to Groundwater: 10.78 ft Date: 9/1/2017

Installation Depth: 23.5 ft

Survey Point Elevation: N/A

Installation Date: September 1, 2017

Drilling Contractor: C2 Environmental

Installation Method: Geoprobe - Hollow Stem Auger

Water Removed During Development: N/A

Hydrogeologist: Honpong Lau

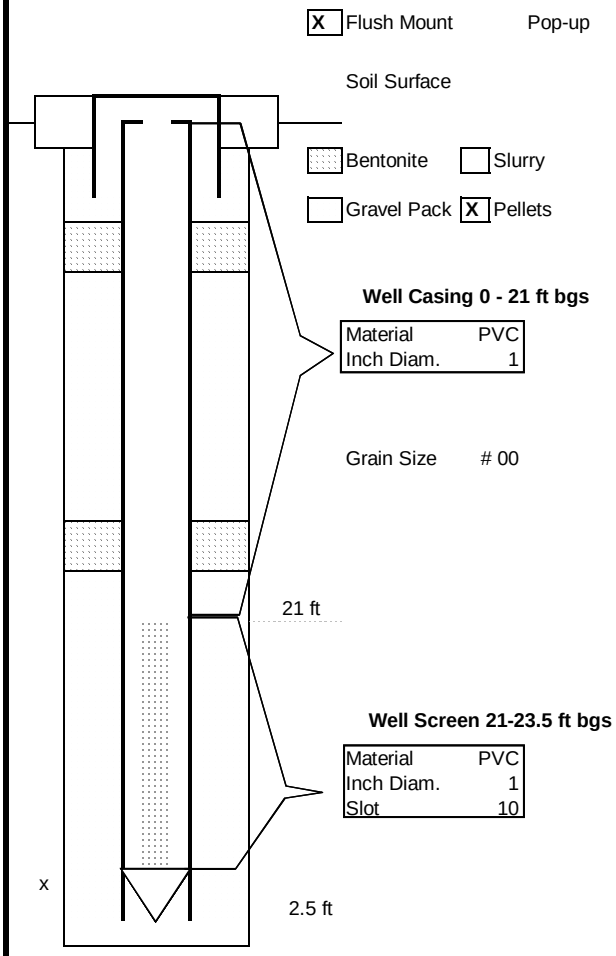
Company Name: EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

AIR SPARGING WELL

CONSTRUCTION LOG

AS4



Note: Drawing is not to scale.
Depths are given in feet below land surface.

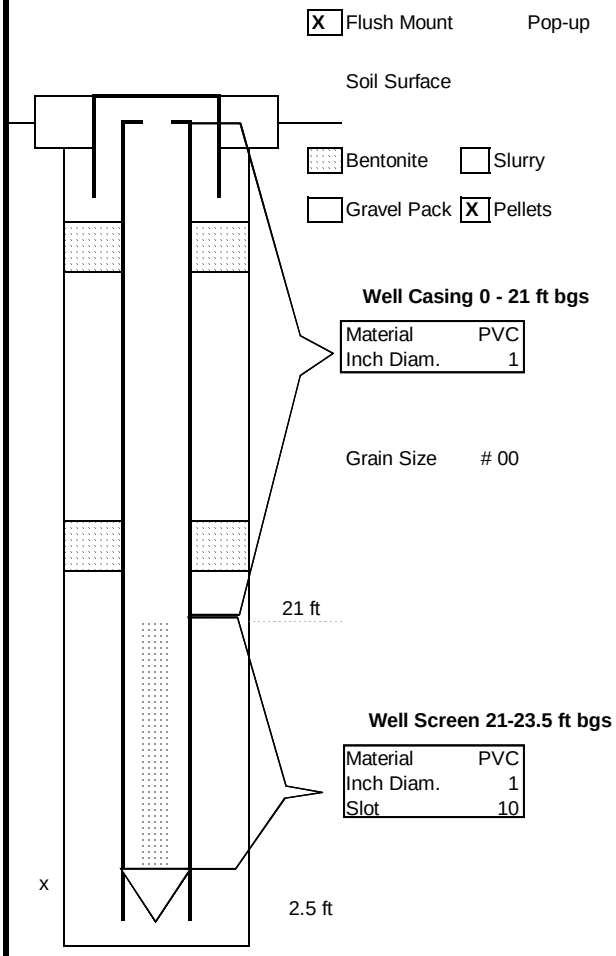
Monitoring Well No.:	AS4		
Project:	Former Tomat Service Station		
	1815 Ocean Ave,Brooklyn,NY		
Depth to Groundwater:	10.81 ft	Date:	9/1/2017
Installation Depth:	23.5 ft		
Survey Point Elevation:	N/A		
Installation Date:	September 1, 2017		
Drilling Contractor:	C2 Environmental		
Installation Method:	Geoprobe - Hollow Stem Auger		
Water Removed During Development:	N/A		
Hydrogeologist:	Honpong Lau		
Company Name:	EBC		

ENVIRONMENTAL BUSINESS CONSULTANTS

AIR SPARGING WELL

CONSTRUCTION LOG

AS5



Note: Drawing is not to scale.
Depths are given in feet below land surface.

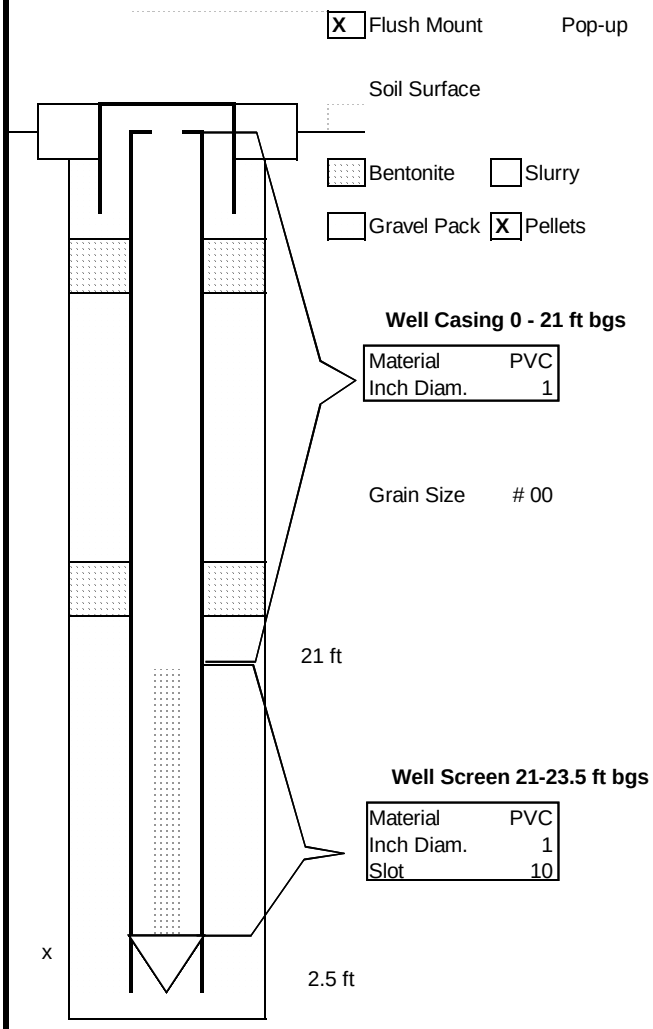
Monitoring Well No.:	AS5
Project:	Former Tomat Service Station
	1815 Ocean Ave,Brooklyn,NY
Depth to Groundwater:	10.84 ft Date: 9/5/2017
Installation Depth:	23.5 ft
Survey Point Elevation:	N/A
Installation Date:	September 5, 2017
Drilling Contractor:	C2 Environmental
Installation Method:	Geoprobe - Hollow Stem Auger
Water Removed During Development:	N/A
Hydrogeologist:	Jeremy Rosenberg
Company Name:	EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

AIR SPARGING WELL

CONSTRUCTION LOG

AS6



Note: Drawing is not to scale.
Depths are given in feet below land surface.

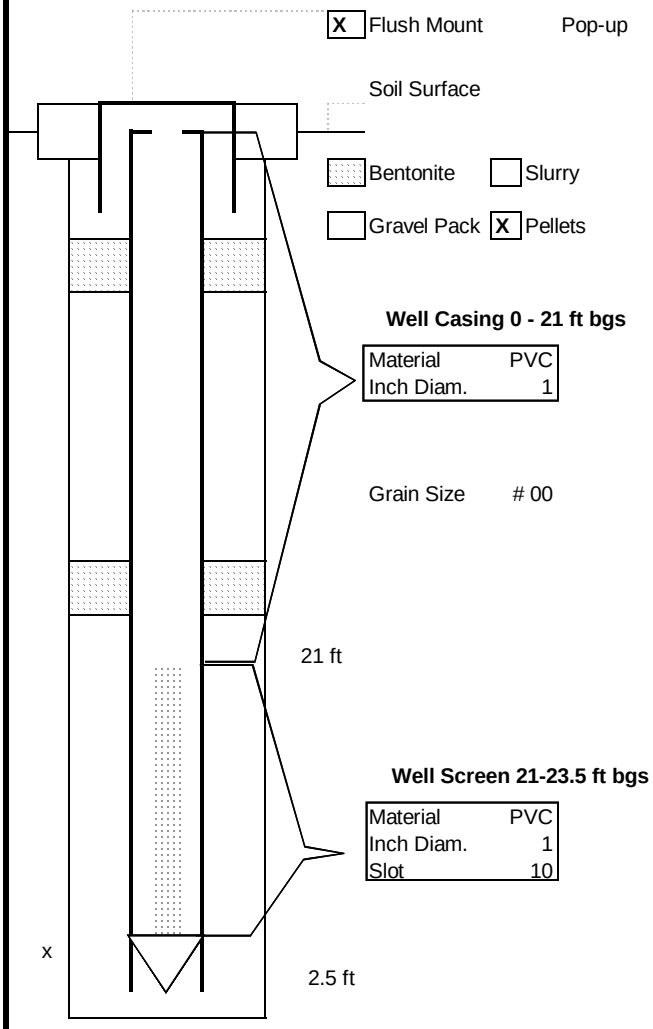
Monitoring Well No.:	AS6
Project:	Former Tomat Service Station
	1815 Ocean Ave,Brooklyn,NY
Depth to Groundwater:	10.76 ft Date: 9/5/2017
Installation Depth:	23.5 ft
Survey Point Elevation:	N/A
Installation Date:	September 5, 2017
Drilling Contractor:	C2 Environmental
Installation Method:	Geoprobe - Hollow Stem Auger
Water Removed During Development:	N/A
Hydrogeologist:	Jeremy Rosenberg
Company Name:	EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

AIR SPARGING WELL

CONSTRUCTION LOG

AS7



Note: Drawing is not to scale.
Depths are given in feet below land surface.

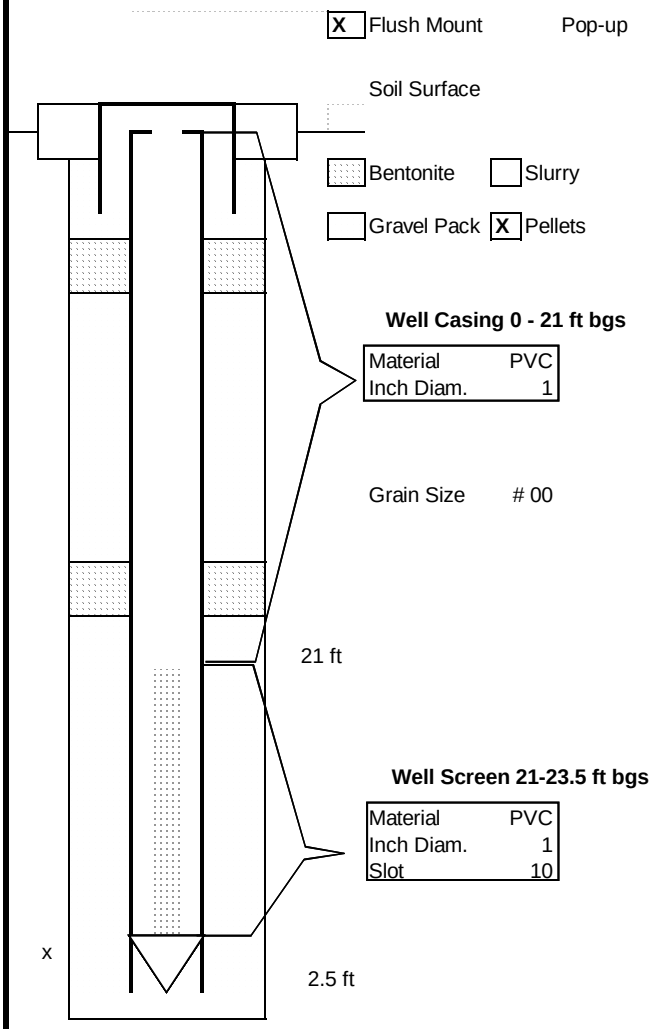
Monitoring Well No.:	AS7
Project:	Former Tomat Service Station
	1815 Ocean Ave,Brooklyn,NY
Depth to Groundwater:	10.81 ft Date: 9/5/2017
Installation Depth:	23.5 ft
Survey Point Elevation:	N/A
Installation Date:	September 5, 2017
Drilling Contractor:	C2 Environmental
Installation Method:	Geoprobe - Hollow Stem Auger
Water Removed During Development:	N/A
Hydrogeologist:	Jeremy Rosenberg
Company Name:	EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

AIR SPARGING WELL

CONSTRUCTION LOG

AS8



Note: Drawing is not to scale.
Depths are given in feet below land surface.

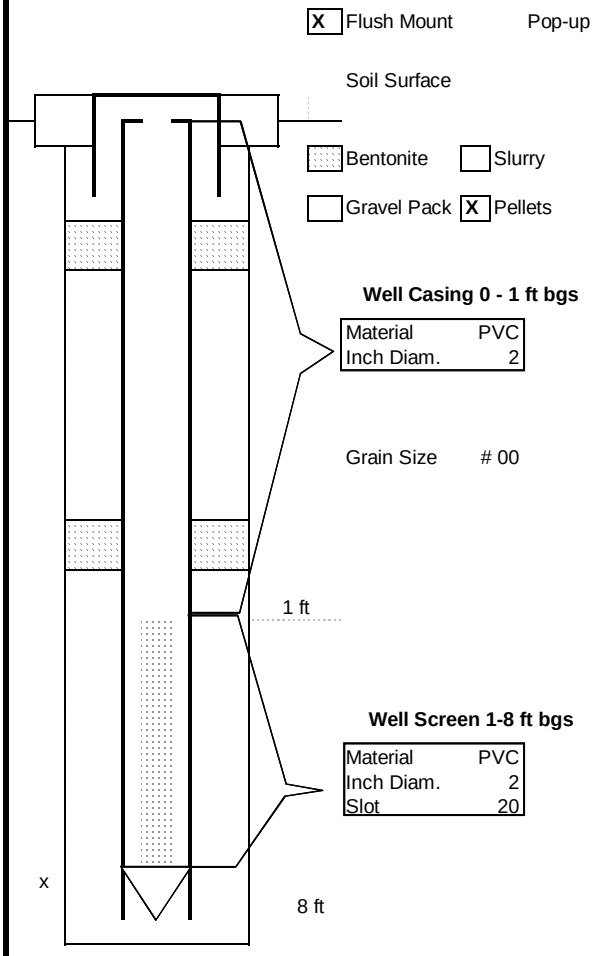
Monitoring Well No.:	AS8
Project:	Former Tomat Service Station
	1815 Ocean Ave,Brooklyn,NY
Depth to Groundwater:	10.81 ft Date: 9/5/2017
Installation Depth:	23.5 ft
Survey Point Elevation:	N/A
Installation Date:	September 5, 2017
Drilling Contractor:	C2 Environmental
Installation Method:	Geoprobe - Hollow Stem Auger
Water Removed During Development:	N/A
Hydrogeologist:	Jeremy Rosenberg
Company Name:	EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

SOIL VAPOR EXTRACTION WELL

CONSTRUCTION LOG

SVE1



Note: Drawing is not to scale.
Depths are given in feet below land surface.

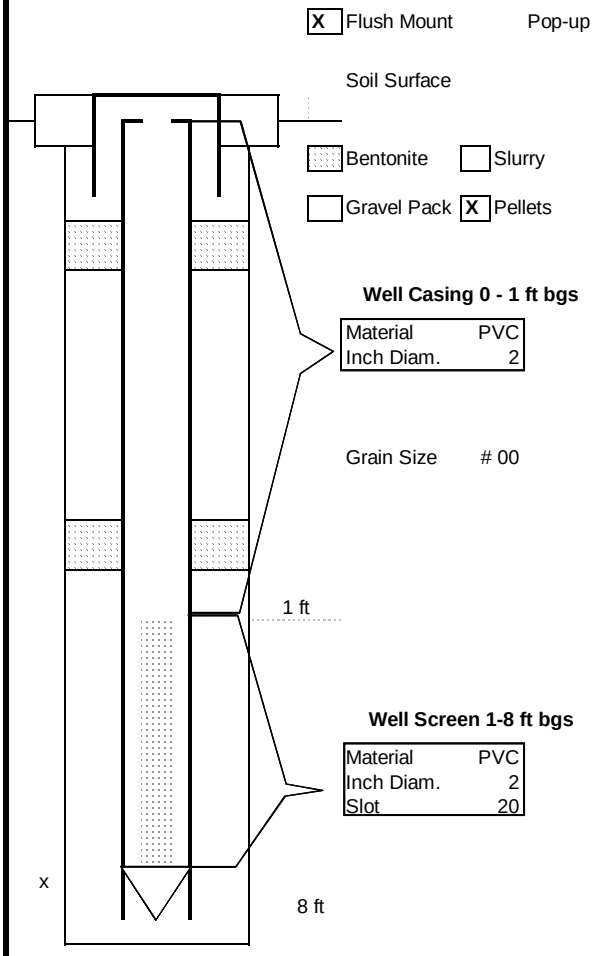
Monitoring Well No.:	SVE1
Project:	Former Tomat Service Station
	1815 Ocean Ave,Brooklyn,NY
Depth to Groundwater:	N/A Date: 9/5/2017
Installation Depth:	9 ft
Survey Point Elevation:	N/A
Installation Date:	September 5, 2017
Drilling Contractor:	C2 Environmental
Installation Method:	Geoprobe - Hollow Stem Auger
Water Removed During Development:	N/A
Hydrogeologist:	Jeremy Rosenberg
Company Name:	EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

SOIL VAPOR EXTRACTION WELL

CONSTRUCTION LOG

SVE2



Note: Drawing is not to scale.
Depths are given in feet below land surface.

Monitoring Well No.:	SVE2
Project:	Former Tomat Service Station
	1815 Ocean Ave,Brooklyn,NY
Depth to Groundwater:	N/A Date: 9/5/2017
Installation Depth:	9 ft
Survey Point Elevation:	N/A
Installation Date:	September 5, 2017
Drilling Contractor:	C2 Environmental
Installation Method:	Geoprobe - Hollow Stem Auger
Water Removed During Development:	N/A
Hydrogeologist:	Jeremy Rosenberg
Company Name:	EBC

ATTACHMENT E
Field Sampling Plan

Tomat Service Station
1815-1825 Ocean Avenue
Brooklyn, New York
Block 7656 Lots 55&58

FIELD SAMPLING PLAN

NYSDEC Site Number: **C224217**

Prepared for:
Ocean Units LLC
1274 49th Street; Suite 443
Brooklyn, NY 11219

Prepared by:

Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961

OCTOBER 2019

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TOMAT SERVICE STATION
FIELD SAMPLING PLAN

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TOMAT SERVICE STATION
FIELD SAMPLING PLAN

List of Acronyms

AS	Air Sparging
ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
CLP	Contract Laboratory Program
COC	Certificate of Completion
CO2	Carbon Dioxide
CP	Commissioner Policy
DER	Division of Environmental Remediation
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
ERP	Environmental Restoration Program
EWP	Excavation Work Plan
GHG	Green House Gas
GWE&T	Groundwater Extraction and Treatment
HASP	Health and Safety Plan
IC	Institutional Control
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PID	Photoionization Detector
PRP	Potentially Responsible Party
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act

RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Remedial Party
RSO	Remedial System Optimization
SAC	State Assistance Contract
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SOP	Standard Operating Procedures
SOW	Statement of Work
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program

1.0 INTRODUCTION

1.1 General

This Field Sampling Plan is a part of the Site Management Plan for the Tomat Service Station Site located at 1815-1825 Ocean Avenue, Brooklyn, New York (hereinafter referred to as the "Site").

Ocean Units LLC (the Volunteer) entered into a Brownfield Cleanup Agreement with the New York State Department of Environmental Conservation (NYSDEC) on June 29, 2015 to remediate a 0.38-acre parcel located in Brooklyn, Kings County, New York (Site No. C224217). The Site was remediated to Restricted Residential Use and will be used for restricted residential use.

The Site is located in at 1815 -1825 Ocean Avenue, in Brooklyn, Kings County, New York and is identified as Block 7656 and Lots 55 and 58 on the Brooklyn Tax Map. The Site is an approximately 0.38-acre area located on the east side of Ocean Avenue. The Site is bounded by a multi-family residential apartment building (Block 7656, Lot 42 – 1801 Ocean Avenue) to the north, a multi-family residential apartment building (Block 7656, Lot 61 – 1833 Ocean Avenue) to the south, multiple multi-family residential buildings (Block 7656, Lots 13, 14, 17, 19 and 21 – 1452-1466 East 21st Street Avenue) to the east and Ocean Avenue to the west.

After completion of the remedial work, some contamination was left at this site, which is hereafter referred to as "remaining contamination". The Site will be limited to Restricted Residential Use, groundwater use is prohibited, and future excavation will be handled as per the SMP. A air sparge soil vapor extraction system has been installed to control exposure to remaining contamination to ensure protection of public health and the environment. This Field Sampling Plan (FSP) outlines the necessary methods to monitor the installed AS/SVE system and the groundwater conditions. This plan provides information on:

- Sampling locations, protocol and frequency;

- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

2.0 SUMMARY OF REMEDIAL ACTIONS

2.1 Remedial Actions Taken

The former underground gasoline tanks have been removed, and petroleum contaminated soil has been excavated from the source area to a depth of approximately 12 feet below grade. The east of the Site was excavated to a depth of approximately 1 foot below grade and the west side of the site was excavated to a depth of 12 feet.

Following Site excavation, six monitoring wells, two soil vapor extraction (SVE) wells and eight air sparge wells were installed.

The SVE extraction well was installed on September 5, 2017 by C-Squared Environmental Corporation under EBC oversight. AMC Engineering (AMC) completed a start-up test of the AS/SVE system on 12/18/17, to verify the adequacy of the AS/SVE design. The system began operation on 12/18/17. The SVE system consists of two (2) extraction wells with 8-feet of 2-inch diameter, 0.02-inch slotted pvc well screen with approximately 1-foot of 2-inch diameter PVC riser. A 5 HP regenerative blower (Rotron EN707) connects the extraction wells to two, 85-gallon GAC drums arranged in series. The AS system consists of eight (8) air sparging points, arranged in two legs, constructed of 2.5 feet of 1-inch diameter, 0.02-inch slotted pvc well screen with approximately 21 feet of 1-inch diameter pvc riser. A 3 HP rotary lobe blower (Roots URAI 32) connects the air sparging wells.

Six monitoring wells were installed on August 31, 2017, September 1, 2017 and October 16, 2017 by C-Squared Environmental Corporation under EBC oversight. Quarterly groundwater samples have obtained from the monitoring wells to assess the effectiveness of the treatment process.

2.2 Remedial Action Objectives

The Remedial Action Work Plan identified the following Remedial Action Objectives (RAOs):

2.2.1 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater, surface water, or sediment contamination.

2.2.2 Soil Vapor

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at the site.

2.2.3 Groundwater

RAOs for Public Health Protection

- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.
- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable (if found to be related to an on-site release).
- Remove the source of ground or surface water contamination (if found to be related to an on-site release).

2.3 Remaining Contamination

2.3.1 Soil

Based on the endpoint samples obtained across the Site, this site met the Track 2 Cleanup SCOs.

2.3.2 Groundwater

Groundwater contamination was noted during the remedial investigation at a depth of approximately 46 ft below sidewalk grade. Petroleum VOCs above NYSDEC Ambient Water Quality Standards (GQS) were detected across the Site. The highest concentrations of gasoline related VOCs in groundwater were detected within the groundwater samples collected closest to the tank pad and immediately down gradient of the tanks. As part of the groundwater remediation, an air sparge soil vapor extraction system was implemented to treat the elevated VOCs present in the groundwater. Groundwater wells were installed to confirm the effectiveness of the system. Groundwater monitoring will continue on a annual basis.

2.3.3 Surface Water

There is no surface water located on site. No remedial actions were undertaken for this media.

2.3.4 Soil Vapor

Soil vapor testing completed during the Remedial Investigation identified generally low levels of petroleum related volatile organic compounds with elevated levels of CVOCs in the western half of the Site near the north and south property line. The AS/SVE system was installed to remediate the remaining deep soil and groundwater contamination. In addition, operation of this system will reduce or minimize potential for soil vapor intrusion to affect the indoor air quality of any future on-site redevelopment.

2.4 Engineering Controls

2.4.1 Soil Vapor Extraction System (SVE)

The SVE system was installed as follows:

- Two extraction wells (SVE1 and SVE2) system to 21 ft below grade.
- An extraction line consisting of a 2-inch diameter PVC with 10 feet of 0.020-slotted screen and 1 foot of riser, embedded in approximately 6 inches of bentonite grout;
- Extraction well equipped with vacuum gauge, sampling port, and flow controller;
- 5 HP regenerative blower (Ameteck Rotron EN757 or equivalent) with particulate filter and vapor trap;
- A 2-cannister, discharge treatment with vapor-phase granular activated carbon arranged in parallel (General Carbon Corporation).

2.4.2 AS System (AS)

The AS system was installed as follows:

- Eight air sparging wells (AS1, AS2, AS3, AS4, AS5, AS6, AS7 and AS8) system to 35 ft below grade.
- The sparging wells consist of a 1-inch diameter PVC with 2.5 feet of 0.020-slotted screen and 22.5 feet of riser, embedded in approximately 6 inches of bentonite grout;
- 3 HP rotary lobe blower (Roots model 22 URAI-DSL or equivalent) with inlet / outlet silencer and a pressure relief valve;

2.4.3 In-Situ Chemical Oxidation (ISCO)

Injections will be conducted at 17GW2 and 17GW62 in the event that VOC concentrations increase at these locations. These wells are around the former tank area. Injections at these locations deliver oxidant to the subsurface allowing further treatment of this area.

3.0 MONITORING PLAN

3.1 Treatment System Monitoring and Sampling

3.1.1 AS/SVE System Monitoring

AS/SVE system components to be monitored include, but are not limited to, the components included in Table 1. Monitoring of the AS/SVE system will be performed on a routine basis, as identified in Table 2. Modification to the frequency or sampling requirements will require approval from the NYSDEC. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the AS/SVE system has been reported or an emergency occurs that is deemed likely to affect the operation of the system.

Table 1 – Remedial System Monitoring Requirements and Schedule

AS/SVE System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
Regenerative Blower	Flow Rate	TBD	Monthly for the first three months and then quarterly thereafter
Rotary Lobe Blower	Flow Rate	TBD	Monthly for the first three months and then quarterly thereafter
Activated Carbon Drums	Expiration date, damage, labeling	-	Monthly for the first three months and then quarterly thereafter
Plumbing	Cracks, damage, labeling	-	Monthly for the first three months and then quarterly thereafter

A complete list of components to be inspected is provided in the Inspection Checklist, provided in Attachment H of the SMP. If any readings are not within their specified operation range, any equipment is observed to be malfunctioning or the system is not performing within specifications; maintenance and repair is required immediately.

3.1.2 AS/SVE System Sampling

Samples shall be collected from the AS/SVE system on a variable schedule. Sampling locations, required analytical parameters, and schedule are provided in Table 2, below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 2– Remedial System Sampling Requirements and Schedule

Sampling Location	**Field Screening Parameters PID**	**Parameters** VOCs (USEPA TO15)	**Parameters** PFAs (USEPA 537 Modified)	**Parameters** 1,4 dioxane (USEPA 8270 SIM)	**Parameters** VOC (USEPA 8260C)	**Schedule**
SVE Influent (before carbon)	X	X				Monthly for the first 3 months then quarterly thereafter
Between Carbon Canisters	X					Monthly for the first 3 months then quarterly thereafter
SVE Discharge (after carbon)	X	X				Monthly for the first 3 months then quarterly thereafter
17GW1, 17GW2, 17GW3, 17GW4, 17GW5 and 17GW6			X	X	X	Quarterly

The results of the sampling events will be indicated in Periodic Review Reports (PRR). As part of the PRR submittal, a graph showing the change in VOCs concentrations, specifically BTEX compounds, will be attached. As part of each groundwater monitoring event, the six monitoring wells are to be sampled quarterly to monitor groundwater quality.

3.1.3 ISCO Monitoring

Monitoring of the ISCO treatment is on a quarterly basis, as identified in the ISCO Monitoring Requirements and Schedule (see below). Modification to the frequency or sampling requirements will require approval from the NYSDEC. A visual inspection of the monitoring wells will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when an emergency occurs that is deemed likely to affect the operation of the system. ISCO system components to be monitored include, but are not limited to, the components included are below.

ISCO Monitoring Requirements and Schedule

ISCO System Component	**Monitoring Parameter**	**Monitoring Schedule**
Monitoring Wells (applicable to 17GW2 and 17GW6 only)	Condition, PID Screen, Depth to water, depth to bottom.	Quarterly

A complete list of components to be inspected is provided in the Inspection Checklist, provided in **Attachment H** - Site Management Forms. If the monitoring wells have been damaged, lost, or require redevelopment, maintenance and repair, as per the Operation and Maintenance Plan, is required immediately.

3.1.4 ISCO Sampling

Following oxidant application, groundwater samples will be collected from monitoring wells on a quarterly basis as noted in Section 3.1.2 above.

3.2 Post-Remediation AS/SVE Media Monitoring and Sampling

The AS/SVE system has been designed to mitigate soil and groundwater petroleum contamination. When the AS/SVE system is no longer actively recovering significant contaminant mass, a request will be made to NYSDEC to terminate operation. A plan for such post-remedial sampling, if required will be made to NYSDEC in a separate submittal.

SVE Influent and SVE Effluent Sampling Protocol

The SVE Influent and Effluent samples will be collected in 6 Liter summa canisters fitted with 30-min laboratory calibrated regulators. The sample identification, date, start time, start vacuum, end time and end vacuum will be recorded on tags attached to each canister and on the chain of custody. Samples will be submitted to Phoenix for laboratory analysis of VOCs EPA Method TO-15.

3.3 Post-Remediation Groundwater Sampling

Groundwater samples will be collected from 17GW1, 17GW2, 17GW, 17GW4, 17GW5 and 17GW6 approximately on an quarterly basis to confirm the performance of the remedy.

Sample locations and required analytical parameters are provided in Table 2, above. Sampling will be conducted in accordance with NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated May 2010, and Sampling Guidelines and Protocols, dated March 1991. Groundwater wells will be gauged with a water level meter to record a depth to groundwater reading (1/100 foot), and if necessary, an interface meter to determine the thickness of LNAPL or DNAPL. Modification to the sampling requirements will require approval from NYSDEC.

All sampling activities will be recorded in a field book and associated sampling log as provided in **Attachment H** - Site Management Forms. Other observations (e.g., groundwater monitoring well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network.

Groundwater Sampling Protocol

Groundwater samples will be collected from all wells (17GW1, 17GW2, 17GW3, 17GW4, 17GW5 and 17GW6) to assess compliance with applicable SOCs in soil. Sample procurement will be achieved through the use of dedicated polyethylene tubing, a stainless steel check valve and a peristaltic pump.

All groundwater sampling activities will be recorded in the project dedicated field book. This will include a description of:

- Date and time of sample collection
- Sample location
- Purging time, duration and volume;
- Sample appearance
- Analytical methodology:

Groundwater samples will be collected using a check valve, peristaltic pump and dedicated polyethylene tubing in accordance with standard low-flow sampling procedures as follows:

- Record pump make & model on sampling form.
- Wear appropriate health and safety equipment as outlined in the Health and Safety Plan
- Inspect each well for any damage or evidence of tampering and note condition in field logbook.
- Remove the well cap.
- Lay out plastic sheeting and place the monitoring, purging and sampling equipment on the sheeting.
- To avoid cross-contamination, do not let any downhole equipment touch the ground.
- Measure well headspace with a PID or FID and record the reading in the field logbook.
- A synoptic water level measurement round should be performed (in the shortest possible time) before any purging and sampling activities begin. Measure and record the depth to water using a water level meter or interface probe to the nearest 0.01 ft. Record the measurement in the field logbook. Do not measure the

depth to the bottom of the well at this time (to avoid disturbing any sediment that may have accumulated). Obtain depth to bottom information from installation information in the field logbook or soil boring logs.

- Collect samples in order from wells with lowest contaminant concentration to highest concentration.
- Connect the polyethylene tubing to the peristaltic pump and lower the tubing into the well to approximately the middle of the screen. Tubing should be a minimum of 2 feet above the bottom of the well as this may cause mobilization of any sediment present in the bottom of the well.
- Start the pump at its lowest speed setting and slowly increase the speed until discharge occurs. Check water level. Adjust pump speed until there is little or no water level drawdown (less than 0.3 feet). If the minimal drawdown that can be achieved exceeds 0.3 feet but remains stable, continue purging until indicator field parameters stabilize.
- There should be at least 1 foot of water over the end of the tubing so there is no risk of entrapment of air in the sample. Pumping rates should be reduced to the minimum capabilities of the pump, if needed, to avoid purging the well dry. However, if the recharge rate of the well is very low and the well is purged dry, then wait until the well has recharged to a sufficient level and collect the appropriate volume of sample.
- During well purging, monitor indicator field parameters (turbidity, temperature, specific conductance and pH) every three to five minutes (or less frequently, if appropriate). Sample will not be collected until the turbidity is less than 50 NTUs. Note: during the early phase of purging emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments. Purging is considered complete and sampling may begin when all the above indicator field parameters have stabilized. Stabilization is considered to be achieved when three consecutive readings, taken at three (3) to five (5) minute intervals, are within the following limits:
    - specific conductance (3%),
    - temperature (3%),
    - pH (± 0.1 unit)
- VOC samples should be collected directly into pre-preserved sample containers. Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence. Fill each container with sample to just overflowing so that no air bubbles are entrapped inside. Cap each bottle as it is filled.
- Label the samples, and record them on the chain of custody form. Place immediately into a cooler for shipment and maintain at 4oC.
- Remove the tubing from the well. The polyethylene tubing must either be dedicated to each well or discarded. If dedicated the tubing should be placed in a large plastic garbage bag, sealed, and labeled with the appropriate well identification number.
- Close and lock the well.
- Decontaminate pump either by changing the surgical pump tubing between wells or as follows:

1. Flush the equipment/pump with potable water.
2. Flush with non-phosphate detergent solution. If the solution is recycled, the solution must be changed periodically.
3. Flush with potable or distilled/deionized water to remove all of the detergent solution. If the water is recycled, the water must be changed periodically.
4. Flush with isopropyl alcohol (pesticide grade). If equipment blank data from the previous sampling event show that the level of contaminants is insignificant, then this step may be skipped.
5. Flush with distilled/deionized water. The final water rinse must not be recycled.

Samples will be collected in pre-cleaned laboratory supplied glassware, stored in a cooler with ice and submitted to a New York State ELAP certified environmental laboratory. Groundwater samples from monitoring well locations will be submitted for analysis of VOCs by EPA Method 8260, PFAs by EPA Method 537 Modified and 1,4 dioxane by EPA Method 8270 SIM.

All monitoring wells will be surveyed to determine relative casing elevation to the nearest 0.01 ft and horizontal position to the nearest 0.1ft.

4.0 AS/SVE SAMPLING PROTOCOL

4.1 Monitoring Procedure

An inspection form has been attached that details the information to be collected during each monitoring event. The following list is followed by environmental professionals where monitoring the AS/SVE System at this Site:

PRIOR TO STARTING

1. Take depth to water and total depth readings at all observation wells.
2. Take DO readings at all observation wells.
3. Zero out the digital manometer. Calibrate the PID.
4. Fit observation wells with cap / hose barb fitting.
5. Measure the distance from the SVE test well to each of the observations wells and then measure the distance from the sparging test well to each of the observation wells.
6. Take vacuum / pressure readings with manometer and PID readings at all observation wells.

SVE ONLY

1. Connect SVE blower to SVE test well. Open bypass valve on blower.
1. Turn on generator and then blower.
2. Fully close bypass valve on blower and note maximum vacuum at SVE well vacuum gauge. Reduce vacuum by adjusting bypass valve until vacuum at wellhead is 1/3rd of maximum.
3. Record vacuum readings in the observation wells with a manometer. Record the vacuum at the blower and at the wellhead with the vacuum gauges. Do not use manometer for vacuum readings at blower as it will damage the unit.
4. Run the test at this vacuum for 15 minutes or until vacuum at the observation wells stabilize. Record air flow at discharge point and take pid readings in the influent air stream (before carbon).
5. Increase the vacuum at the well head to 2/3rds maximum and repeat steps 4 and 5.
6. Increase the vacuum at the well head to maximum and repeat steps 4 and 5.

4.2 Sampling Procedure

Prior to the occupancy of the building being constructed on the Site, a Soil Vapor Intrusion (SVI) evaluation will be performed to determine whether any mitigation measures are necessary to eliminate potential exposure to vapors in the structure. Prior to conducting an SVI investigation or installing a mitigation system, a work plan will be developed and submitted to the NYSDEC and NYSDOH for approval.

Sub slab and Indoor ambient air quality samples would be collected.

Sub-slab Samples
In accordance with NYSDOH guidance, a tracer gas (helium) would be used as a quality assurance/quality control device to verify the integrity of the sampling point seal prior to collecting the samples. This would be accomplished by enriching the air space above the seal with a tracer gas (helium) while continuously monitoring air drawn from the implant with a helium detector (Ionscience Gas Check G).

Following verification that the surface seal was tight, one to three volumes (i.e., the volume of the sample probe and tube) would be purged with a handheld vacuum pump prior to collecting the samples to ensure samples collected were representative. After purging, a 6-liter summa canister, fitted with a 2-hour flow regulator would be attached to the surface tube of each of the sampling points and the valve would be opened to initiate sampling. Sample identification, date, start time, start vacuum, end time and end vacuum would be recorded on tags attached to each canister and on a sample log sheet. When the remaining vacuum in the canisters was between 0 and 7 inches Hg, (after approximately 2 hrs of run-time) the valve was closed and the canisters were detached from the sampling tube. All of the suma canisters had remaining vacuum at the completion of the sampling periods.

Sample canisters were picked up the following day by a Phoenix laboratory courier and delivered to the laboratory for analysis of VOCs by USEPA Method TO-15.

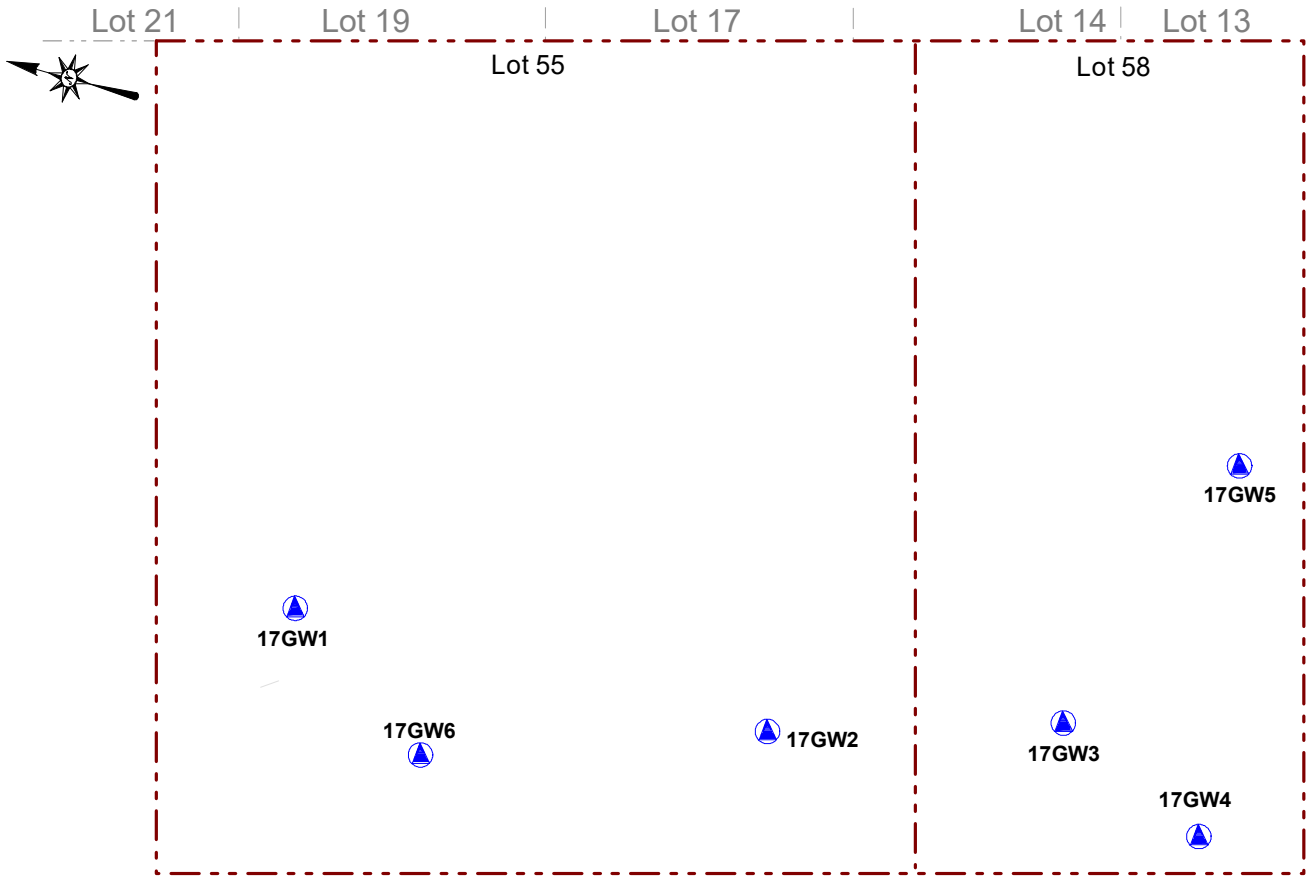
Indoor ambient air quality
Six liter summa canisters will be installed onsite during these sampling events to collect ambient air for 8 hours.

The summa canister will be placed at a height of 3-4 feet above the floor to be within the breathing zone. The ambient air samples will be collected in 6-Liter summa canisters fitted with 8 hour laboratory calibrated regulators. The sample identification, date, start time, start vacuum, end time and end vacuum must be recorded on the tags attached to each canister and on the chain of custody. All samples will be submitted to Phoenix Environmental Laboratories (Phoenix) of 587 East Middle Turnpike, Manchester, CT 06040, a New York State ELAP certified environmental laboratory (ELAP Certification No. 11301). Transport to the laboratory will be through a Phoenix courier under strict chain-of custody documentation. The samples are undergo laboratory analysis of VOCs by EPA Method TO-15. See Appendix B for a sample chain of custody.

4.3 Standard Protocol

All sampling activities will be recorded in a field book and will be documented with photos. Other observations (e.g., well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. The field sampler is expected to report on the entire site and take immediate action if necessary.

FIGURES



AMC Engineeting, PLLC
18-36 42nd Street
Astoria, NY 11105

Figure No.
1

Site Name: FORMER TOMAT SERVICE STATION
Site Address: 1815-1825 Ocean Avenue, Brooklyn, NY
Drawing Title: Monitoring Well Locations

APPENDIX A

Inspection Forms

Tomat Service Station
1815-1825 Ocean Avenue, Brooklyn NY

SOIL VAPOR EXTRACTION SYSTEM INSPECTION FORM

Date:_____

Time:_____

Weather:_____

Inspector:_____

Extraction Point	Vacuum (iwc)	PID Reading(ppm)
SVE-1		
SVE-2		
Blower inlet		
Carbon inlet		
Between carbon		

Inspection:	Yes / No	Comments
Blower Operating?		
Spare Carbon Drums?		
System Integrity?		

Comments:

Tomat Service Station
1815-1825 Ocean Avenue, Brooklyn NY

AIR SPARGING SYSTEM INSPECTION FORM

Injection Point	Pressure
AS-1	
AS-2	
AS-3	
AS-4	
AS-5	
AS-6	
AS-7	
AS-8	

Inspection:	Yes / No	Comments
Blower Operating?		
Timer, 3-way actuated valve operating?		
System Integrity?		

Comments:

Tomat Service Station
1815-1825 Ocean Avenue, Brooklyn NY

CARBON MONITORING

Carbon filter installation date:_____

Date/Time	**Location**	**PID reading**	**PID units(ppm or ppb)**
	Pre-Carbon		
	Between Carbon		
	Post -Carbon		

Comments:

EQUIPMENT SHED

Inspection:	Yes / No	Comments
Vent Operating?		

GROUNDWATER PURGE / SAMPLE LOGS

ENVIRONMENTAL BUSINESS CONSULTANTS

Well I.D.: _____ Date:

Well Depth (from TOC): _____ Equipment:

Static Water Level (from TOC): _____

Height of Water in Well: _____

Gallons of Water per Well Volume: _____

Flow Rate: 400ml/min.

Time	Pump Rate	Gal. Removed	pH	Cond. (mS/cm)	Temp. (deg. C)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	TDS	Comments

Note 400 ml = 0.11 gallons

SVE / AIR SPARGE TEST PROCEDURES

PRIOR TO STARTING

1. Take depth to water and total depth readings at all observation wells.

2. Take DO readings at all observation wells.

3. Zero out the digital manometer. Calibrate the PID.

4. Fit observation wells with cap / hose barb fitting.

5. Measure the distance from the SVE test well to each of the observations wells and then measure the distance from the sparging test well to each of the observation wells.

6. Take vacuum / pressure readings with manometer and PID readings at all observation wells.

SVE ONLY

1. Connect SVE blower to SVE test well. Open bypass valve on blower.

2. Turn on generator and then blower.

3. Fully close bypass valve on blower and note maximum vacuum at SVE well vacuum gauge. Reduce vacuum by adjusting bypass valve until vacuum at wellhead is 1/3rd of maximum.

4. Record vacuum readings in the observation wells with a manometer. Record the vacuum at the blower and at the wellhead with the vacuum gauges. Do not use manometer for vacuum readings at blower as it will damage the unit.

5. Run the test at this vacuum for 15 minutes or until vacuum at the observation wells stabilize. Record air flow at discharge point and take pid readings in the influent air stream (before carbon).

6. Increase the vacuum at the well head to 2/3rds maximum and repeat steps 4 and 5.

7. Increase the vacuum at the well head to maximum and repeat steps 4 and 5.

APPENDIX B

Sample Chain of Custody

PHOENIX
Environmental Laboratories, Inc.

NY/NJ CHAIN OF CUSTODY RECORD

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Temp Pg of

Data Delivery:
- ☐ Fax #: ______
- ☑ Email: ______

Customer: ______ Project: ______ Project P.O: ______
Address: ______ Report to: ______ Phone #: ______
______ Invoice to: ______ Fax #: ______

Client Sample - Information - Identification

Sampler's Signature ______ Date: ______

Matrix Code:
DW=drinking water **WW**=wastewater **S**=soil/solid **O**=oil
GW=groundwater **SL**=sludge **A**=air **X**=other

Analysis Request

Phoenix Sample #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	x	x	x	x	x	x	x	x	x	x	x	x	Soil VOA [ ] Methanol [ ] S. Bisulfate [ ] H2O	GL Soil container (8) oz	GL Soil container (2) oz	40 ml VOA Vial [ ] As is [x] HCl	GL Amber 1000ml [x] As is [ ] H2SO4	PL As is [ ] 250ml [x] 500ml [x] 1000ml	PL H2SO4 [x] 250ml [ ] 500ml	PL HNO3 250ml	PL NaOH 250ml	Bacteria Bottle

Relinquished by:	Accepted by:	Date:	Time:

Comments, Special Requirements or Regulations:

Turnaround:
- ☐ 1 Day*
- ☐ 2 Days*
- ☐ 3 Days*
- ☐ Standard
- ☐ Other 5 DAYS

* **SURCHARGE APPLIES**

NJ
- ☐ Res. Criteria
- ☐ Non-Res. Criteria
- ☐ Impact to GW Soil Cleanup Criteria
- ☐ GW Criteria

NY
- ☐ TAGM 4046 GW
- ☐ TAGM 4046 SOIL
- ☐ NY375 Unrestricted Soil
- ☐ NY375 Residential Soil
- ☐ NY375 Restricted Non-Residential Soil

Data Format
- ☐ Phoenix Std Report
- ☐ Excel
- ☐ PDF
- ☐ GIS/Key
- ☐ EQuIS
- ☐ NJ Hazsite EDD
- ☐ NY EZ EDD (ASP)
- ☐ Other

Data Package
- ☐ NJ Reduced Deliv. *
- ☐ NY Enhanced (ASP B) *
- ☐ Other

State where samples were collected: NY

CHAIN OF CUSTODY RECORD AIR ANALYSES

PHOENIX Environmental Laboratories, Inc.

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-1102

Data Delivery:
☐ Fax #: _____
☐ Email: _____

Report to: _____ **Invoice to:** _____ **Project Name:** _____

Address: _____ **Address:** _____ **Location:** _____

Project Mgr: _____ **P.O. #** _____ **State:** _____

Phone # _____ **Quote #** _____ **Sampled by:** _____

Phoenix ID #	Client Sample ID	Canister ID #	Canister Size (L)	Outgoing Canister Pressure (" Hg)	Incoming Canister Pressure ("Hg)	Flow Regulator ID #	Flow Controller Setting (mL/min)	Sampling Start Time	Sampling End Time	Sample Start Date	Canister Pressure at Start (" Hg)	Canister Pressure at End ("Hg)	Ambient/Indoor Air	Soil Gas	Grab (G) Composite (C)		TO-14	TO-15				Is Canister Returned Unused? Y/N
		LAB USE ONLY											MATRIX				ANALYSES					

Relinquished by:	Accepted by:	Date:	Time:

Criteria Requested: **Deliverable:**
RCP ☐
MCP ☐
State where samples collected: _____

Data Format:
Excel ☐ Equis ☐
PDF ☐ Other: ☐
GISKey ☐

SPECIAL INSTRUCTIONS, QC REQUIREMENTS, REGULATORY INFORMATION:

I attest that all media released by Phoenix Environmental Laboratories, Inc. have been received in good working condition and agree to the terms and conditions as listed on the back of this document:

Signature: _____Date: _____

ATTACHMENT F
Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN
Tomat Service Station
1815-1825 Ocean Avenue, Brooklyn, NY

OCTOBER 2019

Prepared on behalf of:

Ocean Units LLC
1274 49th Street Suite 443
Brooklyn, NY 11219

Prepared by:

EBC
Environmental Business Consultants
Ridge, NY 11961

TABLE OF CONTENTS

QUALITY ASSURANCE PROJECT PLAN

Tomat Service Station
1815-1825 Ocean Avenue, Brooklyn, NY

TABLES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared in accordance with DER-10 to detail procedures to be followed during the course of the sampling and analytical portion of the project, as required by the approved SMP.

To ensure the successful completion of the project each individual responsible for a given component of the project must be aware of the quality assurance objectives of his / her particular work and of the overall project. The EBC Project Director, Charles Sosik will be directly responsible to the client for the overall project conduct and quality assurance/quality control (QA/QC) for the project. The Project Director will be responsible for overseeing all technical and administrative aspects of the project and for directing QA/QC activities. Mr. Kevin Brussee will serve as the Quality Assurance Officer (QAO) and in this role may conduct:

- conduct periodic field and sampling audits;
- interface with the analytical laboratory to resolve problems; and
- interface with the data validator and/or the preparer of the DUSR to resolve problems.

Chawinie Reilly will serve as the Project Manager and will be responsible for implementation of the Remedial Investigation and coordination with field sampling crews and subcontractors. Reporting directly to the Project Manager will be the Field Operations Officer, Kevin Waters; who will serve as the on-Site qualified environmental professional who will record observations, direct the drilling crew and be responsible for the collection and handling of all samples.

1.1 Organization

Project QA will be maintained under the direction of the Project Manager, in accordance with this QAPP. QC for specific tasks will be the responsibility of the individuals and organizations listed below, under the direction and coordination of the Project Manager

.

GENERAL RESPONSIBILITY	SCOPE OF WORK	RESPONSIBILITY OF QUALITY CONTROL
Field Operations	Supervision of Field Crew, sample collection and handling	Tom Gallo EBC
Project Manager	Implementation of the SMP	Chawinie Reilly, EBC
Laboratory Analysis	Analysis of air and groundwater samples by NYSDEC ASP methods Laboratory	NYSDOH-Certified Laboratory
Data review	Review for completeness and compliance	3rd party validation

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1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

2.0 QUALITY ASSURANCE PROJECT PLAN OBJECTIVES

2.1 Overview

Overall project goals are defined through the development of Data Quality Objectives (DQOs), which are qualitative and quantitative Statements that specify the quality of the data required to support decisions; DQOs, as described in this section, are based on the end uses of the data as described in the work plan.

In this plan, Quality Assurance and Quality Control are defined as follows:

- Quality Assurance - The overall integrated program for assuring reliability of monitoring and measurement data.

- Quality Control - The routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process.

2.2 QA / QC Requirements for Analytical Laboratory

Samples will be analyzed by a New York State Department of Health (NYSDOH) certified laboratory. Data generated from the laboratory will be used to evaluate contaminants such as volatile organic compounds (VOCs) in groundwater and air. The QA requirements for all subcontracted analytical laboratory work performed on this project are described below. QA elements to be evaluated include accuracy, precision, sensitivity, representativeness, and completeness. The data generated by the analytical laboratory for this project are required to be sensitive enough to achieve detection levels low enough to meet required quantification limits as specified in NYSDEC Analytical Services Protocol (NYSDEC ASP, 07/2005. The analytical results meeting the required quantification limits will provide data sensitive enough to meet the data quality objectives of this remedial program as described in the work plan. Reporting of the data must be clear, concise, and comprehensive. The QC elements that are important to this project are completeness of field data, sample custody, sample holding times, sample preservation, sample storage, instrument calibration and blank contamination.

2.2.1 Instrument Calibration

Calibration curves will be developed for each of the compounds to be analyzed. Standard concentrations and a blank will be used to produce the initial curves. The development of calibration curves and initial calibration response factors must be consistent with method requirements presented in the most recent version of NYSDEC ASP 07/2005).

2.2.2 Continuing Instrument Calibration

The initial calibration curve will be verified every 12 hrs by analyzing one calibration standard. The standard concentration will be the midpoint concentration of the initial calibration curve. The calibration check compound must come within 25% relative percent difference (RPD) of the average response factor obtained during initial calibration. If the RPD is greater than 25%, then corrective action must be taken as provided in the specific methodology.

2.2.3 Method Blanks

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Method blank or preparation blank is prepared from an analyte·free matrix which includes the same reagents, internal standards and surrogate standards as the related samples. This is carried through the entire sample preparation and analytical procedure. A method blank analysis will be performed once for each 12 hr period during the analysis of samples for volatiles. An acceptable method blank will contain less than two (2) times the CRQL of methylene chloride, acetone and 2-butanone. For all other target compounds, the method blank must contain less than or equal to the CRQL of any single target compound. For non-target peaks in the method blank, the peak area must be less than 10 percent of the nearest internal standard. The method blank will be used to demonstrate the level of laboratory background and reagent contamination that might result from the analytical process itself.

2.2.4 Trip Blanks.

Trip blanks consist of a single set of sample containers filled at the laboratory with deionized. laboratory-grade water. The water used will be from the same source as that used for the laboratory method blank. The containers will be carried into the field and handled and transported in the same way as the samples collected that day. Analysis of the trip blank for VOCs is used to identify contamination from the air, shipping containers, or from other items coming in contact with the sample bottles. (The bottles holding the trip blanks will be not opened during this procedure.) A complete set of trip blanks will be provided with each shipment of samples to the certified laboratory.

2.2.5 Surrogate Spike Analysis

For organic analyses, all samples and blanks will be spiked with surrogate compounds before purging or extraction in order to monitor preparation and analyses of samples. Surrogate spike recoveries shall fall within the advisory limits in accordance with the NY5DEC ASP protocols for samples falling within the quantification limits without dilution.

2.2.6 Matrix Spike / Matrix Spike Duplicate / Matrix Spike Blank (MS/MSDIMSB) Analysis

MS, MSD and MSB analyses will be performed to evaluate the matrix effect of the sample upon the analytical methodology along with the precision of the instrument by measuring recoveries. The MS / MSD / MSB samples will be analyzed for each group of samples of a similar matrix at a rate of 5% (one for every 20 field samples). The RPD will be calculated from the difference between the MS and MSD. Matrix spike blank analysis will be performed to indicate the appropriateness of the spiking solution(s) used for the MS/MSD.

2.3 Accuracy

Accuracy is defined as the nearness of a real or the mean (x) of a set of results to the true value. Accuracy is assessed by means of reference samples and percent recoveries. Accuracy includes both precision and recovery and is expressed as percent recovery (% REC). The MS sample is used to determine the percent recovery. The matrix spike percent recovery (% REC) is calculated by the following equation:

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

Where:
SSR = spike sample results
SR = sample results

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Fax 631.924.2870

SA = spike added from spiking mix

2.4 Precision

Precision is defined as the measurement of agreement of a set of replicate results among themselves without assumption of any prior information as to the true result. Precision is assessed by means of duplicate/replicate sample analyses.

Analytical precision is expressed in terms of RPD. The RPD is calculated using the following formula:

$$RPD = \frac{D^1 - D^2}{(D^1 + D^2)/2} \times 100$$

Where:
RPD = relative percent difference
D^1 = first sample value
D^2 = second sample value (duplicate)

2.5 Sensitivity

The sensitivity objectives for this plan require that data generated by the analytical laboratory achieve quantification levels low enough to meet the required detection limits specified by NYSDEC ASP and to meet all site-specific standards, criteria and guidance values (SGCs) established for this project.

2.6 Representativeness

Representativeness is a measure of the relationship of an individual sample taken from a particular site to the remainder of that site and the relationship of a small aliquot of the sample (i.e., the one used in the actual analysis) to the sample remaining on site. The representativeness of samples is assured by adherence to sampling procedures described in the Remedial Investigation Work Plan.

2.7 Completeness

Completeness is a measure of the quantity of data obtained from a measurement system as compared to the amount of data expected from the measurement system. Completeness is defined as the percentage of all results that are not affected by failing QC qualifiers, and should be between 70 and 100% of all analyses performed. The objective of completeness in laboratory reporting is to provide a thorough data support package. The laboratory data package provides documentation of sample analysis and results in the form of summaries, QC data, and raw analytical data. The laboratory will be required to submit data packages that follow NYSDEC ASP reporting format which, at a minimum, will include the following components:

1. All sample chain-of-custody forms.
2. The case narrative(s) presenting a discussion of any problems and/or procedural changes required during analyses. Also presented in the case narrative are sample summary forms.
3. Documentation demonstrating the laboratory's ability to attain the contract specified detection limits for all target analytes in all required matrices.
4. Tabulated target compound results and tentatively identified compounds.
5. Surrogate spike analysis results (organics).
6. Matrix spike/matrix spike duplicate/matrix spike blank results.
7. QC check sample and standard recovery results
8. Blank results (field, trip, and method).

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9. Internal standard area and RT summary.

2.8 Laboratory Custody Procedures

The following elements are important for maintaining the field custody of samples:

- Sample identification
- Sample labels
- Custody records
- Shipping records
- Packaging procedures

Sample labels will be attached to all sampling bottles before field activities begin; each label will contain an identifying number. Each number will have a suffix that identifies the site and where the sample was taken. Approximate sampling locations will be marked on a map with a description of the sample location. The number, type of sample, and sample identification will be entered into the field logbook. A chain-of-custody form, initiated at the analytical laboratory will accompany the sample bottles from the laboratory into the field. Upon receipt of the bottles and cooler, the sampler will sign and date the first received blank space. After each sample is collected and appropriately identified, entries will be made on the chain-of-custody form that will include:

- Site name and address
- Samplers' names and signatures

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Phone 631.504.6000
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3.0 ANALYTICAL PROCEDURES

3.1 Laboratory Analysis

Samples will be analyzed by the NYSDOH ELAP laboratory for one or more of the following parameters: VOCs in groundwater by USEPA Method 8260C, PFAs in groundwater by USEPA Method 537 Modified, 1,4 dioxane by USEPA Method 8270 SIM and VOCs in air by USEPA Method TO15. If any modifications or additions to the standard procedures are anticipated and if any nonstandard sample preparation or analytical protocol is to be used, the modifications and the nonstandard protocol will be explicitly defined and documented. Prior approval by EBC's PM will be necessary for any nonstandard analytical or sample preparation protocol used by the laboratory, i.e., dilution of samples or extracts by greater than a factor of five (5).

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Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

4.0 DATA REDUCTION, REVIEW, AND REPORTING

4.1 Overview

The process of data reduction, review, and reporting ensures the assessments or a conclusion based on the final data accurately reflects actual site conditions. This plan presents the specific procedures, methods, and format that will be employed for data reduction, review and reporting of each measurement parameter determined in the laboratory and field. Also described in this section is the process by which all data, reports, and work plans are proofed and checked for technical and numerical errors prior to final submission.

4.2 Data Reduction

Standard methods and references will be used as guidelines for data handling, reduction, validation, and reporting. All data for the project will be compiled and summarized with an independent verification at each step in the process to prevent transcription/typographical errors. Any computerized entry of data will also undergo verification review.

Sample analysis will be provided by a New York State certified environmental laboratory. Laboratory reports will include ASP category B deliverables for use in the preparation of a data usability summary report (DUSR). All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format. Analytical results shall be presented on standard NYSDEC ASP-B forms or equivalents, and include the dates the samples were received and analyzed, and the actual methodology used.

Laboratory QA/QC information required by the method protocols will be compiled, including the application of data QA/QC qualifiers as appropriate. In addition, laboratory worksheets, laboratory notebooks, chains-of-custody, instrument logs, standards records, calibration records, and maintenance records, as applicable, will be provided in the laboratory data packages to determine the validity of data. Specifics on internal laboratory data reduction protocols are identified in the laboratory's SOPs.

Following receipt of the laboratory analytical results by EBC, the data results will be compiled and presented in an appropriate tabular form. Where appropriate, the impacts of QA/QC qualifiers resulting from laboratory or external validation reviews will be assessed in terms of data usability.

4.3 Laboratory Data Reporting

All sample data packages submitted by the analytical laboratory will be required to be reported in conformance to the NYSDEC ASP (7/2005), Category B data deliverable requirements as applicable to the method utilized. All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format.

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5.0 CORRECTIVE ACTION

Review and implementation of systems and procedures may result in recommendations for corrective action. Any deviations from the specified procedures within approved project plans due to unexpected site-specific conditions shall warrant corrective action. All errors, deficiencies, or other problems shall be brought to the immediate attention of the EBC PM, who in turn shall contact the Quality Assurance/Data Quality Manager or his designee (if applicable) and the NYSDEC project manager.

Procedures have been established to ensure that conditions adverse to data quality are promptly investigated, evaluated and corrected. These procedures for review and implementation of a change are as follows:

- Define the problem.
- Investigate the cause of the problem.
- Develop a corrective action to eliminate the problem, in consultation with the personnel who defined the problem and who will implement the change.
- Complete the required form describing the change and its rationale (see below for form requirements).
- Obtain all required written approvals.
- Implement the corrective action.
- Verify that the change has eliminated the problem.

During the field investigation, all changes to the sampling program will be documented in field logs/sheets and the EBC PM advised.

If any problems occur with the laboratory or analyses, the laboratory must immediately notify the PM, who will consult with other project staff. All approved corrective actions shall be controlled and documented.

All corrective action documentation shall include an explanation of the problem and a proposed solution which will be maintained in the project file or associated logs. Each report must be approved by the necessary personnel (e.g., the PM) before implementation of the change occurs. The PM shall be responsible for controlling, tracking, implementing and distributing identified changes.

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TABLE 1
SUMMARY OF
SAMPLING PROGRAM RATIONALE AND ANALYSIS

Matrix	Location	Approximate Number of Samples	Frequency	Rationale for Sampling	Laboratory Analysis	Duplicates	Matrix Spikes	Spike Duplicates	Trip Blanks
Groundwater	From the 6 groundwater monitoring wells; located on site	6	1 per well	Performance AS/SVE System	VOCs EPA Method 8260C, PFAs by EPA Method 537 Modified and 1,4 dioxane by EPA Method 8270 SIM	1 per day	1 per 20 samples	1 per 20 samples	1 per trip
Air Sample	From SVE Influent and discharge (before and after carbon)	2	1 at the before carbon location and 1 at the after carbon location	Performance AS/SVE System	VOCs EPA Method TO15	n/a	n/a	n/a	n/a

TABLE 2
SAMPLE COLLECTION AND ANALYSIS PROTOCOLS

Sample Type	Matrix	Sampling Device	Parameter	Sample Container	Sample Preservation	Analytical Method#	CRQL / MDLH	Holding Time
Groundwater	Water	Pump tubing	VOCs and 1,4 Dioxane	(3) 40 ml Vials and 8oz amber w/NAHS04-Water	Cool to 4° C 1:1 HCL	EPA Method 8260C SIM Mode / USEPA Method 8270 SIM	Compound specific (1-5 ug/L)	7 Days to extraction and 40 days following Extraction; holding time for VOCs is 14 days with preserved HCL.
Groundwater	Water	Pump tubing	PFAs	250-mL HDPE Containers	Cool to 6° C	EPA Method 537 Modified	Compound specific (1-5 ng/L)	14 Days to extraction and 28 days following extraction
Air	Soil Vapor	Suma Canister	VOCs	6 liters	None	TO15	Compound specific (1-5 mg/L)	None

Notes:
All holding times listed are from Verified Time of Sample Receipt (VTSR) unless noted otherwise. * Holding time listed is from time of sample collection.
The number in parentheses in the "Sample Container" column denotes the number of containers needed.
Triple volume required when collected MS/MSD samples
The number of trip blanks are estimated.
CRQL / MDL = Contract Required Quantitation Limit / Method Detection Limit
NA = Not available or not applicable.

ATTACHMENT G
Health and Safety Plan

TOMAT SERVICE STATION SITE

1815-1825 OCEAN AVENUE
BROOKLYN, NEW YORK
Block 7656 Lot 55 & 58

CONSTRUCTION HEALTH AND SAFETY PLAN

NOVEMBER 2017

Prepared for:
Ocean Units LLC
1274 49th Street Suite 443
Brooklyn, NY 11219

Prepared by:

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 Middle Country Road
Ridge, NY 11961

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APPENDICES

STATEMENT OF COMMITMENT

This Construction Health and Safety Plan (CHASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Site Management Plan at the Tomat Service Station Site, 1815-1825 Ocean Avenue, Brooklyn, NY

This CHASP, which applies to persons present at the site actually or potentially exposed to hazardous materials, describes emergency response procedures for actual and potential chemical hazards. This CHASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy by signing off on receipt of their individual copy of the document. Contractors and suppliers are retained as independent contractors and are responsible for ensuring the health and safety of their own employees.

1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS

This document describes the health and safety guidelines developed by Environmental Business Consultants (EBC) for the Site Management Plan (SMP) at the Tomat Service Station Site, 1815-1825 Ocean Avenue, Brooklyn, New York to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes during activities under the SMP. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this CHASP, including the attachments, addresses safety and health hazards related to excavation, loading and other soil disturbance activities and is based on the best information available. The CHASP may be revised by EBC at the request of Ocean Units LLC and/or a regulatory agency upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC's project manager, site safety officer and/or the EBC health and safety consultant.

1.1 Training Requirements

Personnel entering the exclusion zone or decontamination zone are required to be certified in health and safety practices for hazardous waste site operations as specified in the Federal OSHA Regulations CFR 1910.120e (revised 3/6/90).

Paragraph (e - 3) of the above referenced regulations requires that all on-site management personnel directly responsible for or who supervise employees engaged in hazardous waste operations, must initially receive 8 hours of supervisor training related to managing hazardous waste work.

Paragraph (e - 8) of the above referenced regulations requires that workers and supervisors receive 8 hours of refresher training annually on the items specified in Paragraph (e-1) and/or (e-3).

Additionally all on-site personnel must receive adequate site-specific training in the form of an on-site Health and Safety briefing prior to participating in field work with emphasis on the following:

- Protection of the adjacent community from hazardous vapors and / or dust which may be released during intrusive activities.
- Identification of chemicals known or suspected to be present on-site and the health effects and hazards of those substances.
- The need for vigilance in personnel protection, and the importance of attention to proper use, fit and care of personnel protective equipment.
- Decontamination procedures.
- Site control including work zones, access and security.
- Hazards and protection against heat or cold.
- The proper observance of daily health and safety practices, such as entry and exit of work zones and site. Proper hygiene during lunch, break, etc.
- Emergency procedures to be followed in case of fire, explosion and sudden release of hazardous gases.

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

Health and Safety meetings will be conducted on a daily basis and will cover protective clothing and other equipment to be used that day, potential and chemical and physical hazards, emergency procedures, and conditions and activities from the previous day.

1.2 Medical Monitoring Requirements

Field personnel and visitors entering the exclusion zone or decontamination zone must have completed appropriate medical monitoring required under OSHA 29 CFR 1910.120(f) if respirators or other breathing related PPE is needed. Medical monitoring enables a physician to monitor each employee's health, physical condition, and his fitness to wear respiratory protective equipment and carry out on-site tasks.

1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments

The project superintendent and the site safety officer are responsible for informing personnel (EBC employees and/or owner or owners representatives) entering the work area of the contents of this plan and ensuring that each person signs the safety plan acknowledging the on-site hazards and procedures required to minimize exposure to adverse effects of these hazards. A copy of the Acknowledgement Form is included in **Appendix A**.

Site conditions may warrant an amendment to the CHASP. Amendments to the CHASP are acknowledged by completing forms included in **Appendix B**.

1.4 Key Personnel - Roles and Responsibilities

Personnel responsible for implementing this Health and Safety Plan are:

Name	Title	Address	Contact Numbers
Mrs. Chawinie Reilly	EBC- Project Manager	1808 Middle Country Rd Ridge, NY 11961	(631) 504-6000
Mr. Kevin Waters	Health and Safety Officer	1808 Middle Country Rd Ridge, NY 11961	(631) 504-6000

The project manager is responsible for overall project administration and, with guidance from the site safety officer, for supervising the implementation of this CHASP. The site safety officer will conduct daily (tail gate or tool box) safety meetings at the project site and oversee daily safety issues. Each subcontractor and supplier (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute about health and safety or project activities, on-site personnel will attempt to resolve the issue. If the issue cannot be resolved at the site, then the project manager will be consulted.
The site safety officer is also responsible for coordinating health and safety activities related to hazardous material exposure on-site. The site safety officer is responsible for the following:

1. Educating personnel about information in this CHASP and other safety requirements to be observed during site operations, including, but not limited to, decontamination procedures, designation of work zones and levels of protection, air monitoring, fit testing,

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

and emergency procedures dealing with fire and first aid.

2. Coordinating site safety decisions with the project manager.

3. Designating exclusion, decontamination and support zones on a daily basis.

4. Monitoring the condition and status of known on-site hazards and maintaining and implementing the air quality monitoring program specified in this CHASP.

5. Maintaining the work zone entry/exit log and site entry/exit log.

6. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site).

The person who observes safety concerns and potential hazards that have not been addressed in the daily safety meetings should immediately report their observations/concerns to the site safety officer or appropriate key personnel.

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

2.0 SITE BACKGROUND AND SCOPE OF WORK

The street address for the Site is 1815-1825 Ocean Avenue, Brooklyn, NY. The Site is located in the Midwood section of Kings County and is comprised of two tax parcels totaling 16,555 square feet (0.38 acre). The Site has approximately 150.5 ft of frontage along Ocean Avenue and is approximately 110 ft deep. Currently the property is currently under construction and the former buildings have been demolished.

The Site has a long history of use as a gas station since the 1930's.

2.1 Previous Investigations

2.1.1 December 30, 2013 –Subsurface Assessment Report (Hydrotech Environmental Corp)
Hydro Tech Environmental, Corp. has performed a Subsurface Assessment at the property located at 1815 Ocean Avenue, Brooklyn, New York. This assessment was conducted on behalf of Tomat Service Center Inc. based upon their request to investigate the overall soil and groundwater quality.

The assessment consisted of the performance of the installation and sampling of a series of soil probes, groundwater probes, and monitoring wells. A Hydro Tech geologist screened all soil samples in the field for organic vapors utilizing a Photoionization Detector. Select soil, groundwater, and monitoring well samples were analyzed at a State-certified laboratory for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). A select soil and groundwater sample was additionally analyzed for diesel range organic compounds and gasoline range organic compounds.

VOCs were detected in soil samples at the groundwater interface and in the groundwater in the vicinity of a fuel oil UST located to the north of the building at concentrations exceeding their respective regulatory standards. The petroleum compounds identified in the soil and groundwater samples was been classified as #2 fuel oil, as per the fingerprint analysis and the groundwater sample.

Dissolved VOCs were detected in groundwater beneath the southern portion of the Site, to the south of gasoline tanks and pump islands, at high concentrations exceeding their regulatory standards. Total VOCs were noted to be 4,006.6 ug/L and at 6,471.7 ug/L. These findings indicated that groundwater had been impacted. Spill #1408472 is associated with the Site.

In addition, a ground penetrating radar survey (GPR) was conducted to clear sampling locations and discover any anomalies. One anomaly was identified on the north side of the interior of the site and is associated with a UST.

2.1.2 Phase II Investigation Report – 1815 Ocean Avenue, Brooklyn NY. Environmental Business Consultants (EBC) dated February 25, 2015
The field work portion of the investigation was performed on February 7, 2015. The work consisted of the installation of four soil borings, two permanent monitoring wells, two temporary monitoring wells, and the collection and analysis of related samples. Four soil boring locations were selected. All of the borings were advanced with Geoprobe™ direct push equipment to a

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

depth of 25 ft. Soil was characterized as a brown slit and sand with some historic fill material mixed in from surface grade to generally 1 foot below grade with the deepest locations at approximately 6-8 feet below grade followed by a brown silt and brown coarse fine sand to the termination depth. Groundwater was encountered and is expected at approximately 17 to 22 ft below grade.

PID readings ranging from 130 ppm to 250 ppm and petroleum odors were noted in several samples in the 21-25 foot interval. Soil samples were collected from the following intervals; 0-2 feet and 22-24 feet.

EBC collected four groundwater samples from each of the characterization borings. Permanent monitoring wells were installed by advancing the borehole to the water table (approx. 17 to 22 ft bgs) and installing a one-inch diameter PVC well 5-feet below the water table interface. Groundwater samples were collected in pre-cleaned, laboratory supplied glassware, stored in a cooler with ice and submitted to Phoenix Laboratories for analysis of VOCs by EPA Method 8260.

Deep soil and groundwater samples were analyzed for volatile organic compounds (VOCs) by USEPA method 8260. Shallow soil samples were analyzed for total lead.

Soil and groundwater samples collected in the vicinity of the USTs indicate gasoline contamination. Several gasoline related VOCs were detected above Unrestricted Use SCOs in soil samples. Lead was detected above Unrestricted Use SCOs in shallow soil samples. Gasoline related VOCs were noted above groundwater standards in all groundwater samples. These results indicate that further remedial action will be required.

2.1.3 Phase II Data Summary for 1825 Ocean Avenue, Brooklyn, NY. Environmental Business Consultants (EBC) dated April 29, 2015

The field work portion of the investigation was performed on April 22, 2015. The work consisted of the installation of five soil borings, three permanent monitoring wells, and the collection and analysis of related samples. Five soil boring locations were selected. Borings were advanced with Geoprobe™ direct push equipment to a depth of 15 feet, 20-23 feet and 25 ft. Soil was characterized as a brown medium fine sand with some historic fill material mixed in from surface grade to approximately 6-8 feet below grade followed by a brown sand to the termination depth. Groundwater was encountered and is expected at approximately 23 ft below grade.

Petroleum odors were noted in the 20-25 foot interval soil samples. Soil samples were collected from the following intervals; 0-2 feet and 23-25 feet.

EBC collected three groundwater samples from each of the characterization borings. Permanent monitoring wells were installed by advancing the borehole to the water table (approx. 20 to 23 ft bgs) and installing a one-inch diameter PVC well 5-feet below the water table interface. Groundwater samples were collected in pre-cleaned, laboratory supplied glassware, stored in a cooler with ice and submitted to Phoenix Laboratories for analysis of VOCs by EPA Method 8260.

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Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

Deep soil and groundwater samples were analyzed for volatile organic compounds (VOCs) by USEPA method 8260. Shallow soil samples were analyzed for SVOCs (CP51), PCBs and TAL Metals. Deep soil samples were analyzed for (VOCs) by USEPA method 8260 and SVOCs (CP51).

Soil and groundwater samples collected indicate gasoline contamination. Several gasoline related VOCs were detected above Unrestricted Use and Residential Restricted SCOs in soil samples. Lead was detected above Residential Restricted SCOs in the shallow soil sample. Gasoline related VOCs were noted above groundwater standards in all groundwater samples. These results indicate that further remedial action will be required. A spill was called in for this site and assigned a SPILL # 1501018.

2.1.4 Phase I Screening for 1815-1825 Ocean Avenue, Brooklyn, NY. Environnemental Business Consultants (EBC) dated April 30, 2015.
Prior to the construction of the existing improvements (circa 1950), the Site was occupied by a gas station (lot 55) and 2-story dwelling (lot 58) in the 1930's. From 1895 to 1906, the site was vacant land (lot 55) and a 2-story dwelling (lot 58).

In the 1930 Sanborn map four gasoline tanks are depicted on the west side of the Site. In the 1950-2007 Sanborn maps, five gasoline tanks are depicted on the west side of the Site.

2.2 Redevelopment Plans

The redevelopment project consists of the demolition of the existing gas station and auto repair facility and the construction of a new 8-story residential building which will cover 65 percent of the Site. The Site will be developed with a cellar. The cellar will occupy the center portion of the lot down to about 10-12 feet below grade. The cellar will be utilized for bike storage, refuse area, elevator mechanical room, sprinkler room, water meter room, electrical meter room and a gas meter room. The slab on grade area (44.3 x 110 foot area) on the north side of the Site will be excavated to a depth of 2 feet. A 40 x 150 foot yard area on the east side of the Site will not be excavated. The elevator pit will be excavated to approximately 15 feet below grade. The maximum height of the building will be proposed at eighty feet tall with additional height provided for accessory spaces as permitted. The front yard will match the adjacent buildings on the street with a minimum of forty feet in the rear yard. The building will be proposed up to the side lot property lines. The building will be proposed with a maximum of ninety-three units with a mix of one, two and three bedroom units.

2.3 Description of Remedial Action

Site activities included within the Remedial Action that are included within the scope of this CHASP include the following:

1. Removal of the two 4,000-gallon gasoline underground storage tanks, one 550-gallon No. 2 fuel oil underground storage tank,, one 550-gallon waste oil underground storage tank

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

located on the west side of the Site and two oil / water separators. Note that this work will be completed under the approved IRM Work Plan (AMC 7/2016);

2. Excavation of soil/fill exceeding Track 2 Restricted Residential Use SCOs (**Table 1)** within the top 15 ft of the soil column. This will require excavation within the source area to 12 ft below grade to remove petroleum impacted soil and 1 foot across the remainder of the Site to remove historic fill soil. Excavation of clean soil will proceed as needed for the building's cellar level foundation. Note: this work will be completed under the approved IRM (AMC 7/2016);
3. Remediation of deeper petroleum VOCs in soil and groundwater with the installation of an air sparge and soil vapor extraction system;
4. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;
5. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of Track 2 SCOs within their respective areas. Note: this work will be completed under the approved IRM (AMC 7/2016);
6. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal. Note: this work will be completed under the approved IRM (AMC 7/2016);
7. Import of materials to be used for backfill and cover in compliance with: (1) chemical limits and other specifications included in **Table 1**, (2) all Federal, State and local rules and regulations for handling and transport of material.
8. If Track 2 SCOs are not achieved, a composite cover system consisting of the concrete building slab (new building footprint) and a concrete slab or 2 feet of clean soil (rear yard) will be constructed.
9. Implementation of a Site Management Plan (SMP) for long term maintenance of the Engineering Controls.
10. An Environmental Easement will be filed against the Site to ensure implementation of the SMP.
11. New buildings on site will be evaluated for soil vapor intrusion and will implement any actions required by the department.
12. A groundwater monitoring plan as part of the SMP.

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

If Track 2 SCOs are not met, or if site management extends beyond 5 years then a Track 4 remedy may result for this area.

All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP. All deviations from the RAWP will be promptly reported to NYSDEC for approval and fully explained in the FER.

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

3.0 HAZARD ASSESSMENT

This section identifies the hazards associated with the proposed scope of work, general physical hazards that can be expected at most sites; and presents a summary of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against using engineering controls and/or personal protective equipment.

3.1 Physical Hazards

3.1.1 Tripping Hazards

An area of risk associated with on-site activities are presented by uneven ground, concrete, curbstones or equipment which may be present at the site thereby creating a potential tripping hazard. During intrusive work, care should be taken to mark or remove any obstacles within the exclusion zone.

3.1.2 Climbing Hazards

During site activities, workers may have to work on excavating equipment by climbing. The excavating contractor will conform with any applicable NIOSH and OSHA requirements or climbing activities.

3.1.3 Cuts and Lacerations

Field activities that involve excavating activities usually involve contact with various types of machinery. A first aid kit approved by the American Red Cross will be available during all intrusive activities.

3.1.4 Lifting Hazards

Improper lifting by workers is one of the leading causes of industrial injuries. Field workers in the excavation program may be required to lift heavy objects. Therefore, all members of the field crew should be trained in the proper methods of lifting heavy objects. All workers should be cautioned against lifting objects too heavy for one person.

3.1.5 Utility Hazards

Before conducting any excavation, the excavation contractor will be responsible for locating and verifying all existing utilities at each excavation.

3.1.6 Traffic Hazards

All traffic, vehicular and pedestrian, shall be maintained and protected at all times consistent with local, state and federal agency regulations regarding such traffic and in accordance with NYCDOT guidelines. The excavation contractor shall carry on his operations without undue interference or delays to traffic. The excavation contractor shall furnish all labor, materials, guards, barricades, signs, lights, and anything else necessary to maintain traffic and to protect his work and the public, during operations.

3.2 Work in Extreme Temperatures

Work under extremely hot or cold weather conditions requires special protocols to minimize the chance that employees will be affected by heat or cold stress.

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

3.2.1 Heat Stress

The combination of high ambient temperature, high humidity, physical exertion, and personal protective apparel, which limits the dissipation of body heat and moisture, can cause heat stress.

The following prevention, recognition and treatment strategies will be implemented to protect personnel from heat stress. Personnel will be trained to recognize the symptoms of heat stress and to apply the appropriate treatment.

1. Prevention
    a. Provide plenty of fluids. Available in the support zone will be a 50% solution of fruit punch and water or plain water.
    b. Work in Pairs. Individuals should avoid undertaking any activity alone.
    c. Provide cooling devices. A spray hose and a source of water will be provided to reduce body temperature, cool protective clothing and/or act as a quick-drench shower in case of an exposure incident.
    d. Adjustment of the work schedule. As is practical, the most labor-intensive tasks should be carried out during the coolest part of the day.

2. Recognition and Treatment
    a Heat Rash (or prickly heat):
        Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.
        Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.
        Treatment: Remove source or irritation and cool skin with water or wet cloths.

    b. Heat Cramps (or heat prostration)
        Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.
        Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.
        Treatment: Perform the following while making arrangement for transport to a medical facility. Remove the worker to a contamination reduction zone. Remove protective clothing. Lie worker down on back in a cool place and raise feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of salt-water solution, using one teaspoon of salt in 12 ounces of water. Transport to a medical facility.
    c. Heat Exhaustion
        Cause: Exposure to high temperatures accompanied by fluid loss. There are two type of heat exhaustion: water depletion and salt depletion.
        Symptoms: Headache, nausea, dizziness, vomiting and heavy sweating.
        Treatment: Cool worker immediately by moving to a cooler environment, elevating feet and replenishing fluids.
    d. Heat Stroke
        Cause: Same as heat exhaustion. This is also an extremely serious

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

condition.

Symptoms: Dry hot skin, dry mouth, dizziness, nausea, headache, rapid pulse.

Treatment: Cool worker immediately by immersing or spraying with cool water or sponge bare skin after removing protective clothing. Transport to hospital

3.2.2 Cold Exposure

Exposure to cold weather, wet conditions and extreme wind-chill factors may result in excessive loss of body heat (hypothermia) and /or frostbite. To guard against cold exposure and to prevent cold injuries, appropriate warm clothing should be worn, warm shelter must be readily available, rest periods should be adjusted as needed, and the physical conditions of on-site field personnel should be closely monitored. Personnel and supervisors working on-site will be made aware of the signs and symptoms of frost bite and hypothermia such as:

- Shivering;
- reduced blood pressure;
- reduced coordination;
- drowsiness;
- impaired judgment;
- fatigue;
- pupils dilated but reactive to light; and,
- numbing of the toes and fingers.

3.3 Chemical Hazards

The RI Investigation identified chlorinated and petroleum volatile organic compounds (VOCs) in soil, groundwater and soil vapor and free phase fuel oil and semi-volatile compounds in soil at the Site. In addition "Urban fill" materials which contain elevated levels of SVOCs and metals as well as other compounds were identified throughout the Site. These "contaminants" are not related to a chemical release occurring on the site, but are inherent in the reworked fill material in the area which contains ash and bits of tar and asphalt. Considering the previous sampling results and the past and present use of the site, the following compounds are considered for the site as potential contaminants: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyl's (PCBs), and heavy metals such as arsenic, chromium, lead and mercury.

Based on the findings of the Remedial Investigation and the inherent properties of urban fill, the following compounds are considered for the site as potential contaminants: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and heavy metals.

Volatile organic compounds reported to be present in soil include the following:

1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	Acetone	Ethylbenzene
m&p-xylenes	Methylene Chloride	napthalene	n-Butylbenzene
n-propylbenzene	o-xylenes	o-xylenes	Toluene

Semi-Volatile organic compounds expected to be in the fill materials include the following:

Indeno(1,2,3-cd)pyrene	Napthalene

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

Metals expected to be present in fill materials include the following:

Chromium	Lead	Nickel

The primary routes of exposure to these contaminants are inhalation, ingestion and absorption.

Appendix C includes information sheets for suspected chemicals that may be encountered at the site. Also included under the appendix are procedures for handling and storing the chemical oxidant. These procedures will be followed to protect workers and the public.

3.3.1 Respirable Dust

Dust may be generated from vehicular traffic and/or excavation activities. If visible observation detects elevated levels of dust, a program of wetting will be employed by the site safety officer. If elevated dust levels persist, the site safety office will employ dust monitoring using a particulate monitor (Miniram or equivalent). If monitoring detects concentrations greater than 150 µg/m3 over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with high efficiency particulate air (HEPA) cartridges.

Absorption pathways for dust and direct contact with soils or groundwater will be mitigated with the implementation of latex gloves, hand washing and decontamination exercises when necessary.

3.3.2 Dust Control and Monitoring During Earthwork

Dust generated during excavation activities or other earthwork may contain contaminants identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 150 $\mu g/m^3$ over site-specific background in the breathing zone as measured by a dust monitor unless the site safety officer directs workers to wear APRs. The site safety officer will use visible dust as an indicator to implement the dust control plan.

3.3.3 Organic Vapors

Elevated levels of chlorinated VOCs were detected in soil, soil gas and groundwater samples collected during previous investigations at the site. Therefore, excavation activities may cause the release of organic vapors to the atmosphere. The site safety officer will periodically monitor organic vapors with a Photoionization Detector (PID) during excavation activities to determine whether organic vapor concentrations exceed action levels shown in Section 5 and/or the Community Air Monitoring Plan.

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) shall be selected in accordance with the site air monitoring program, OSHA 29 CFR 1910.120(c), (g), and 1910.132. Protective equipment shall be NIOSH approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D thru B is the addition of the type of respiratory protection. **It is anticipated that work will be performed in Level D PPE.**

4.1 Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. Level D PPE consists of:

- standard work uniform, coveralls, or tyvek, as needed;
- steel toe and steel shank work boots;
- hard hat;
- gloves, as needed;
- safety glasses;
- hearing protection;
- equipment replacements are available as needed.

4.2 Level C

Level C PPE shall be donned when the concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable OVA, or equivalent), but are less than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have adequate warning properties and criteria for using APR have been met. Level C PPE consists of:

- chemical resistant or coated tyvek coveralls;
- steel-toe and steel-shank workboots;
- chemical resistant overboots or disposable boot covers;
- disposable inner gloves (surgical gloves);
- disposable outer gloves;
- full face APR fitted with organic vapor/dust and mist filters or filters appropriate for the identified or expected contaminants;
- hard hat;
- splash shield, as needed; and,
- ankles/wrists taped with duct tape.

The site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes.

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

The exact PPE ensemble is decided on a site-by-site basis by the Site Safety Officer with the intent to provide the most protective and efficient worker PPE.

4.3 Activity-Specific Levels of Personal Protection

The required level of PPE is activity-specific and is based on air monitoring results (Section 4.0) and properties of identified or expected contaminants. **It is expected that site work will be performed in Level D.** If air monitoring results indicate the necessity to upgrade the level of protection engineering controls (i.e. Facing equipment away from the wind and placing site personnel upwind of drilling locations, active venting, etc.) will be implemented before requiring the use of respiratory protection.

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Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

5.0 AIR MONITORING AND ACTION LEVELS

29 CFR 1910.120(h) specifies that monitoring shall be performed where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances.

5.1 Air Monitoring Requirements

If excavation work is performed, air will be monitored for VOCs with a portable ION Science 3000EX photoionization detector, or the equivalent. If necessary, Lower Explosive Limit (LEL) and oxygen will be monitored with a Combustible Gas Indicator (CGI). If appropriate, fugitive dust will be monitored using a MiniRam Model PDM-3 aerosol monitor. Air will be monitored when any of the following conditions apply:

- initial site entry;
- during any work where a potential IDLH condition or flammable atmosphere could develop;
- excavation work begins on another portion of the site;
- contaminants, other than those previously identified, have been discovered;
- each time a different task or activity is initiated;
- during trenching and/or excavation work.

The designated site safety officer will record air monitoring data and ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. Instruments will be zeroed daily and checked for accuracy. Monitoring results will be recorded in a field notebook and will be transferred to instrument reading logs.

5.2 Work Stoppage Responses

The following responses will be initiated whenever one or more of the action levels necessitating a work stoppage are exceeded:

1 The SSO will be consulted immediately
2 All personnel (except as necessary for continued monitoring and contaminant migration, if applicable) will be cleared from the work area (eg from the exclusion zone).
3 Monitoring will be continued until intrusive work resumes.

5.3 Action Levels During Soil Disturbance Activities

Instrument readings will be taken in the breathing zone, unless otherwise noted. Each action level is independent of all other action levels in determining responses.

Organic Vapors (PID)	LEL %	Responses
0-1 ppm above background	0%	• Continue soil disturbance • Level D protection • Continue monitoring every 15 minutes

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Phone 631.504.6000
Fax 631.924.2870

1-5 ppm Above Background, Sustained Reading	1-10%	• Continue soil disturbance • Go to Level C protection or employ engineering controls • Continue monitoring every 15 minutes
5-25 ppm Above Background, Sustained Reading	10-20%	• Discontinue soil disturbance, unless PID is only action level exceeded. • Level C protection or employ engineering controls • Continue monitoring for organic vapors 200 ft downwind • Continuous monitoring for LEL at soil disturbance area
>25 ppm Above Background, Sustained Reading	>20%	• Discontinue soil disturbance • Withdraw from area, shut off all engine ignition sources. • Allow soil disturbance area to vent • Continuous monitoring for organic vapors 200 ft downwind.

Notes: Air monitoring will occur in the breathing zone 30 inches above the soil disturbance area. Readings may also be taken in the soil disturbance area but will not be used for action levels.

If action levels for any one of the monitoring parameters are exceeded, the appropriate responses listed in the right hand column should be taken. If instrument readings do not return to acceptable levels after the soil disturbance area has been vented for a period of greater than one-half hour, a decision will then be made whether or not to seal the soil disturbance area with suppressant foam.

If, during soil disturbance activities, downwind monitoring PID readings are greater than 5 ppm above background for more than one-half hour, soil disturbance will stop until sustained levels are less then 5 ppm (see Community Air Monitoring Plan).

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Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

6.0 SITE CONTROL

6.1 Work Zones

The primary purpose of site controls is to establish the perimeter of a hazardous area, to reduce the migration of contaminants into clean areas, and to prevent access or exposure to hazardous materials by unauthorized persons. When operations are to take place involving hazardous materials, the site safety officer will establish an exclusion zone, a decontamination zone, and a support zone. These zones "float" (move around the site) depending on the tasks being performed on any given day. The site safety officer will outline these locations before work begins and when zones change. The site safety officer records this information in the site log book. If contamination is encountered then the Site Safety officer will establish the zones as follows:

Tasks requiring OSHA 40-hour Hazardous Waste Operations and Emergency Response Operations training are carried out in the exclusion zone. The exclusion zone is defined by the site safety officer but will typically be a 50-foot area around work activities. Gross decontamination (as determined by the site Health and Safety Officer) is conducted in the exclusion zone; all other decontamination is performed in the decontamination zone or trailer.

Protective equipment is removed in the decontamination zone. Disposable protective equipment is stored in receptacles staged in the decontamination zone, and non-disposable equipment is decontaminated. All personnel and equipment exit the exclusion zone through the decontamination zone. If a decontamination trailer is provided the first aid equipment, an eye wash unit, and drinking water are kept in the decontamination trailer.

The support zone is used for vehicle parking, daily safety meetings, and supply storage. Eating, drinking, and smoking are permitted only in the support zone. When a decontamination trailer is not provided, the eye wash unit, first aid equipment, and drinking water are kept at a central location designated by the site safety officer.

6.2 General Site Work

A general excavation contractor may complete the site excavation/grading as needed for the footing installation, or as deemed necessary by the Interim Remedial Measure Work Plan and/or Project Manager. All onsite employees must have obtained OSHA 24-hour Hazardous Waste Operations and Emergency Response Operations training prior to performing soil disturbing activities.

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Environmental Business Consultants
1808 Middle Country Road
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Phone 631.504.6000
Fax 631.924.2870

7.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital will be posted in the command post. Site personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment.

7.1 Emergency Equipment On-site

Private telephones:	Site personnel.
Two-way radios:	Site personnel where necessary.
Emergency Alarms:	On-site vehicle horns*.
First aid kits:	On-site, in vehicles or office.
Fire extinguisher:	On-site, in office or on equipment.

* Horns: Air horns will be supplied to personnel at the discretion of the project superintendent or site safety officer.

7.2 Emergency Telephone Numbers

General Emergencies	911
New York City Police	911
New York Community Hospital	1-718-692-5300
NYSDEC Spills Division	1-800-457-7362
NYSDEC Division of Env. Remediation	1-718-482-4900
NYCDEP	1-718-699-9811
NYC Department of Health	1-212-788-4711
NYC Fire Department	911
National Response Center	1-800-424-8802
Poison Control	1-212-340-4494
Site Safety Officer	1-631-504-6000
Alternate Site Safety Officer	1-631-504-6000

7.3 Personnel Responsibilities During an Emergency

The project manager is primarily responsible for responding to and correcting any emergency situations. However, in the absence of the project manager, the site safety officer shall act as the project manager's on-site designee and perform the following tasks:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, evacuate and secure the site, or upgrade/downgrade the level of protective clothing and respiratory protection;

- Ensure that appropriate federal, state, and local agencies are informed and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation;

- Ensure appropriate decontamination, treatment, or testing for exposed or injured personnel;

- Determine the cause of incidents and make recommendations to prevent recurrence; and,

- Ensure that all required reports have been prepared.

The following key personnel are planned for this project:

- Project Manager — Mrs. Chawinie Reilly (631) 504-6000
- Site Safety Officer — Mr. Kevin Waters (631) 504-6000

7.4 Medical Emergencies

A person who becomes ill or injured in the exclusion zone will be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination will be completed and first aid administered prior to transport. First aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (**Appendix D**) must be filled out for any injury.

A person transporting an injured/exposed person to a clinic or hospital for treatment will take the directions to the hospital (**Appendix D**).and information on the chemical(s) to which they may have been exposed (**Appendix C**).

7.5 Fire or Explosion

In the event of a fire or explosion, the local fire department will be summoned immediately. The site safety officer or his designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on-site. If it is safe to do so, site personnel may:

- use fire fighting equipment available on site; or,
- remove or isolate flammable or other hazardous materials that may contribute to the fire.

7.6 Evacuation Routes

Evacuation routes established by work area locations for each site will be reviewed prior to commencing site operations. As the work areas change, the evacuation routes will be altered accordingly, and the new route will be reviewed.

Under extreme emergency conditions, evacuation is to be immediate without regard for equipment. The evacuation signal will be a continuous blast of a vehicle horn, if possible, and/or by verbal/radio communication. When evacuating the site, personnel will follow these

instructions:

- Keep upwind of smoke, vapors, or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.
- The site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.
- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

7.7 Spill Control Procedures

Spills associated with site activities may be attributed to project equipment and include gasoline, diesel and hydraulic oil. In the event of a leak or a release, site personnel will inform their supervisor immediately, locate the source of spillage and stop the flow if it can be done safely. A spill containment kit including absorbent pads, booms and/or granulated speedy dry absorbent material will be available to site personnel to facilitate the immediate recovery of the spilled material. Daily inspections of site equipment components including hydraulic lines, fuel tanks, etc. will be performed by their respective operators as a preventative measure for equipment leaks and to ensure equipment soundness. In the event of a spill, site personnel will immediately notify the NYSDEC (1-800-457-7362), and a spill number will be generated.

7.8 Vapor Release Plan

If work zone organic vapor (excluding methane) exceeds 5 ppm, then a downwind reading will be made either 200 feet from the work zone or at the property line, whichever is closer. If readings at this location exceed 5 ppm over background, the work will be stopped.

If 5 ppm of VOCs are recorded over background on a PID at the property line, then an off-site reading will be taken within 20 feet of the nearest residential or commercial property, whichever is closer. If efforts to mitigate the emission source are unsuccessful for 30 minutes, then the designated site safety officer will:

- contact the local police;
- continue to monitor air every 30 minutes, 20 feet from the closest off-site property. If two successive readings are below 5 ppm (non-methane), off-site air monitoring will be halted.
- All property line and off site air monitoring locations and results associated with vapor releases will be recorded in the site safety log book.

APPENDIX A

SITE SAFETY ACKNOWLEDGEMENT FORM

DAILY BREIFING SIGN-IN SHEET

Date:_____ Person Conducting Briefing:_____

Project Name and Location:_____

1. AWARENESS (topics discussed, special safety concerns, recent incidents, etc…):

_____

_____

_____

_____

2. OTHER ISSUES (HASP changes, attendee comments, etc…):

_____

_____

_____

3. ATTENDEES (Print Name):

1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

APPENDIX B

SITE SAFETY PLAN AMENDMENTS

SITE SAFETY PLAN AMENDMENT FORM

Site Safety Plan Amendment #:_____

Site Name: _____

Reason for Amendment:_____

_____

_____

_____

Alternative Procedures:_____

_____

_____

_____

Required Changes in PPE:_____

_____

_____

_____

_____ _____

Project Superintendent (signature) Date

_____ _____

Health and Safety Consultant (signature) Date

_____ _____

Site Safety Officer (signature) Date

APPENDIX C

CHEMICAL HAZARDS

CHEMICAL HAZARDS

The attached International Chemical Safety Cards are provided for contaminants of concern that have been identified in soils and/or groundwater at the site.

APPENDIX D

HOSPITAL INFORMATION AND MAP

FIELD ACCIDENT REPORT

FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME _____ PROJECT. NO._____

Date of Accident _____ Time _____ Report By _____

Type of Accident (Check One):

( ) Vehicular ( ) Personal ( ) Property

Name of Injured _____ DOB or Age _____

How Long Employed _____

Names of Witnesses _____

_____

Description of Accident _____

_____

_____

Action Taken _____

_____

_____

Did the Injured Lose Any Time? _____ How Much (Days/Hrs.)? _____

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)? _____

_____

(If not, it is the EMPLOYEE'S sole responsibility to process his/her claim through his/her Health and Welfare Fund.)

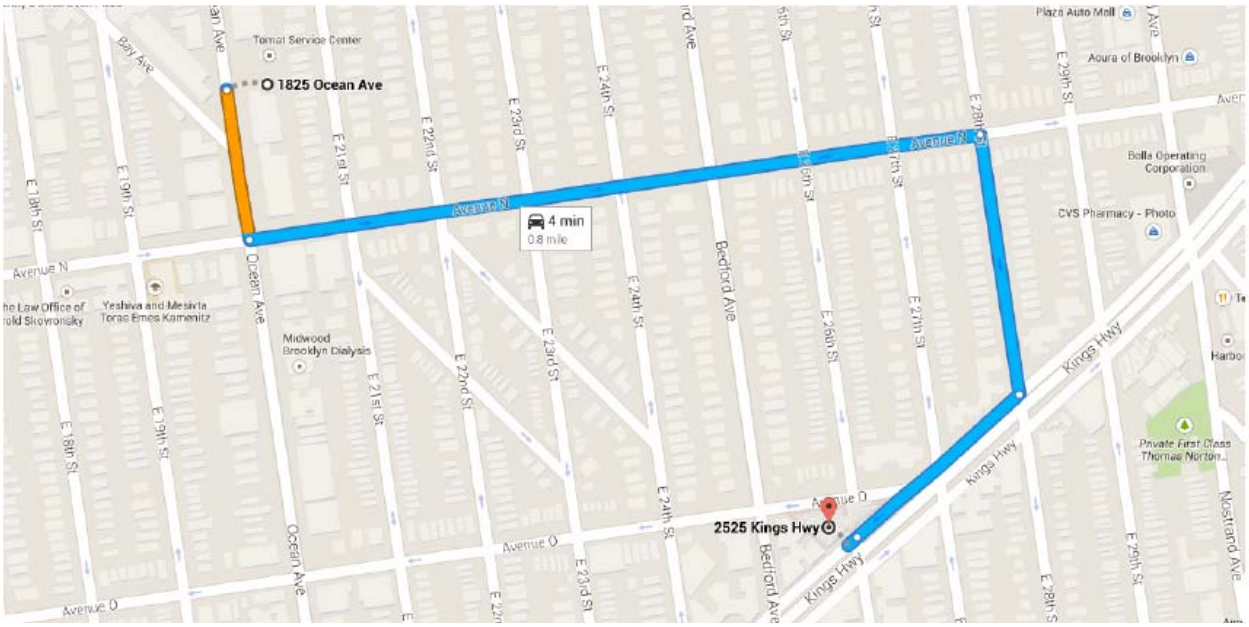
INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

HOSPITAL INFORMATION AND MAP

The hospital nearest the site is:

New York Community Hospital

2525 Kings Highway
Brooklyn, New York 11229
0.8 miles – 4 min
(718)-692-5300



1825 Ocean Ave
Brooklyn, NY 11230

1. Head **south** on **Ocean Ave** toward **Bay Ave** — 436 ft
2. Turn **left** onto **Avenue N** — 0.4 mi
3. Turn **right** onto **E 28th St** — 0.1 mi
4. Turn **right** onto **Kings Hwy** — 0.1 mi
5. Keep **right** to stay on **Kings Hwy** — 36 ft
   Destination will be on the right

2525 Kings Hwy
Brooklyn, NY 11229

ATTACHMENT H
Site Management Forms

Tomat Service Station
1815-1825 Ocean Avenue, Brooklyn NY

SOIL VAPOR EXTRACTION SYSTEM INSPECTION FORM

Date:_____

Time:_____

Weather:_____

Inspector:_____

Extraction Point	Vacuum (iwc)	PID Reading(ppm)
SVE-1		
SVE-2		
Blower inlet		
Carbon inlet		
Between carbon		

Inspection:	Yes / No	Comments
Blower Operating?		
Spare Carbon Drums?		
System Integrity?		

Comments:

Tomat Service Station
1815-1825 Ocean Avenue, Brooklyn NY

AIR SPARGING SYSTEM INSPECTION FORM

Injection Point	Pressure
AS-1	
AS-2	
AS-3	
AS-4	
AS-5	
AS-6	
AS-7	
AS-8	

Inspection:	Yes / No	Comments
Blower Operating?		
Timer, 3-way actuated valve operating?		
System Integrity?		

Comments:

Tomat Service Station
1815-1825 Ocean Avenue, Brooklyn NY

CARBON MONITORING

Carbon filter installation date:_____

Date/Time	**Location**	**PID reading**	**PID units(ppm or ppb)**
	Pre-Carbon		
	Between Carbon		
	Post -Carbon		

Comments:

EQUIPMENT SHED

Inspection:	Yes / No	Comments
Vent Operating?		

AS Blower Lubrication and Oil Change

Location	Frequency	Comments
AS Blower Lubrication checks	Every Visit	
AS Blower Oil Change	Every 166 Days	

SVE / AIR SPARGE TEST PROCEDURES

PRIOR TO STARTING

1. Take depth to water and total depth readings at all observation wells.

2. Take DO readings at all observation wells.

3. Zero out the digital manometer. Calibrate the PID.

4. Fit observation wells with cap / hose barb fitting.

5. Measure the distance from the SVE test well to each of the observations wells and then measure the distance from the sparging test well to each of the observation wells.

6. Take vacuum / pressure readings with manometer and PID readings at all observation wells.

SVE ONLY

1. Connect SVE blower to SVE test well. Open bypass valve on blower.

2. Turn on generator and then blower.

3. Fully close bypass valve on blower and note maximum vacuum at SVE well vacuum gauge. Reduce vacuum by adjusting bypass valve until vacuum at wellhead is 1/3rd of maximum.

4. Record vacuum readings in the observation wells with a manometer. Record the vacuum at the blower and at the wellhead with the vacuum gauges. Do not use manometer for vacuum readings at blower as it will damage the unit.

5. Run the test at this vacuum for 15 minutes or until vacuum at the observation wells stabilize. Record air flow at discharge point and take pid readings in the influent air stream (before carbon).

6. Increase the vacuum at the well head to 2/3rds maximum and repeat steps 4 and 5.

7. Increase the vacuum at the well head to maximum and repeat steps 4 and 5.

Summary of Green Remediation Metrics for Site Management

Site Name: _____ Site Code: _____
Address: _____ City: _____
State: _____ Zip Code: _____ County: _____

Initial Report Period (Start Date of period covered by the Initial Report submittal)
Start Date: _____

Current Reporting Period
Reporting Period From: _____ To: _____

Contact Information
Preparer's Name: _____ Phone No.: _____
Preparer's Affiliation: _____

I. Energy Usage: Quantify the amount of energy used directly on-site and the portion of that derived from renewable energy sources.

	Current Reporting Period	**Total to Date**
Fuel Type 1 (e.g. natural gas (cf))		
Fuel Type 2 (e.g. fuel oil, propane (gals))		
Electricity (kWh)		
Of that Electric usage, provide quantity:		
Derived from renewable sources (e.g. solar, wind)		
Other energy sources (e.g. geothermal, solar thermal (Btu))		

Provide a description of all energy usage reduction programs for the site in the space provided on Page 3.

II. Solid Waste Generation: Quantify the management of solid waste generated on-site.

	Current Reporting Period (tons)	**Total to Date (tons)**
Total waste generated on-site		
OM&M generated waste		
Of that total amount, provide quantity:		
Transported off-site to landfills		
Transported off-site to other disposal facilities		
Transported off-site for recycling/reuse		
Reused on-site		

Provide a description of any implemented waste reduction programs for the site in the space provided on Page 3.

III. Transportation/Shipping: Quantify the distances travelled for delivery of supplies, shipping of laboratory samples, and the removal of waste.

	Current Reporting Period (miles)	**Total to Date (miles)**
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service		
Waste Removal/Hauling		

Provide a description of all mileage reduction programs for the site in the space provided on Page 3. Include specifically any local vendor/services utilized that are within 50 miles of the site.

IV. Water Usage: Quantify the volume of water used on-site from various sources.

	Current Reporting Period (gallons)	**Total to Date (gallons)**
Total quantity of water used on-site		
Of that total amount, provide quantity:		
Public potable water supply usage		
Surface water usage		
On-site groundwater usage		
Collected or diverted storm water usage		

Provide a description of any implemented water consumption reduction programs for the site in the space provided on Page 3.

V. Land Use and Ecosystems: Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition (i.e. Green Infrastructure).

	Current Reporting Period (acres)	**Total to Date (acres)**
Land disturbed		
Land restored		

Provide a description of any implemented land restoration/green infrastructure programs for the site in the space provided on Page 3.

Description of green remediation programs reported above (Attach additional sheets if needed)
Energy Usage:
Waste Generation:
Transportation/Shipping:
Water usage:
Land Use and Ecosystems:
Other:

CERTIFICATION BY CONTRACTOR
I, _____ (**Name**) do hereby certify that I am _____ (**Title**) of the Company/Corporation herein referenced and contractor for the work described in the foregoing application for payment. According to my knowledge and belief, all items and amounts shown on the face of this application for payment are correct, all work has been performed and/or materials supplied, the foregoing is a true and correct statement of the contract account up to and including that last day of the period covered by this application. _____ **Date** **Contractor**

Site Inspection Checklist - Cover System
1815-1825 Ocean Ave
Brooklyn NY

Date: _____ Time: _____

Inspector Name/Organization: _____

Visual Inspection of Concrete Slabs

Cellar Slab Inspect concrete slab for cracks, perforations and patching

Describe General Condition of Slab

Describe any Cracks or New Penetrations

Describe any Patching

Visual Inspection of Asphalt Slabs

1st Floor Asphalt Slab Inspect asphalt slab for cracks, perforations and patching

Describe General Condition of Slab

Describe any Cracks or New Penetrations

Describe any Patching

Visual Inspection of Soil Cap

Soil Cap Inspect soil cap

Describe General Condition of Soil Cap

Describe any New Penetrations

Describe any Patching

CONTACT LIST

ENVIRONMENTAL CONSULTANT	Chawinie Reilly	631-504-6000	Creilly@ebcincny.cm
DEC PROJECT MANGER	Richard Mustico	518-402-9647	richard.mustico1@dec.ny.gov
PROPERTY OWNER	Ocean Units LLC		

Repairs Needed and / or Maintenance at this time?

Signature: _____ Date: _____

ATTACHMENT I
O&M Manual (Prepared for all Active ECs)

1.0 SYSTEM OPERATION AND MAINTENANCE

1.1 START-UP

The SVE and AS systems can begin operation once all of the components (piping, equipment, electrical connections, etc.) have been installed and determined to be functional. Following installation of the system, the following items will be inspected to ensure proper operation:

1) Check all exposed/visible piping for evidence of damage, cracks, or leaks.
2) Turn the SVE blower on and off to ensure the start box is functioning properly and then leave blower on;
3) Record vacuum reading at the SVE blower;
4) Record vacuum readings at each extraction wellhead;
5) Balance the vacuum between the two extraction wells by adjusting the ball valves;
6) Take PID readings before, in-between and after carbon vessels;
7) Turn the AS blower on and off to ensure the start box is functioning properly and then leave blower on;
8) Determine which leg of the system is on and adjust the air pressure at each wellhead to 10 -15% above that required to overcome the water column in the well (break-out pressure).
9) Toggle the three-way valve to the second leg and repeat step 7 on the wells connected to the second leg of the system.

The system testing described above will be conducted if, in the course of the AS / SVE system lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

1.2 SYSTEM INSPECTIONS AND ADJUSTMENT

The air sparging system will need to be adjusted in response to changes in water level. Such changes will either increase or decrease the amount of pressure needed to overcome the water column and maintain optimal operating conditions. The SVE portion of the system will not require periodic adjustment once the extraction wells are properly balanced.

A visual inspection of the complete system will be conducted during each monitoring event. The AS Blower (Roots URAI 32) requires lubrication checks of the gear box and bearing reservoirs which will be completed every visit. In addition oil changes will be needed for the AS Blower (Roots URAI 32) every 166 days. AS /SVE system components to be monitored include, but are not limited to, the following:

AS /SVE system components	**Frequency**
SVE Blower (EN707)	Monthly basis for the first 3 months of operation going to quarterly thereafter
AS Blower (Roots URAI 32)	Monthly basis for the first 3 months of operation going to quarterly thereafter
AS Blower (Roots URAI 32) Lubrication	Every Visit
AS Blower (Roots URAI 32) Oil Change	Every 166 Days
General system piping	Monthly basis for the first 3 months of operation going to quarterly thereafter
Vacuum gauges at blower	Monthly basis for the first 3 months of operation going to quarterly thereafter
Pressure relief valve	Monthly basis for the first 3 months of operation going to quarterly thereafter
PID and Vacuum readings from SVE1, SVE2, blower inlet, carbon inlet, between carbon	Monthly basis for the first 3 months of operation going to quarterly thereafter
PID Readings	Monthly basis for the first 3 months of operation going to quarterly thereafter
PID Readings	Monthly basis for the first 3 months of operation going to quarterly thereafter
Pressure readings from AS1, AS2, AS3, AS4, AS5, AS6 AS7 and AS8	Monthly basis for the first 3 months of operation going to quarterly thereafter
Equipment Shed	Monthly basis for the first 3 months of operation going to quarterly thereafter

The adjustment procedures for the dual leg air sparging system are as follows:

Method 1 (if sparging lines are not air tight and there is access to each sparge point wellhead)

1. Turn off sparge blower
2. Check actuator valve to determine which leg is in the "ON" cycle.
3. Take depth to water readings & total depth (if not known) at each sparge point.
4. Determine displacement pressure & operating pressure for each point according to following example:
Displacement pres. (psi) = ((T.D. - DTW) - 2.4) x 0.43302
Operating pres. (psi) = Disp. pres. x 1.15 (for 15% over)
5. Turn on sparge blower and adjust each point (on leg 1) to calc. operating pressure.
6. Switch actuator valve to second leg and adjust each point (on leg 2) to calc. operating pressure.
7. Return actuator valve to original position.
8. Record vacuum/pressure readings at vent wells and observation wells. Balance out vacuum at SVE wells. Take PID readings at SVE emission stack.

Method 2 (if lines are air tight)

1. Close off air supply (globe valve) to first sparge point in system. Watch press. gauge and wait for stabilization (approx. 4-4.5 psi for a 10 foot water column). Stabilization psi = displacement psi. Calculate operating psi as described above.

2. Perform procedures 6, 7 and 8 as detailed above.

All results must be recorded on the SVE System Inspection and AS System Inspection forms (Appendix G).

1.3 SVE System Operation: Non-Routine Equipment Maintenance

Non-routine maintenance is expected if any component of the system is damaged or fails. During each inspection, the system will be checked for structural integrity. Component damage or failure includes a broken valve, damaged pipe, or blower malfunction.

Additionally, if a hissing sound is noted in cellar area, this could be a sign of extraction line damage. In any case of component damage or failure, the system should be shut off and repairs/replacements should be made. The owner should contact AMC Engineering with any issues.

The system will not be restarted until all repairs are made. When the repairs are completed, the system should be started up as listed above.

2.0 MAINTENANCE AND PERFORMANCE MONITORING REPORTING REQUIREMENTS

Maintenance reports and any other information generated during regular operations at the site will be kept on-file.

2.1 Routine Maintenance Reports

Checklists or forms (attached) will be completed during each routine maintenance event. Checklists/forms will include, but not be limited to the following information:

- Date;
- Name, company, and position of person(s) conducting maintenance activities;
- Maintenance activities conducted;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted ; and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

2.2 Non-Routine Maintenance Reports

During each non-routine maintenance event, a form will be completed which will include, but not be limited to, the following information:

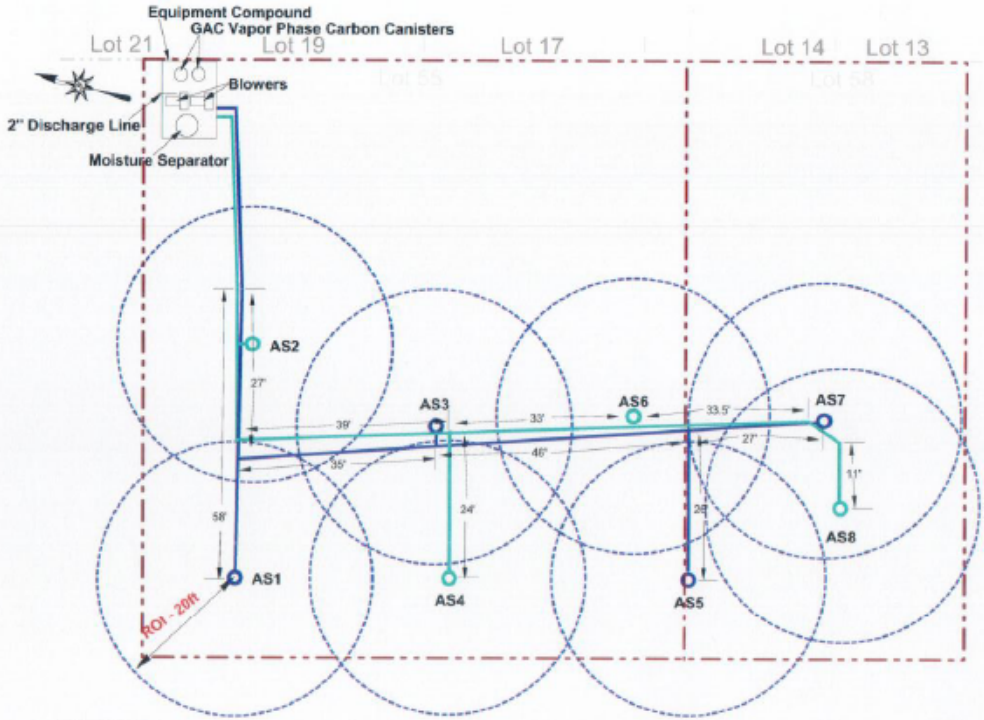
- Date;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Presence of leaks;
- Repairs or adjustments made to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and,

Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

2.3 Routine Parts List

Below are a list of system components that may require replacement:

Part Name	Manufacturer	Part Number	Supplier
PVC Ball Valves	Pro-Line	107-634HC	Home Depot https://www.homedepot.com/
PVC Globe Valves	Design Plastic System, Inc	1260-010	Design Plastic System, Inc 2541 General Armisted Avenue Norristown, PA 19403 (610)666-1806
Pressure Gauges	McMaster Carr	3846K1	McMaster Carr https://www.mcmaster.com/
SVE Blower	Ametek-Rotron	EN707	Enviro-Equipment Inc 11180 Downs Rd Pineville, NC 28134 (704)588-7970
AS Blower	Roots	Roots URAI 32	
85- Gallon Carbon Vessels	General Carbon	85G Air General	General Carbon 33 Paterson Street Paterson, New Jersey 07501 (973)-523-2223

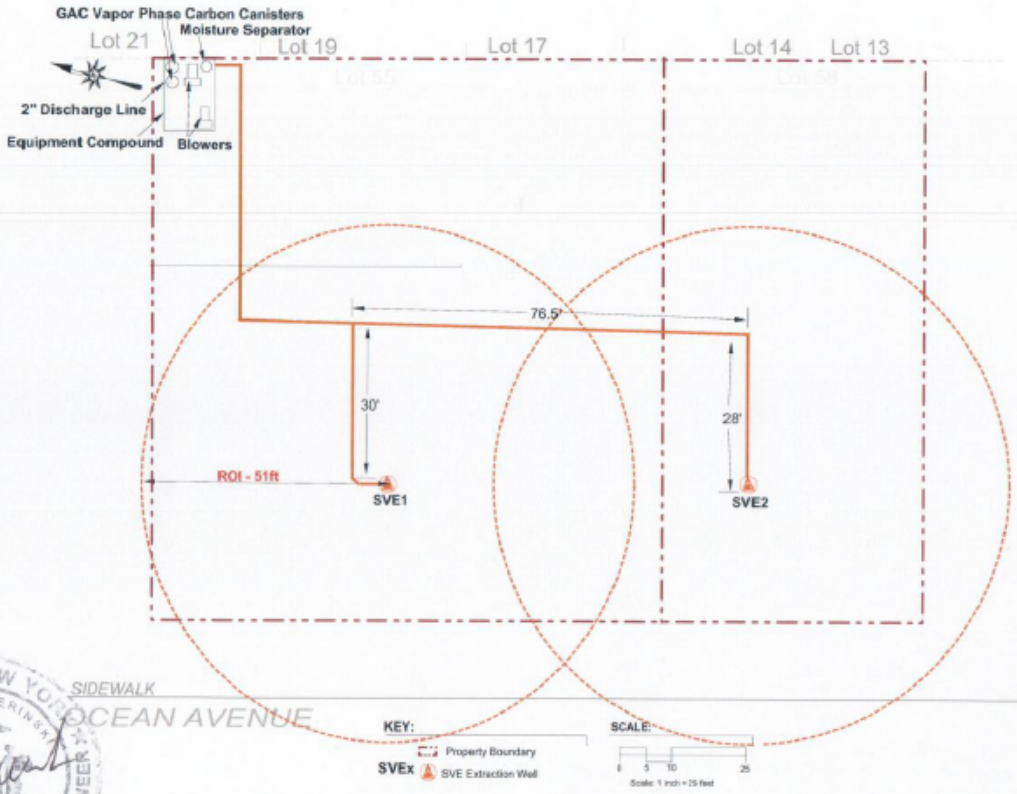


STATE OF NEW YORK
APPEL CZEMERINSKI
LICENSED PROFESSIONAL ENGINEER
076506

AMC Engineeting, PLLC
18-36 42nd Street
Astoria, NY 11105

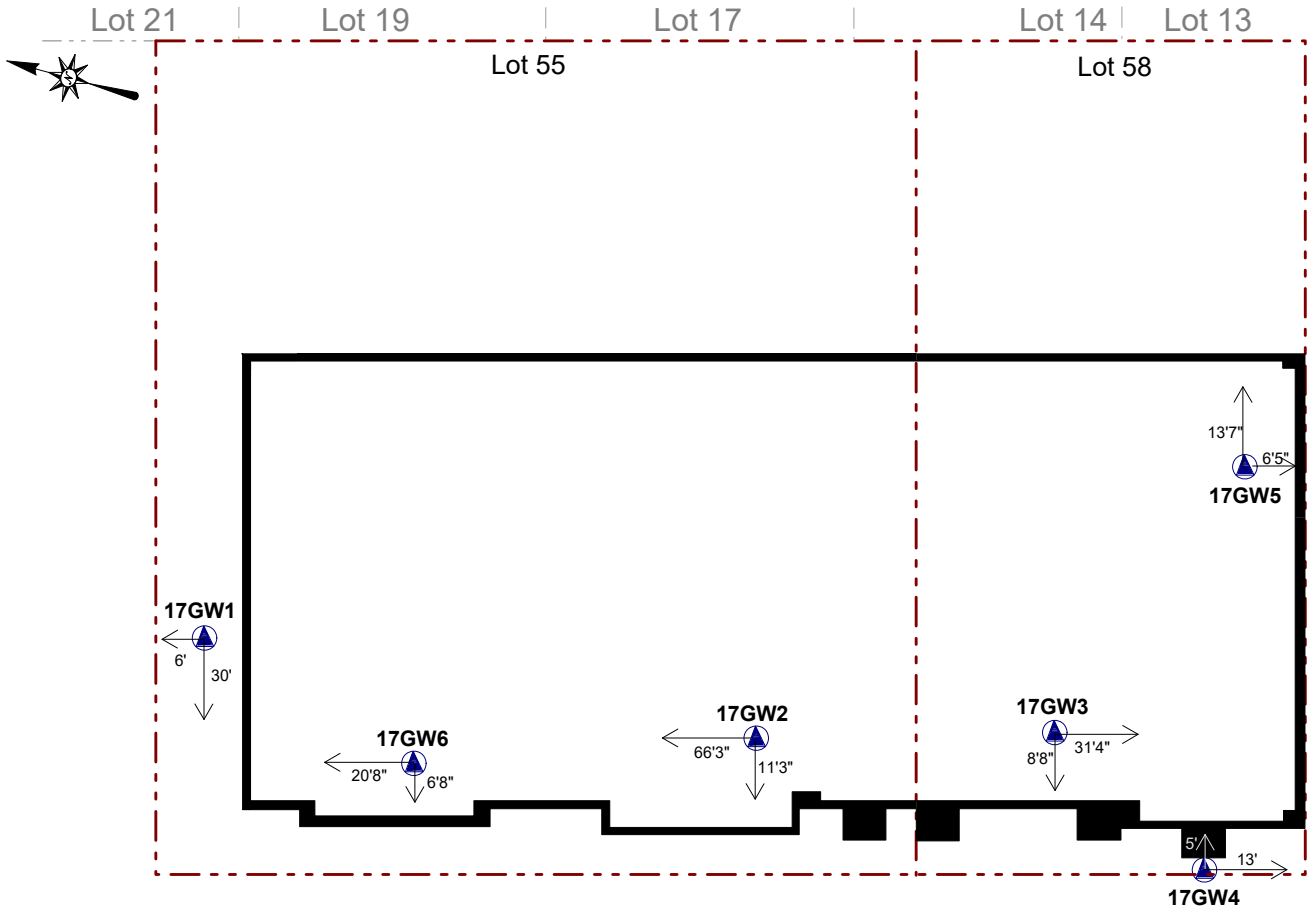
Figure No. 2

Site Name: TOMAT SERVICE STATION
Site Address: 1815-1825 OCEAN AVENUE, BROOKLYN, NY
Drawing Title: AIR SPARGE SYSTEM LAYOUT



STATE OF NEW YORK
AMEL CZEMERINSKY
LICENSED PROFESSIONAL ENGINEER
075506

AMC Engineering, PLLC 18-36 42nd Street Astoria, NY 11105	*Figure No.* **1**	Site Name:	TOMAT SERVICE STATION
		Site Address:	1815-1825 OCEAN AVENUE, BROOKLYN, NY
		Drawing Title:	SOIL VAPOR EXTRACTION SYSTEM LAYOUT



AMC Engineeting, PLLC
18-36 42nd Street
Astoria, NY 11105

Figure No.
3

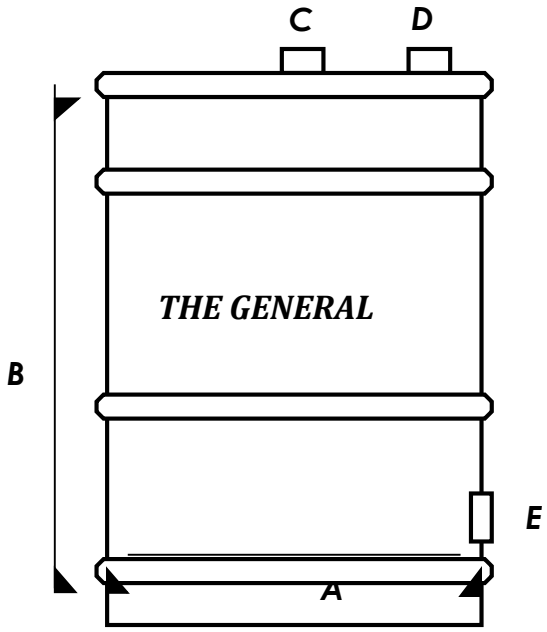
Site Name: TOMAT SERVICE STATION
Site Address: 1815-1825 OCEAN AVENUE, BROOKLYN, NY
Drawing Title: GROUNDWATER WELL LOCATION MAP

GENERAL CARBON CORP.

THE GENERAL

air pollution control barrels

THE GENERAL AIR POLLUTION CONTROL BARRELS are ready to use, low cost, self-contained air purification adsorbers designed to treat airflows streams of up to 250 CFM. The units are available in four different sizes to better serve your treatment applications.



SPECIFICATIONS	30 GALLON	55 GALLON	85 GALLON	110 GALLON
A - Diameter, Outside	19 -1/2"	24"	28"	32"
B – Height, Outside	29"	35"	39"	43"
Inlet Fitting	E - 2" MPT	E - 2" MPT	C - 4" FPT	C - 4" FPT
Outlet Fitting	C - 2" MPT	C - 2" MPT	D - 4" FPT	D - 4" FPT
Drain Fitting	E - 2" FPT	E - 2" FPT	E - 1" FPT	E - 1" FPT
Carbon Weight, lbs.	90	150	300	400
Max. Recommended Flow Rate, CFM	100	100	180	250
Maximum Pressure, psig	7	10	7	7
Maximum Design Temp., Deg F	140	140	140	140
Flow Direction	Upflow	Upflow	Upflow	Upflow

Activated Carbon - The General vapor adsorbers are filled with virgin, high activity, activated carbon. Any of virgin coal, coconut shell, reactivated or impregnated carbons are available as well.

Removable Lid - 16 gauge lid with ring & bolt closure, poly-clad cellulose gasket.

Connections - Metal connections with standard pipe threads insure easy, durable and leak proof hookup to your system. Unions or quick connect fittings are advised to make drum exchange easy. Drains let you remove any accumulated condensate.

Flow Distributors - The 55 gallon barrel uses an air chamber to insure even distribution of the airflow through the carbon. Low-pressure drop slotted Schedule 40 PVC collectors are used in the 85 gallon and 110 gallon drums for proper flow distribution. Stainless Steel internals and drums are available for special applications.

Coatings - The General pollution control barrels are coated on the inside with heat cured phenolic epoxy. The outside coating is industrial enamel. A polyethylene liner is available for extra corrosion resistance for the 55 gallon and 85 gallon units.

Installation & Start Up - The General air pollution control barrel requires no special procedure for startup. Just connect the inlet and outlet to the treatment system and start it up. Multiple units are usually connected in series with testing advised between the units to determine when the first unit needs to be changed out.

Maintenance - Once connected, The General requires no maintenance other than the monitoring of the influent and effluent air streams and the operating pressure of the system. Monitoring the air stream into the last Air Pollution Control Barrel in series mode is a recommended safeguard against breakthrough in the final discharge. When the concentration of contaminants in the outflow equals the concentration in the inflow, The General has reached its removal capacity and should be removed from service. The working life of each adsorber is dependent upon the type of contaminant in the air as well as its concentration and the airflow rate. A pressure relief device is advised to prevent damage to the canister in the event of excessive pressure buildup.

Recharging The General - Once the carbon has reached its pollutant removal capacity, the unit should be removed and replaced with a fresh one. To purchase replacement carbon or to arrange for a carbon change out, please contact our office.

Disposal - Dispose of the spent carbon in accordance with Federal, State and Local regulations.

Caution!

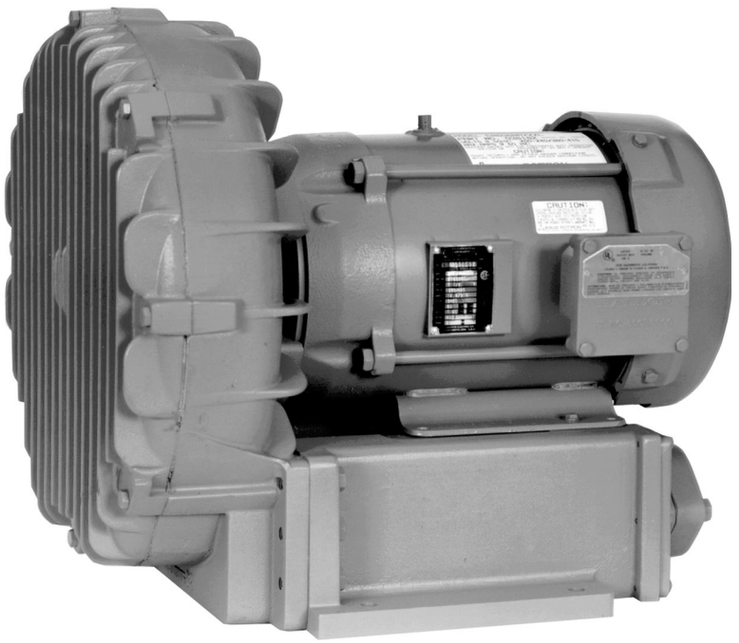
Wet activated carbon removes oxygen from air causing a severe hazard to workers inside carbon vessels. Confined space / low oxygen procedures should be put in place before any entry is made. Such procedures should comply with all applicable local, state and federal guidelines.

33 Paterson Street, Paterson, New Jersey 07501 Tel: 973 523 2223 Fax: 973 523 1494
www.generalcarbon.com sales@generalcarbon.com

EN 707 & CP 707 Three-Phase Sealed Regenerative Blower w/Explosion-Proof Motor

FEATURES

- Manufactured in the USA – ISO 9001 compliant
- Maximum flow: 295 SCFM
- Maximum pressure: 85 IWG
- Maximum vacuum: 87 IWG
- Standard motor: 5.0 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

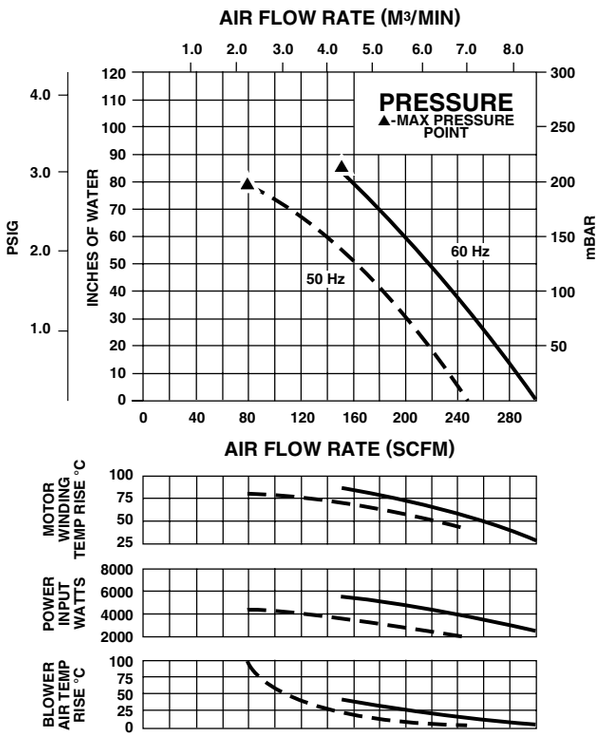
BLOWER OPTIONS

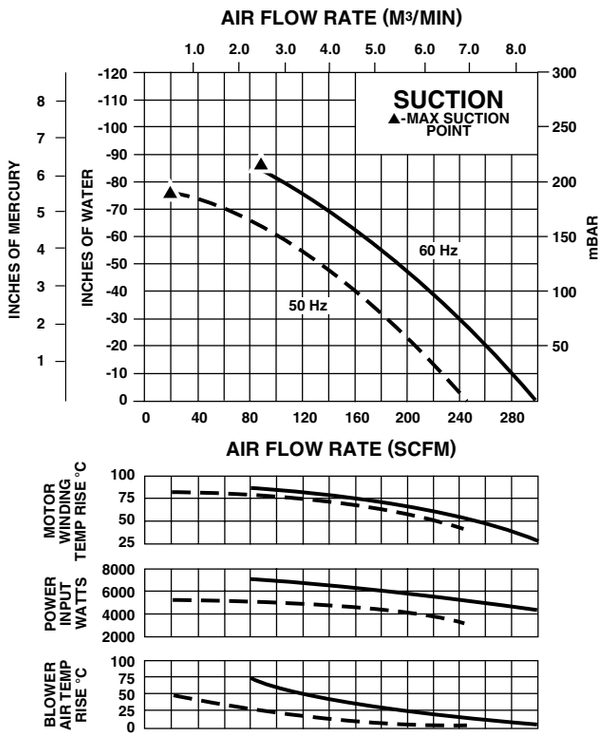
- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

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)
- Variable frequency drive package

BLOWER PERFORMANCE AT STANDARD CONDITIONS



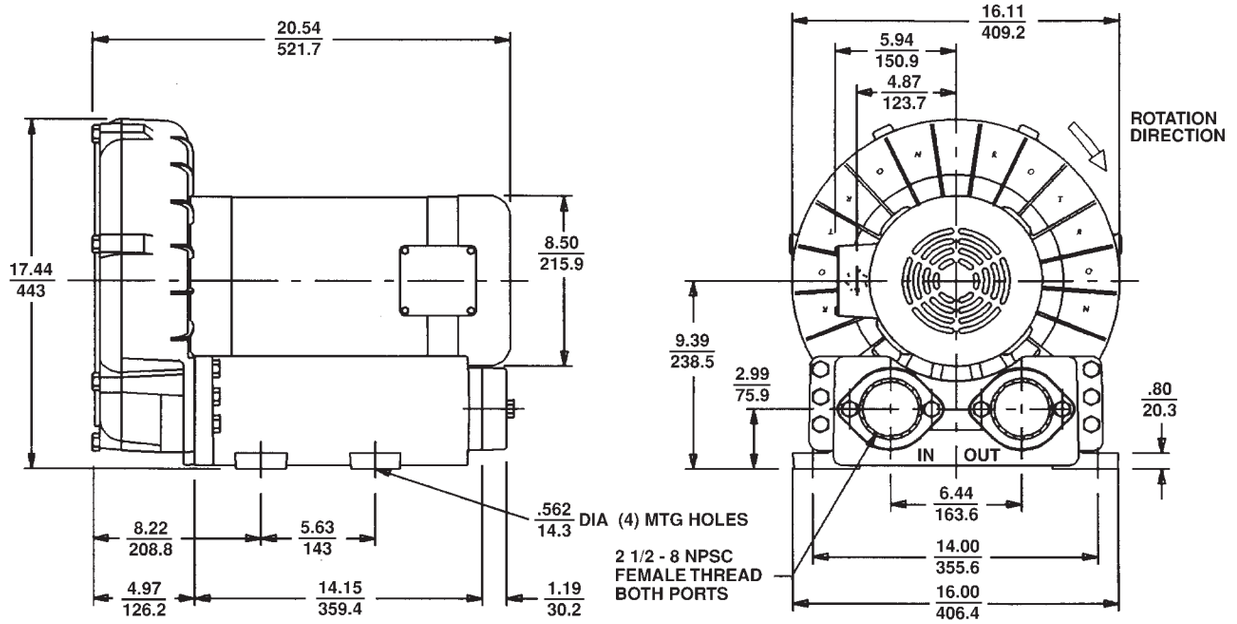


Rev. 2/04

AMETEK Technical and Industrial Products, Kent, OH 44240 • e mail: rotronindustrial@ametek.com • internet: www.ametektmd.com

EN 707 & CP 707 Three-Phase Sealed Regenerative Blower w/Explosion-Proof Motor

Scale CAD drawing available upon request.



DIMENSIONS: IN / MM
TOLERANCES: .XX ± .1 / 2.5
(UNLESS OTHERWISE NOTED)

A 0.75" NPT CONDUIT CONNECTION AT 12 O'CLOCK POSITION

SPECIFICATIONS

MODEL	EN707F72MXL		EN707F86MXL	CP707FW72MXLR
Part No.	038710		038711	038974
Motor Enclosure – Shaft Material	Explosion-proof – **CS**		Explosion-proof – **CS**	Chem XP – **SS**
Horsepower	5.0		5.0	Same as EN707F72MXL – 038710 except add Chemical Processing (CP) features from catalog inside front cover
Phase – Frequency [1]	Three - 60 Hz		Three - 60 Hz	
Voltage [1]	230	460	575	
Motor Nameplate Amps	14	7	5.7	
Max. Blower Amps [3]	15	7.5	6.3	
Inrush Amps	152	76	61	
Starter Size	1	0	0	
Service Factor	1.0		1.0	
Thermal Protection [2]	Class B - Pilot Duty		Class B - Pilot Duty	
XP Motor Class – Group	I-D, II-F&G		I-D, II-F&G	
Shipping Weight	174 lb (79 kg)		174 lb (79 kg)	

[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 **190-208/380-415 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 consult your Local Field Sales Engineer for specification updates.

Rev. 2/04

SERVICE AND PARTS MANUAL FOR BLOWER MODEL

EN454 – EN656

ROTRON Industrial Products
627 lake Street, Kent, ohio 44240 U.S.A.
Telephone: 330-673-3452 Fax: 330-677-3306
e-mail: rotronindustrial@ametek.com
internet: www.ametektip.com

Your Choice. Our Commitment.™

WARRANTY, INSTALLATION, MAINTENANCE AND TROUBLESHOOTING INSTRUCTIONS

TECHNICAL AND INDUSTRIAL PRODUCTS
627 Lake Street, Kent, Ohio 44240 USA
Telephone: 330-673-3452 Fax: 330-677-3306
e-mail: rotronindustrial@ametek.com web site: www.ametektip.com

1. AMETEK Rotron DR, EN and HiE regenerative direct drive blowers are guaranteed for one full year from the date of installation (limited to 18 months from the date of shipment) to the original purchaser only. Should the blower fail we will evaluate the failure If failure is determined to be workmanship or material defect related, we will at our option repair or replace the blower.

2. AMETEK Rotron Minispiral, Revaflow, Multiflow, Nautilair, remote drive blowers, moisture separators, packaged units, CP blowers, Nasty Gas™ models and special built (EO) products are guaranteed for one full year from date of shipment for workmanship and material defect to the original purchaser only. Should the blower fail, If failure is determined to be workmanship or material defect related, we will at our option repair or replace the blower.

3. **Parts Policy** - AMETEK Rotron spare parts and accessories are guaranteed for three months from date of shipment for workmanship and material defect to the original purchaser only. If failure is determined to be workmanship or material defect related we will at our option repair or replace the part.

Corrective Action - A written report will be provided indicating reason(s) for failure, with suggestions for corrective action. Subsequent customer failures due to abuse, misuse, misapplication or repeat offense will not be covered. AMETEK Rotron will then notify you of your options. Any failed unit that is tampered with by attempting repair or diagnosis will void the warranty, unless authorized by the factory.

Terms and Conditions - Our warranty covers repairs or replacement of regenerative blowers only, and will not cover labor for installation, outbound and inbound shipping costs, accessories or other items not considered integral blower parts. Charges may be incurred on products returned for reasons other than failures covered by their appropriate warranty. Out-of-warranty product and in warranty product returned for failures determined to be caused by abuse, misuse, or repeat offense will be subject to an evaluation charge. Maximum liability will in no case exceed the value of the product purchased. Damage resulting from mishandling during shipment is not covered by this warranty. It is the responsibility of the purchaser to file claims with the carrier. Other terms and conditions of sale are stated on the back of the order acknowledgement.

Installation Instructions for SL, DR, EN, CP, and HiE Series Blowers

1. **Bolt It Down** - Any blower must be secured against movement prior to starting or testing to prevent injury or damage. The blower does not vibrate much more than a standard electric motor.

2. **Filtration** - All blowers should be filtered prior to starting. Care must be taken so that no foreign material enters the blower. If foreign material does enter the blower, it could cause internal damage or may exit at extremely high velocity.

   Should excessive amounts of material pass through the blower, it is suggested that the cover(s) and impeller(s) be removed periodically and cleaned to avoid impeller imbalance. Impeller

imbalance greatly speeds bearing wear, thus reducing blower life. Disassembling the blower will void warranty, so contact the factory for cleaning authorization.

3. **Support the Piping** - The blower flanges and nozzles are designed as connection points only and are not designed to be support members.

   Caution: Plastic piping should not be used on blowers larger than 1 HP that are operating near their maximum pressure or suction point. Blower housing and nearby piping temperatures can exceed 200ºF. Access by personnel to the blower or nearby piping should be limited, guarded, or marked, to prevent danger of burns.

4. **Wiring** - Blowers must be wired and protected/fused in accordance with local and national electrical codes. All blowers must be grounded to prevent electrical shock. Slo-Blo or time delay fuses should be used to bypass the first second of start-up amperage.

5. **Pressure/Suction Maximums** - The maximum pressure and/or suction listed on the model label should not be exceeded. This can be monitored by means of a pressure or suction gage (available from Rotron), installed in the piping at the blower outlet or inlet. Also, if problems do arise, the Rotron Field representative will need to know the operating pressure/suction to properly diagnose the problem.

6. **Excess Air** - Bleed excess air off. DO NOT throttle to reduce flow. When bleeding off excess air, the blower draws less power and runs cooler.

   Note: Remote Drive (Motorless) Blowers - Properly designed and installed guards should be used on all belts, pulleys, couplings, etc. Observe maximum remote drive speed allowable. Due to the range of uses, drive guards are the responsibility of the customer or user. Belts should be tensioned using belt gauge.

Maintenance Procedure

When properly piped, filtered, and applied, little or no routine maintenance is required. Keep the filter clean. Also, all standard models in the DR, EN, CP, and HiE series have sealed bearings that require no maintenance. Bearing should be changed after 15,000 to 20,000 hours, on average. Replacement bearing information is specified on the chart below.

Bearing Part Number	Size	Seal Material	Grease	Heat Stabilized
510217 510218 510219	205 206 207	Polyacrylic	Nye Rheotemp 500 30% +/- 5% Fill	Yes – 325 F
510449 516440 516648	203 202 307	Buna N	Exxon Polyrex Grease	NO
516840 516841 516842 516843 516844 516845 516846 516847	206 207 208 210 309 310 311 313	Buna N	Exxon Polyrex Grease	NO

Troubleshooting

		POSSIBLE CAUSE	OUT OF WARRANTY REMEDY ***
IMPELLER DOES NOT TURN	Humming Sound	1. * One phase of power line not connected 2. * One phase of stator winding open 3. Bearings defective 4. Impeller jammed by foreign material 5. Impeller jammed against housing or cover 6. ** Capacitor open	1. Connect 2. Rewind or buy new motor 3. Change bearings 4. Clean and add filter 5. Adjust 6. Change capacitor
	No Sound	1. * Two phases of power line not connected 2. * Two phases of stator winding open	1. Connect 2. Rewind or buy new motor
IMPELLER TURNS	Blown Fuse	1. Insufficient fuse capacity 2. Short circuit	1. Use time delay fuse of proper rating 2. Repair
	Motor Overheated Or Protector Trips	1. High or low voltage 2. * Operating in single phase condition 3. Bearings defective 4. Impeller rubbing against housing or cover 5. Impeller or air passage clogged by foreign material 6. Unit operating beyond performance range 7. Capacitor shorted 8. * One phase of stator winding short circuited	1. Check input voltage 2. Check connections 3. Check bearings 4. Adjust 5. Clean and add filter 6. Reduce system pressure/vacuum 7. Change capacitor 8. Rewind or buy new motor
	Abnormal Sound	1. Impeller rubbing against housing or cover 2. Impeller or air passages clogged by foreign material 3. Bearings defective	1. Adjust 2. Clean and add filter 3. Change bearings
	Performance Below Standard	1. Leak in piping 2. Piping and air passages clogged 3. Impeller rotation reversed 4. Leak in blower 5. Low voltage	1. Tighten 2. Clean 3. Check wiring 4. Tighten cover, flange 5. Check input voltage

*** 3 phase units**

**** 1 phase units**

***** Disassembly and repair of new blowers or motors will void the Rotron warranty. Factory should be contacted prior to any attempt to field repair an in-warranty unit.**

Blower Disassembly:

WARNING: Attempting to repair or diagnose a blower may void Rotron's warranty. It may also be difficult to successfully disassemble and reassemble the unit.

1) Disconnect the power leads. **CAUTION:** Be sure the power is disconnected before doing any work whatsoever on the unit.

2) Remove or separate piping and/or mufflers and filters from the unit.

3) Remove the cover bolts and then the cover. **NOTE:** Some units are equipped with seals. It is mandatory that these seals be replaced once the unit has been opened.

4) Remove the impeller bolt and washers and then remove the impeller. **NOTE:** Never pry on the edges of the impeller. Use a puller as necessary.

5) Carefully note the number and location of the shims. Remove and set them aside. NOTE: If the disassembly was for inspection and cleaning the unit may now be reassembled by reversing the above steps. If motor servicing or replacement and/or impeller replacement is required the same shims may not be used. It will be necessary to re-shim the impeller according to the procedure explained under assembly.

6) Remove the housing bolts and remove the motor assembly (arbor/.housing on remote drive models).

7) Arbor disassembly (Applicable on remote drive models only):
   a) Slide the bearing retraining sleeve off the shaft at the blower end.
   b) Remove the four (4) screws and the bearing retaining plate from the blower end.
   c) Lift the shaft assembly far enough out of the arbor to allow removal of the blower end snap ring.
   d) Remove the shaft assembly from the arbor.
   e) If necessary, remove the shaft dust seal from the pulley end of the arbor.

Muffler Material Replacement:

1) Remove the manifold cover bolts and them manifold cover.

2) The muffler material can now be removed and replaced if necessary. On blowers with fiberglass acoustical wrap the tubular retaining screens with the fiberglass matting before sliding the muffler pads over the screens.

3) Reassemble by reversing the procedure.

NOTE: On DR068 models with tubular mufflers it is necessary to remove the cover and impeller accessing the muffler material from the housing cavity.

Blower Reassembly:

1) Place the assembled motor (assembled arbor assembly for remote drive models) against the rear of the housing and fasten with the bolts and washer.

2) To ensure the impeller is centered within the housing cavity re-shim the impeller according to the procedure outlined below.

3) If blower had a seal replace the seal with a new one.

4) Place the impeller onto the shaft making sure the shaft key is in place and fasten with the bolt, washer and spacer as applicable. Torque the impeller bolt per the table below. Once fastened carefully rotate the impeller to be sure it turns freely.

5) Replace the cover and fasten with bolts.

6) Reconnect the power leads to the motor per the motor nameplate.

Bolt Size	**Torque** **Pound-Force-Foot**
1/4-20	**6.25 +/- 0.25**
5/16-18	**11.5 +/- 0.25**
3/8-16	**20.0 +/- 0.5**
½-13	**49.0 +/- 1**
5/8 –11	**90.0 +/- 2**

Impeller Shimming Procedure:

WARNING: This unit may be difficult to shim. Extreme care may be exercised.

Tools Needed: Machinist's Parallel Bar
Vernier Caliper with depth measuring capability
Feeler gauges or depth gauge

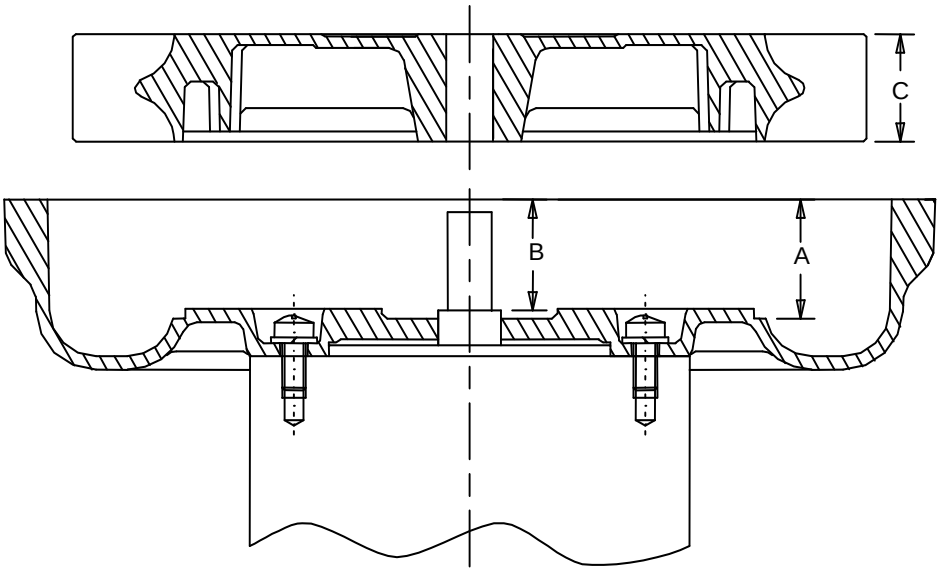
Measure the Following:

Distance from the flange face to the housing (A)
Distance from the flange face to the motor shaft shoulder (B)
Impeller Thickness (C)

Measurements (A) and (B) are made by laying the parallel bar across the housing flange face and measuring to the proper points. Each measurement should be made at three points, and the average of the readings should be used.

Shim Thickness = B – (A+C)/2

After the impeller installation (step #4 above) the impeller/cover clearance can be checked with feeler gauges, laying the parallel bar across the housing flange face. This clearance should nominally be (A-C)/2.



ROTRON TECHNICAL MOTOR DIVISION
REGENERATIVE BLOWER GROUP

75 North Street
Saugerties, New York 12477
Phone: (845) 246-3401
Fax: (845) 246-3802

EXPLOSION-PROOF BLOWERS

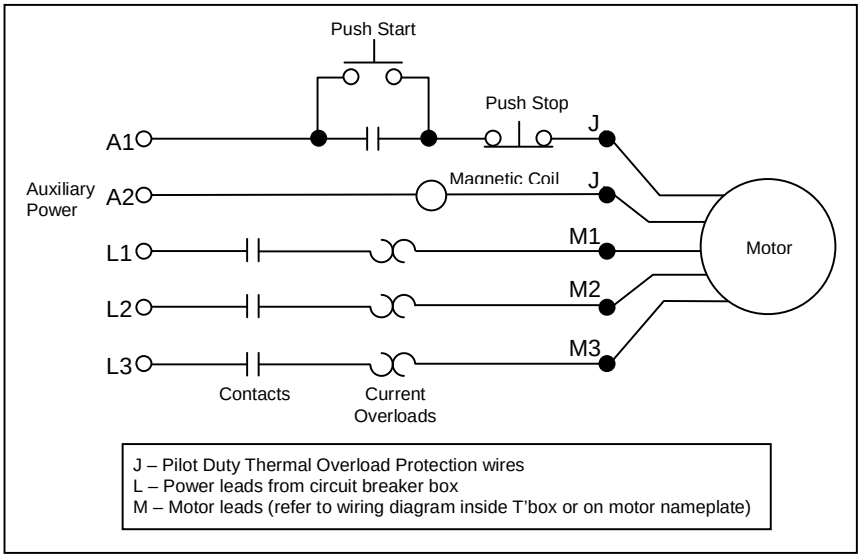
IMPORTANT: Read before wiring this Explosion-proof Blower

This AMETEK Rotron Explosion-proof Regenerative Blower may be equipped with Pilot Duty Thermal Overload (PDTO) or Automatic Thermal Overload (ATO) protection. When properly wired to a motor starter, this protection limits the motor winding temperature rise per the National Electric Code (NEC) article 500. Failure to properly wire this blower is an NEC violation and could cause an explosion. AMETEK Rotron assumes no responsibilities for damages incurred by negligent use of this product, and will not warranty a blower on which the PDTO is not properly connected. Some blowers 1 HP and under do not require PDTO and have built in ATO. Consult the factory if verification of wiring connections is required.

In all cases, follow the motor controller manufacturer's instructions. The following schematic is for conceptual understanding only, and may not apply to all motor/controller combinations.

The manufacturer's wiring diagram found on the motor takes precedent over reference diagrams supplied by AMETEK Rotron Technical Motor Division.

Schematic



The schematic is shown for a three phase motor. For a single phase motor disregard L3 and M3. Pushing the START button completes the auxiliary control circuit, allowing current to flow through the magnetic coil. The contacts are magnetically closed, starting the motor and latching the auxiliary circuit. The motor will continue to run until the STOP push button is depressed, the motor reaches the overload temperature, or the current sensing overloads trip out.

If you have any questions, contact AMETEK Rotron at 914-246-3401 for the location of your area representative.

POLICY REGARDING INSTALLATION OF AMETEK ROTRON REGENERATIVE BLOWERS IN HAZARDOUS LOCATIONS

AMETEK Rotron will not knowingly specify, design or build any regenerative blower for installation in a hazardous, explosive location without the proper NEMA motor enclosure. AMETEK Rotron does not recognize sealed blowers as a substitute for explosion-proof motors. Sealed units with standard TEFC motors should never be utilized where local, state, and/or federal codes specify the use of explosion-proof equipment.

AMETEK Rotron has a complete line of regenerative blowers with explosion-proof motors. Division 1 & 2, Class I, Group D; Class II, Groups F & G requirements are met with these standard explosion-proof blowers.

AMETEK Rotron will not knowingly specify, design or build any regenerative blower for installation in a hazardous, corrosive environment without the proper surface treatment and sealing options.

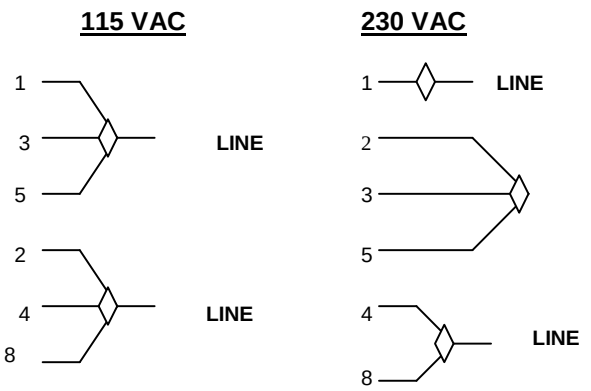
AMETEK Rotron has a complete line of Chemical Processing and Nasty Gas™ regenerative blowers with Chem-Tough™, stainless steel parts, and seals.

AMETEK Rotron offers general application guidance; however, suitability of the particular blower selection is ultimately the responsibility of the purchaser, not the manufacturer of the blower.

FS2 Rev B 3/10/98

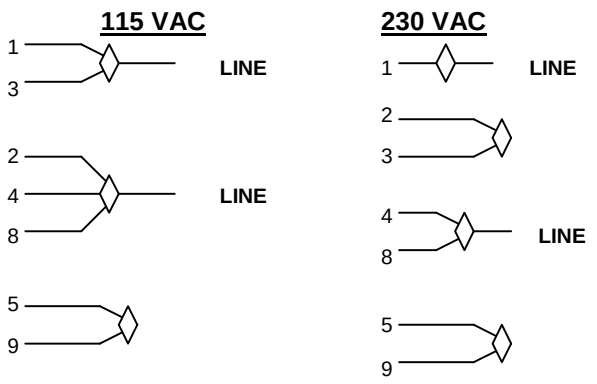
WIRING DIAGRAMS, XP MOTORS

H. 1Ø, 6 WIRE



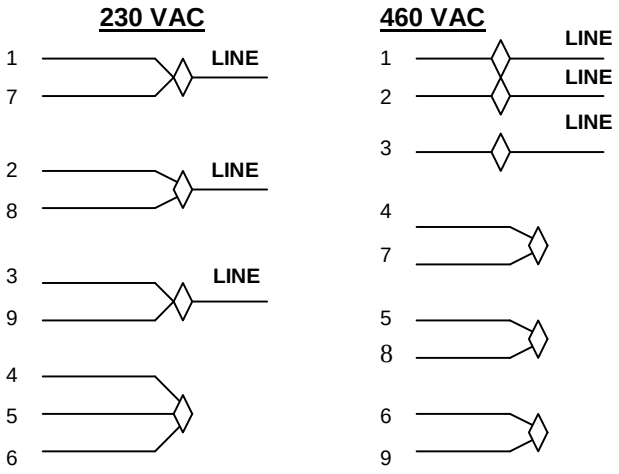
INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

I. 1Ø, 7 WIRE



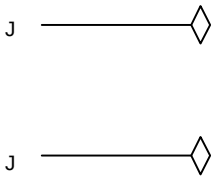
INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

K. 3Ø, 9 WIRE



INTERCHANGE ANY TWO LEAD LINES TO REVERSE ROTATION

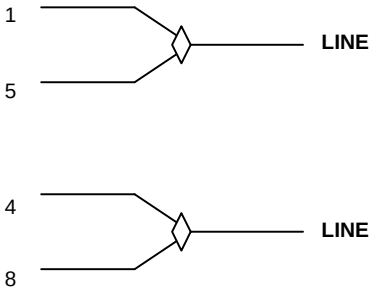
L. PILOT DUTY THERMAL OVERLOADS



HOOK J LEADS TO CONTROL CIRCUITRY

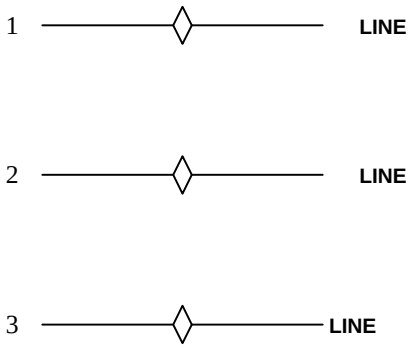
M. 1Ø 230 VAC

SINGLE VOLTAGE



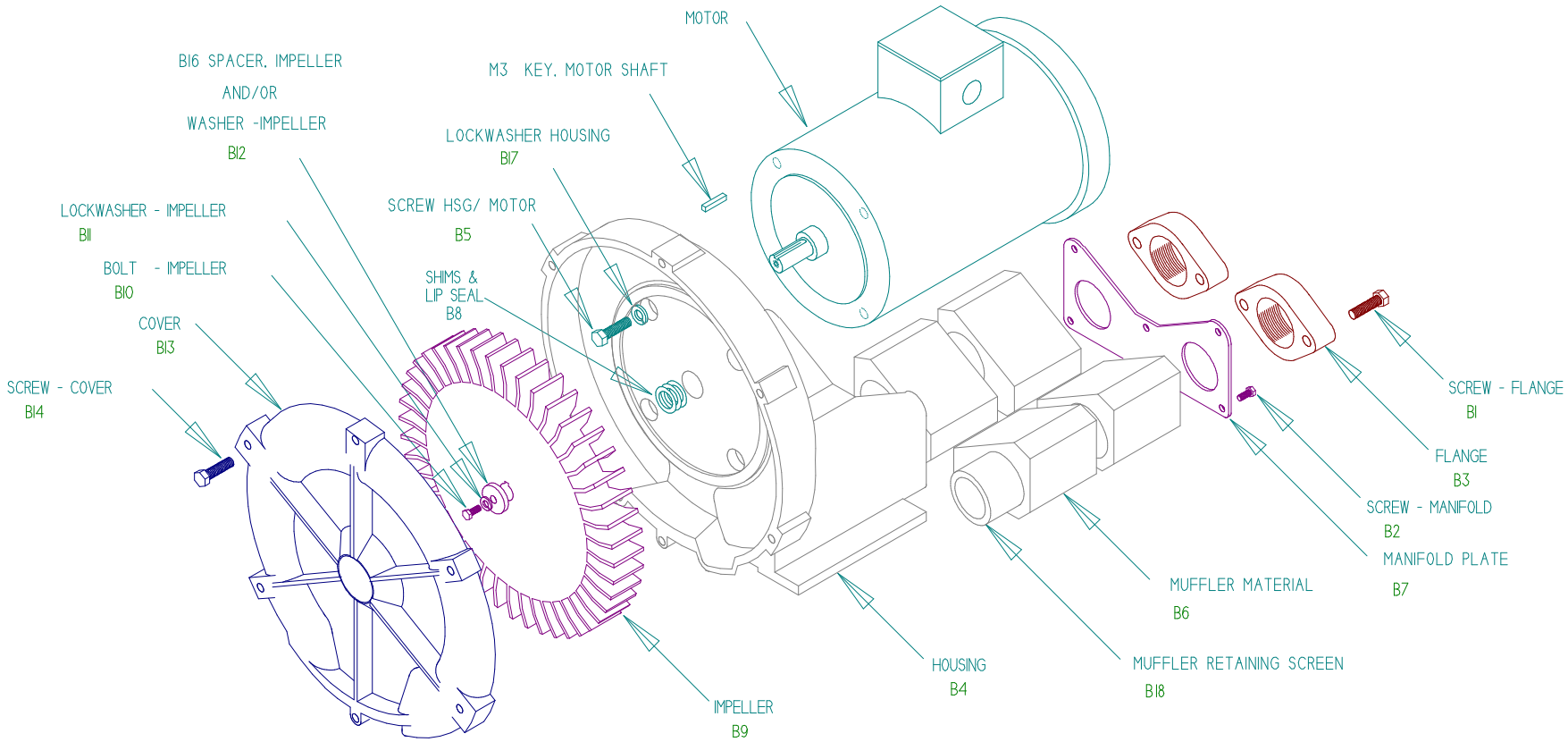
INTERCHANGE LEADWIRES 5 & 8 TO REVERSE ROTATION

N. 3Ø 575 VAC



INTERCHAGE ANY TWO LEAD LINES TO REVERSE ROTATION

ASSEMBLY DIAGRAM
EN454 EN513 EN523 EN505
EN555 EN606 EN656



Parts Breakdown

Item No.	Qty. Req'd	Description	EN454 038175 038176	EN454 080487 080488 080916	EN513 038183 038037	EN523 038223 038184	EN505 038177 038178 038445	EN555 038045	EN606 038179 038222 038437 038536 038538
M3	1	Key Motor Shaft	510629	510629	510629	155099	510629	510629	510629
B1	4	Screw, Flange	120162	120162	120162	120162	120162	120162	155095
B2	6	Screw, Manifold	155496	155170	(10 pcs) 120214	(10 pcs) 120214	155170	155496	155176
B3	2	Flange	510354	510354	510354	510354	510354	510354	511480
B4	1	Housing	515737	551001	523419	523420	See Next Page	516721	See Next Page
B5	4	Screw, Hsg /Motor	251791	155128	251791	251791	155128	251791	251791
B6	4	Muffler Material	515743	515743	516560	516560	(6 pcs) 515743	515743	See Next Page
	2	Muffler Insert	Not Used	551006	Not Used	Not Used	Not Used	Not Used	Not Used
B7	1	Manifold Plate	516410	516410	529868	529868	517460	515482	516392
B8	*	Shim .002"	510356	510356	510356	500664	510356	510356	510356
	*	Shim .005"	510357	510357	510357	500665	510357	510357	510357
	*	Shim .010"	510358	510358	510358	500666	510358	510358	510358
	*	Shim .020"	510359	510359	510359	500667	510359	510359	510359
	*	Shim .030"	Not Used	Not Used	Not Used	510292	Not Used	Not Used	Not Used
B9	1	Impeller	515675	551067	516557	(2 pcs) 516562	517433	516678	511272
B10	1	Bolt, Impeller	120214	120214	120325	120214	120214	120262	120325
B11	1	Lockwasher, Impeller	120203	120203	120203	120203	120203	120203	120203
B12		Washer, Impeller	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B13	1	Cover	517807	551065	516559	516559	517808	516675	511274
B14	6	Screw, Cover	155236	155129	(8 pcs) 120255	(8 pcs) 155098	155236	(7 pcs) 155236	155236
B16	1	Spacer, Impeller Bolt	510355	510355	510355	510355	510355	510355	510355
B17		Lockwasher, Housing	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B18	1	Screen, Muffler Retaining, Right (**)	510362	551087	511718	511718	See Next Page	510362	See Next Page
	1	Screen, Muffler Retaining, Left (**)	510362	551087	511718	511718	See Next Page	510362	See Next Page
B19		Bolt, Muffler Hsg/Hsg	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B20		Muffler Housing	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
		Bolt, Motor/Muffler	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
		Lockwasher, Motor/Muffler	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
		Washer, Motor/Muffler	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
		Spacer, Motor/Muffler	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B23		Bolt, Mounting Rail	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B24		Lockwasher, Rail	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B25		Nut, Rail	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B26		Rail Mounting	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
	1	Lip Seal	516587	516587	516587	516587	516587	516587	516587

Model	Part No.	Motor	Wiring Diagram	Specific Parts	Bearing, Rear (M1)
EN454W58L	038175	515747	H + L		
EN454W72L	038176	515746	K + L		
EN454W58ML	080487	515747	H + L		
EN454W72ML	080488	515746	K + L		
EN454W86ML	080916	517391	N + L		510449
EN513W58L	038183	515747	H + L		
EN513W72L	038037	515746	K + L		
EN523M72L	038184	517675	K + L		
EN523M5L	038223	551373	M + L	B13 516555 1 pc Center Annulus	510217
EN505AX58ML	038177	510326	H + L		
EN505AX72ML	038178	510325	K + L	B4 517419 B18 517435 2 pcs	510449
EN505CJ5ML	038445	529622	M + L	B4 529654 B18 517436 2 pcs	
EN555M72L	038045	516687	K + L		
EN606M72L	038179 ***	516687	K + L	B4 511276 1 pc	510449
EN606M5L	038222 **	551366	M + L	B6 511285 4 pcs	510217
EN606M86L	038437	529630	N + L	B4 529790 1 pc	510449
EN606M72ML	038536	516687	K + L	B6 529781 4 pcs	
EN606M5ML	038538	551366	M + L	B18 529782 2 pcs	510217
EN656M86XL	080058	529630	N + L		510449
EN656M72XL	080059	516687	K + L		
EN656M5XL	080060	551366	M + L	B7 Muffler extension 551974 1 pc	510217

*As needed **Viewed looking at inlet/outlet ports ***Not currently in production; superseded by model listed below

	EN656 080058 080059 080060
510629	
120255	
155170	
511480	
550195	
251791	
(10 pcs.) 551585	
Not Used	
See Next Page	
510356	
510357	
510358	
510359	
Not Used	
550305	
120325	
120203	
Not Used	
550249	
(8 pcs) 155236	
510355	
Not Used	
517436	
517436	
Not Used	
Not Used	
Not Used	
Not Used	
Not Used	
Not Used	
Not Used	
Not Used	
Not Used	
Not Used	
516587	

*As needed **Viewed looking at inlet/outlet ports ***Not currently in production; superseded by model listed below

Bearing, Impeller End (M2)
510217
510218
510217
510217
510218
510217
510218
510217
510218

*As needed **Viewed looking at inlet/outlet ports ***Not currently in production; superseded by model listed below

BALDOR
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Product Information Packet

M7142T

3HP,1800RPM,3PH,60HZ,L182T,TEFC,FOOT,

Part Detail

Revision:	S	**Status:**	INA/A	**Change #:**		**Proprietary:**	No
Type:	AC	**Elec. Spec:**	06WGW385	**CD Diagram:**	CD0005	**Mfg Plant:**	
Mech. Spec:	06J001	**Layout:**	06LYJ001	**Poles:**	04	**Created Date:**	
Base:	RG	**Eff. Date:**	01-14-2011	**Leads:**	9#16		

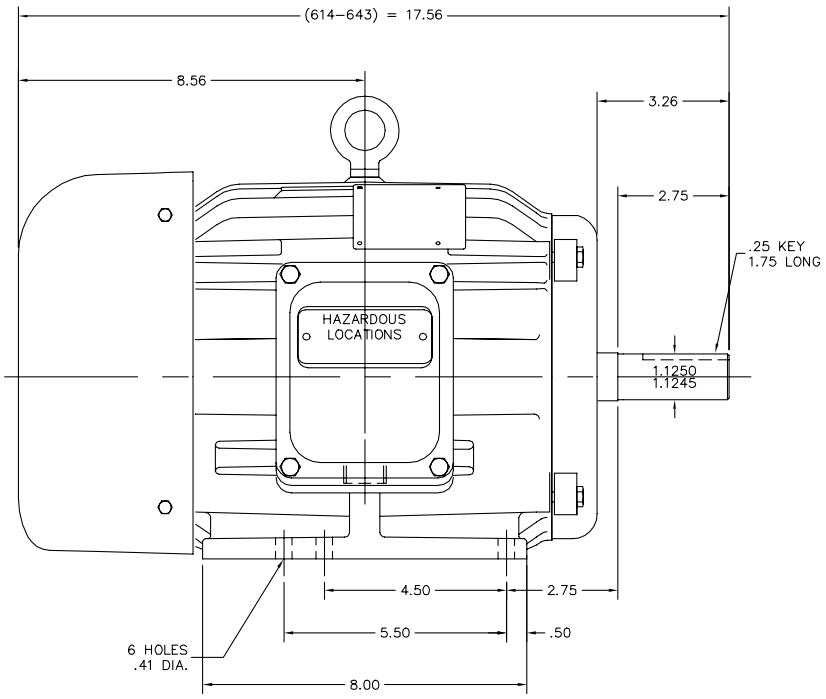
Specs

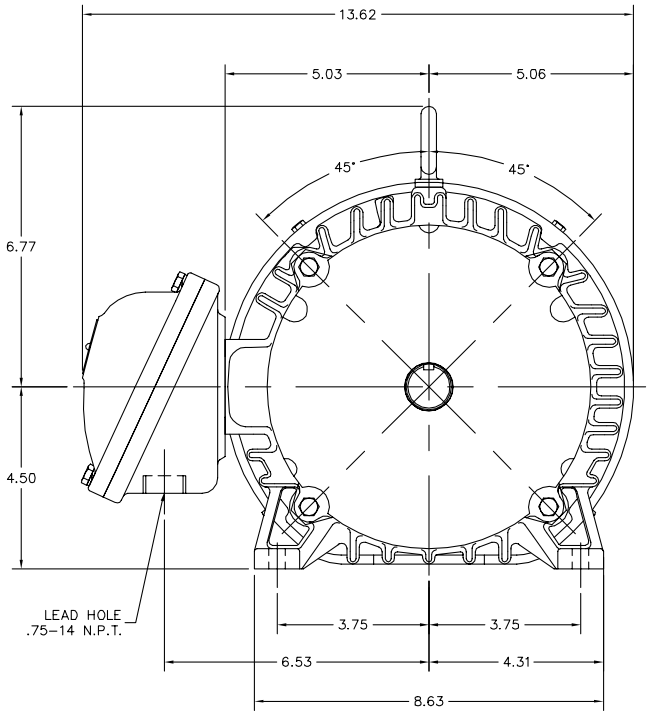
Catalog Number:	M7142T	**Front Shaft Indicator:**	None
Enclosure:	TEFC	**Heater Indicator:**	No Heater
Frame:	182T	**Insulation Class:**	B
Frame Material:	Iron	**Inverter Code:**	Not Inverter
Output @ Frequency:	2.000 HP @ 50 HZ	**KVA Code:**	K
	3.000 HP @ 60 HZ	**Lifting Lugs:**	Standard Lifting Lugs
Synchronous Speed @ Frequency:	1800 RPM @ 60 HZ	**Locked Bearing Indicator:**	No Locked Bearing
	1500 RPM @ 50 HZ	**Motor Lead Quantity/Wire Size:**	9 @ 16 AWG
Voltage @ Frequency:	230.0 V @ 60 HZ	**Motor Lead Exit:**	Ko Box
	190.0 V @ 50 HZ	**Motor Lead Termination:**	Flying Leads
	460.0 V @ 60 HZ	**Motor Type:**	0628M
	380.0 V @ 50 HZ	**Mounting Arrangement:**	F1
XP Division:	Not Applicable	**Power Factor:**	78
Agency Approvals:	UL	**Product Family:**	General Purpose
	CSA	**Pulley End Bearing Type:**	Ball
Auxillary Box:	No Auxillary Box	**Pulley Face Code:**	Standard
Auxillary Box Lead Termination:	None	**Pulley Shaft Indicator:**	Standard
Base Indicator:	Rigid	**Rodent Screen:**	None

Bearing Grease Type:	Polyrex EM (-20F +300F)	**Shaft Extension Location:**	Pulley End
Blower:	None	**Shaft Ground Indicator:**	No Shaft Grounding
Current @ Voltage:	9.600 A @ 230.0 V	**Shaft Rotation:**	Reversible
	8.500 A @ 208.0 V	**Shaft Slinger Indicator:**	No Slinger
	7.000 A @ 190.0 V	**Speed Code:**	Single Speed
	4.800 A @ 460.0 V	**Motor Standards:**	NEMA
	3.500 A @ 380.0 V	**Starting Method:**	Direct on line
Design Code:	B	**Thermal Device - Bearing:**	None
Drip Cover:	No Drip Cover	**Thermal Device - Winding:**	Normally Closed Thermostat
Duty Rating:	CONT	**Vibration Sensor Indicator:**	No Vibration Sensor
Electrically Isolated Bearing:	Not Electrically Isolated	**Winding Thermal 1:**	None
Feedback Device:	NO FEEDBACK	**Winding Thermal 2:**	None
Front Face Code:	Standard	**XP Temp Code:**	T3C

No performance data has been assigned to this product.

06LYJ001





CUSTOMER IS RESPONSIBLE FOR DETERMINING THAT MOTOR PERFORMANCE IS SUITABLE IN THE APPLICATION.

REV. DESC: UPDATE TO INCLUDE 643 STACK		
REV. LTR: D	VERSION: 01	TDR: 000000460249
FILE: \AAA\00000\715	REVISED: 08:40:52 03/26/2008	BY: ENSTEKO
MTL: –		

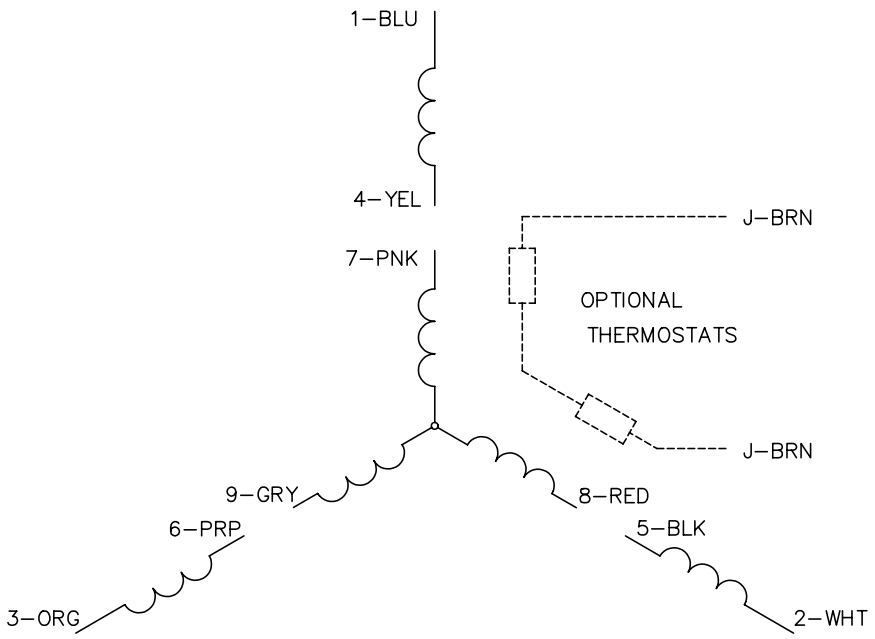
BALDOR • DODGE • RELIANCE

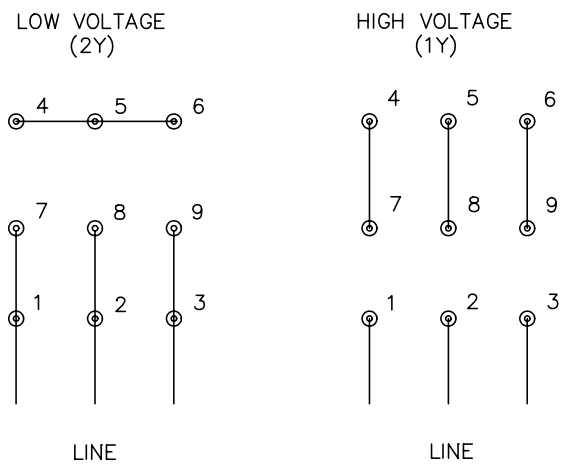
STD HOR 182–4T XPFC 306M CL 1 GP D, CL 2 GP F & G

SH 1 of 1

06LVJ001

CD0005





NOTES:

1. INTERCHANGE ANY TWO LINE LEADS TO REVERSE ROTATION.
2. OPTIONAL THERMOSTATS ARE PROVIDED WHEN SPECIFIED.
3. ACTUAL NUMBER OF INTERNAL PARALLEL CIRCUITS MAY BE A MULTIPLE OF THOSE SHOWN ABOVE.
4. LEAD COLORS ARE OPTIONAL. LEADS MUST ALWAYS BE NUMBERED AS SHOWN.

CD0005

REV. DESC: REVISE TO SHOW OPTIONAL COLORS			BALDOR ELECTRIC Co.
REV. LTR: E	BY: JLP	REVISED: 01/19/99 10:15	TDR: 0171435
CD0005		FILE: AAA00005140	MDL: –
		MTL: –	3PH, DV, 9 LEADS

ROOTS Blowers Compressors Exhausters

US $3.00, Canada $4.50

Universal RAI®, URAI-DSL, URAI-G and Metric Series

Contents

Do These Things To Get The Most From Your ROOTS™ blower

- ❑ Check shipment for damage. If found, file claim with carrier and notify Roots.
- ❑ Unpack shipment carefully, and check contents against Packing List. Notify Roots if a shortage appears.
- ❑ Store in a clean, dry location until ready for installation. Lift by methods discussed under INSTALLATION to avoid straining or distorting the equipment. Keep covers on all openings. Protect against weather and corrosion if outdoor storage is necessary.
- ❑ Read OPERATING LIMITATIONS and INSTALLATION sections in this manual and plan the complete installation.
- ❑ Provide for adequate safeguards against accidents to persons working on or near the equipment during both installation and operation. See SAFETY PRECAUTIONS.
- ❑ Install all equipment correctly. Foundation design must be adequate and piping carefully done. Use recommended accessories for operating protection.
- ❑ **Make sure both driving and driven equipment is correctly lubricated before start-up. See LUBRICATION.**
- ❑ Read starting check points under OPERATION. Run equipment briefly to check for installation errors and make corrections. Follow with a trial run under normal operating conditions.
- ❑ In event of trouble during installation or operation, do not attempt repairs of Roots furnished equipment. Notify Roots, giving all nameplate information plus an outline of operating conditions and a description of the trouble. Unauthorized attempts at equipment repair may void Roots warranty.
- ❑ Units out of warranty may be repaired or adjusted by the owner. Good inspection and maintenance practices should reduce the need for repairs.

NOTE: Information in this manual is correct as of the date of publication. Roots reserves the right to make design or material changes without notice, and without obligation to make similar changes on equipment of prior manufacture.

For your nearest Roots Office, dial our Customer Service Hot Line toll free; 1 877 363 ROOT(S) (7668) or direct 832-590-2600.

ISRB-2002 rev.0207

DRESSER Roots

ROOTS™ products are sold subject to the current General Terms of Sale, GTS-5001 and Warranty Policy WP-5020. Copies are available upon request.
Contact your local Roots Office or Roots Customer Service Hot Line 1-877-363-ROOT(S) (7668) or direct 832-590-2600.

Safety Precautions

It is important that all personnel observe safety precautions to minimize the chances of injury. Among many considerations, the following should be particularly noted:

- Blower casing and associated piping or accessories may become hot enough to cause major skin burns on contact.
- Internal and external rotating parts of the blower and driving equipment can produce serious physical injuries. Do not reach into any opening in the blower while it is operating, or while subject to accidental starting. Protect external moving parts with adequate guards.
- Disconnect power before doing any work, and avoid bypassing or rendering inoperative any safety or protective devices.
- If blower is operated with piping disconnected, place a strong coarse screen over the inlet and avoid standing in the discharge air stream. **CAUTION: Never cover the blower inlet with your hand or other part of body.**
- Stay clear of the blast from pressure relief valves and the suction area of vacuum relief valves.
- Use proper care and good procedures in handling, lifting, installing, operating and maintaining the equipment.
- Casing pressure must not exceed 25 PSI (1725 mbar) gauge. Do not pressurize vented cavities from an external source, nor restrict the vents without first consulting ROOTS.
- Do not use air blowers on explosive or hazardous gases.
- Other potential hazards to safety may also be associated with operation of this equipment. All personnel working in or passing through the area should be trained to exercise adequate general safety precautions.

Operating Limitations

A ROOTS blower or exhauster must be operated within certain approved limiting conditions to enable continued satisfactory performance. Warranty is contingent on such operation.

Maximum limits for pressure, temperature and speed are specified in TABLE 1 for various models & sizes of blowers & exhausters. These limits apply to all units of normal construction, when operated under standard atmospheric conditions. Be sure to arrange connections or taps for instruments, thermometers and pressure or vacuum gauges at or near the inlet and discharge connections of the unit. These, along with a tachometer, will enable periodic checks of operating conditions.

PRESSURE – The pressure rise, between inlet and discharge, must not exceed the figure listed for the specific unit frame size concerned. Also, in any system where the unit inlet is at a positive pressure above atmosphere a maximum case rating of 25 PSI gauge (1725 mbar) should not be exceeded without first consulting Roots. Never should the maximum allowable differential pressure be exceeded.

On vacuum service, with the discharge to atmospheric pressure, the inlet suction or vacuum must not be greater than values listed for the specific frame size.

TEMPERATURE – Blower & exhauster frame sizes are approved only for installations where the following temperature limitations can be maintained in service:

- Measured temperature rise must not exceed listed values when the inlet is at ambient temperature. Ambient is considered as the general temperature of the space around the unit. This is not outdoor temperature unless the unit is installed outdoors.
- If inlet temperature is higher than ambient, the listed allowable temperature rise values must be reduced by 2/3 of the difference between the actual measured inlet temperature and the ambient temperature.
- The average of the inlet and discharge temperature must not exceed 250°F. (121°C).
- The ambient temperature of the space the blower/motor is installed in should not be highter than 120°F (48.8°C).

SPEED – These blowers & exhausters may be operated at speeds up to the maximum listed for the various frame sizes. They may be direct coupled to suitable constant speed drivers if pressure/temperature conditions are also within limits. At low speeds, excessive temperature rise may be a limiting factor.

Special Note: The listed maximum allowable temperature rise for any particular blower & exhauster may occur well before its maximum pressure or vacuum rating is reached. This may occur at high altitude, low vacuum or at very low speed. The units' operating limit is always determined by the maximum rating reached first. It can be any one of the three: Pressure, Temperature or Speed.

Installation

ROOTS blowers & exhausters are treated after factory assembly to protect against normal atmospheric corrosion. The maximum period of internal protection is considered to be one year under average conditions, if shipping plugs & seals are not removed. Protection against chemical or salt water atmosphere is not provided. Avoid opening the unit until ready to start installation, as corrosion protection will be quickly lost due to evaporation.

If there is to be an extended period between installation and start up, the following steps should be taken to ensure corrosion protection.

- ❑ Coat internals of cylinder, gearbox and drive end bearing reservoir with Nox-Rust VCI-10 or equivalent. Repeat once a year or as conditions may require. Nox-Rust VCI-10 is petroleum soluble and does not have to be removed before lubricating. It may be obtained from Daubert Chemical Co., 2000 Spring Rd., Oak Brook, Ill. 60521.

- ❑ Paint shaft extension, inlet and discharge flanges, and all other exposed surfaces with Nox-Rust X-110 or equivalent.

- ❑ Seal inlet, discharge, and vent openings. It is not recommended that the unit be set in place, piped to the system, and allowed to remain idle for extended periods. If any part is left open to the atmosphere, the Nox-Rust VCI-10 vapor will escape and lose its effectiveness.

- ❑ Protect units from excessive vibration during storage.

- ❑ Rotate shaft three or four revolutions every two weeks.

- ❑ Prior to start up, remove flange covers on both inlet and discharge and inspect internals to insure absence of rust. Check all internal clearances. Also, at this time, remove gearbox and drive end bearing cover and inspect gear teeth and bearings for rust.

Because of the completely enclosed unit design, location of the installation is generally not a critical matter. A clean, dry and protected indoor location is preferred. However, an outdoor location will normally give satisfactory service. Important requirements are that the correct grade of lubricating oil be provided for expected operating temperatures, and that the unit be located so that routine checking and servicing can be performed conveniently. Proper care in locating driver and accessory equipment must also be considered.

Supervision of the installation by a ROOTS Service Engineer is not usually required for these units. Workmen with experience in installing light to medium weight machinery should be able to produce satisfactory results. Handling of the equipment needs to be accomplished with care, and in compliance with safe practices. Unit mounting must be solid, without strain or twist, and air piping must be clean, accurately aligned and properly connected.

Bare-shaft Units: Two methods are used to handle a unit without base. One is to use lifting lugs bolted into the top of the unit headplates. Test them first for tightness and fractures by tapping with a hammer. In lifting, keep the direction of cable pull on these bolts as nearly vertical as possible. If lifting lugs are not available, lifting slings may be passed under the cylinder adjacent to the headplates. Either method prevents strain on the extended drive shaft.

Packaged Units: When the unit is furnished mounted on a baseplate, with or without a driver, use of lifting slings passing under the base flanges is required. Arrange these slings so that no strains are placed on the unit casing or mounting feet, or on any mounted accessory equipment. **DO NOT** use the lifting lugs in the top of the unit headplates.

Before starting the installation, remove plugs, covers or seals from unit inlet and discharge connections and inspect the interior completely for foreign material. If cleaning is required, finish by washing the cylinder, headplates and impeller thoroughly with an appropriate solvent. Turn the drive shaft by hand to make sure that the impellers turn freely at all points. Anti-rust compound on the connection flanges and drive shaft extension may also be removed at this time with the same solvent. Cover the flanges until ready to connect piping.

Mounting

Care will pay dividends when arranging the unit mounting. This is especially true when the unit is a “bare-shaft” unit furnished without a baseplate. The convenient procedure may be to mount such a unit directly on a floor or small concrete pad, but this generally produces the least satisfactory results. It definitely causes the most problems in leveling and alignment and may result in a “Soft Foot” condition. Correct soft foot before operation to avoid unnecessary loading on the casing and bearings. Direct use of building structural framing members is not recommended.

For blowers without a base, it is recommended that a well anchored and carefully leveled steel or cast iron mounting plate be provided. The plate should be at least 1 inch (25 mm) thick, with its top surface machined flat, and large enough to provide leveling areas at one side and one end after the unit is mounted. It should have properly sized studs or tapped holes located to match the unit foot drilling. Proper use of a high quality machinist’s level is necessary for adequate installation.

With the mounting plate in place and leveled, set the unit on it without bolting and check for rocking. If it is not solid, determine the total thickness of shims required under one foot to stop rocking. Place half of this under each of the diagonally-opposite short feet, and tighten the mounting studs or screws. Rotate the drive shaft to make sure the impellers turn freely. If the unit is to be direct coupled to a driving motor, consider the height of the motor shaft and the necessity for it to be aligned very accurately with the unit shaft. Best unit arrangement is directly bolted to the mounting plate while the driver is on shims of at least 1/8 inch (3mm) thickness. This allows adjustment of motor position in final shaft alignment by varying the shim thickness.

Aligning

When unit and driver are factory mounted on a common baseplate, the assembly will have been properly aligned and is to be treated as a unit for leveling purposes. Satisfactory

installation can be obtained by setting the baseplate on a concrete slab that is rigid and free of vibration, and leveling the top of the base carefully in two directions so that it is free of twist. The slab must be provided with suitable anchor bolts. The use of grouting under and partly inside the leveled and shimmed base is recommended.

It is possible for a base-mounted assembly to become twisted during shipment, thus disturbing the original alignment. For this reason, make the following checks after the base has been leveled and bolted down. Disconnect the drive and rotate the unit shaft by hand. It should turn freely at all points. Loosen the unit foot hold-down screws and determine whether all feet are evenly in contact with the base. If not, insert shims as required and again check for free impeller rotation. Finally, if unit is direct coupled to the driver, check shaft and coupling alignment carefully and make any necessary corrections.

In planning the installation, and before setting the unit, consider how piping arrangements are dictated by the unit design and assembly. Drive shaft rotation must be established accordingly and is indicated by an arrow near the shaft.

Typical arrangement on vertical units has the drive shaft at the top with counterclockwise rotation and discharge to the left. Horizontal units are typically arranged with the drive shaft at the left with counterclockwise rotation and discharge down. See Figure 4 for other various unit arrangements and possible conversions.

When a unit is DIRECT COUPLED to its driver, the driver RPM must be selected or governed so as not to exceed the maximum speed rating of the unit. Refer to Table 1 for allowable speeds of various unit sizes.

A flexible type coupling should always be used to connect the driver and unit shafts.

When direct coupling a motor or engine to a blower you must insure there is sufficient gap between the coupling halves and the element to prevent thrust loading the blower bearings. When a motor, engine or blower is operated the shafts may expand axially. If the coupling is installed in such a manner that there is not enough room for expansion the blower shaft can be forced back into the blower and cause the impeller to contact the gear end headplate resulting in damage to the blower. The two shafts must be in as near perfect alignment in all directions as possible, and the gap must be established with the motor armature on its electrical center if end-play exists. Coupling manufacturer's recommendations for maximum misalignment, although acceptable for the coupling, are normally too large to achieve smooth operation and maximum life of the blower.

The following requirements of a good installation are recommended. When selecting a coupling to be fitted to the blower shaft ROOTS recommends a taper lock style coupling to insure proper contact with the blower shaft. If the coupling must have a straight bore the coupling halves must be fitted to the two shafts with a line to line thru .001" interference fit. Coupling halves must be warmed up per coupling manufacturer's recommendations. Maximum deviation in offset alignment of the shafts should not exceed .005" (.13 mm) total indicator reading, taken on the two coupling hubs. Maximum deviation from parallel of the inside coupling faces should not exceed .001" (.03 mm) when checked at six points around the coupling.

When a unit is BELT DRIVEN, the proper selection of sheave diameters will result in the required unit speed. When selecting a sheave to be fitted to the blower shaft ROOTS recommends a taper lock style sheave to insure proper contact with the blower shaft. This flexibility can lead to operating temperature problems caused by unit speed being too low. Make sure the drive speed selected is within the allowable range for the specific unit size, as specified under Table 1.

Belt drive arrangements usually employ two or more V-belts running in grooved sheaves. Installation of the driver is less critical than for direct coupling, but its shaft must be level and parallel with the unit shaft. **The driver should be mounted on the inlet side of a vertical unit (horizontal piping) and on the side nearest to the shaft on a horizontal unit. SEE PAGE 6 - Acceptable Blower Drive Arrangement Options.** The driver must also be mounted on an adjustable base to permit installing, adjusting and removing the V-belts. To position the driver correctly, both sheaves need to be mounted on their shafts and the nominal shaft center distance known for the belt lengths to be used.

CAUTION: Drive couplings and sheaves (pulleys) should have an interference fit to the shaft of the blower (set screw types of attachment generally do not provide reliable service.) It is recommended that the drive coupling or sheave used have a taper lock style bushing which is properly sized to provide the correct interference fit required. Drive couplings, that require heating to fit on the blower shaft, should be installed per coupling manufacturer recommendations. A drive coupling or sheave should not be forced on to the shaft of the blower as this could affect internal clearances resulting in damage to the blower.

Engine drive applications often require special consideration to drive coupling selection to avoid harmful torsional vibrations. These vibrations may lead to blower damage if not dampened adequately. It is often necessary to install a flywheel and/or a torsionally soft elastic element coupling based on the engine manufacturer recommendations.

The driver sheave should also be mounted as close to its bearing as possible, and again should fit the shaft correctly. Position the driver on its adjustable base so that 2/3 of the total movement is available in the direction away from the unit, and mount the assembly so that the face of the sheave is accurately in line with the unit sheave. This position minimizes belt wear, and allows sufficient adjustment for both installing and tightening the belts. After belts are installed, adjust their tension in accordance with the manufacturer's instructions. However, only enough tension should be applied to prevent slippage when the unit is operating under load. Excessive tightening can lead to early bearing concerns or shaft breakage.

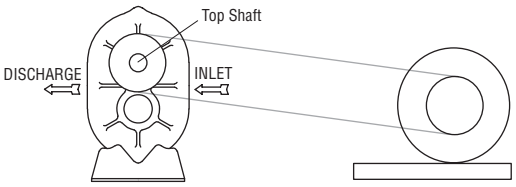
Before operating the drive under power to check initial belt tension, first remove covers from the unit connections. Make sure the interior is still clean, then rotate the shaft by hand. Place a coarse screen over the inlet connection to prevent anything being drawn into the unit while it is operating, and avoid standing in line with the discharge opening. Put oil in the sumps per instructions under **LUBRICATION.**

Piping

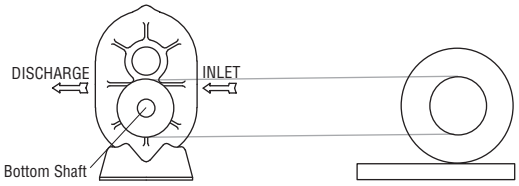
Before connecting piping, remove any remaining anti-rust compound from unit connections. Clean pipe should be no

Acceptable Blower Drive Arrangement Options

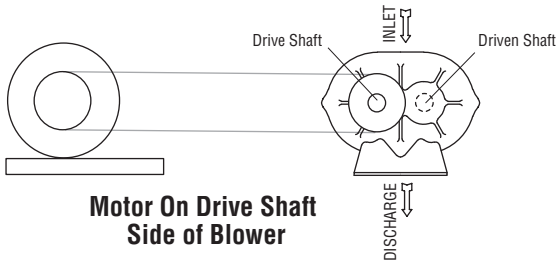
ACCEPTABLE



Motor On Inlet Side of Blower (Top Shaft)

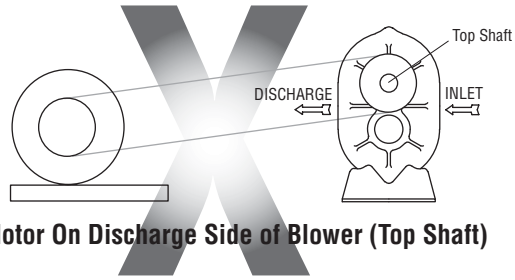


Motor On Inlet Side of Blower (Bottom Shaft)

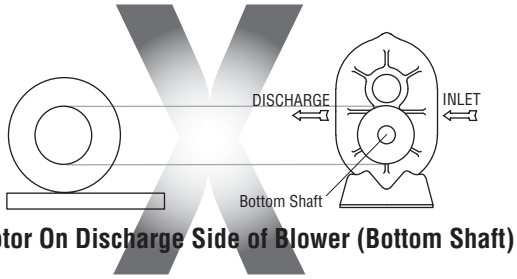


Motor On Drive Shaft Side of Blower

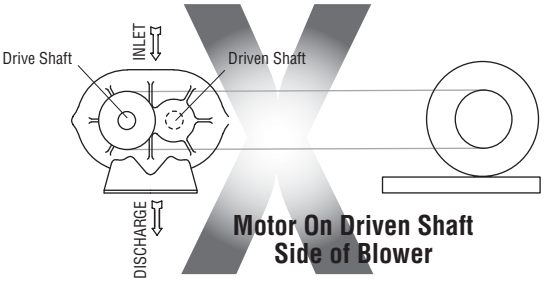
UNACCEPTABLE



Motor On Discharge Side of Blower (Top Shaft)



Motor On Discharge Side of Blower (Bottom Shaft)



Motor On Driven Shaft Side of Blower

smaller than unit connections. In addition, make sure it is free of scale, cuttings, weld beads, or foreign material of any kind. To further guard against damage to the unit, especially when an inlet filter is not used, install a substantial screen of 16 mesh backed with hardware cloth at or near the inlet connections. Make provisions to clean this screen of collected debris after a few hours of operation. It should be removed when its usefulness has ended, as the wire will eventually deteriorate and small pieces going into the unit may cause serious damage.

Pipe flanges or male threads must meet the unit connections accurately and squarely. DO NOT attempt to correct misalignment by springing or cramping the pipe. In most cases this will distort the unit casing and cause impeller rubbing. In severe cases it can prevent operation or result in a broken drive shaft. For similar reasons, piping should be supported near the unit to eliminate dead weight strains. Also, if pipe expansion is likely to occur from temperature change, installation of flexible connectors or expansion joints is advisable.

Figure 3 represents an installation with all accessory items that might be required under various operating conditions. Inlet piping should be completely free of valves or other restrictions. When a shut-off valve can not be avoided, make sure a full size vacuum relief is installed nearest the unit inlet. This will protect against unit overload caused by accidental closing of the shut-off valve.

Need for an inlet silencer will depend on unit speed and pressure, as well as sound-level requirements in the general surroundings. An inlet filter is recommended, especially in dusty or sandy locations. A discharge silencer is also normally suggested, even though Whispair units operate at generally lower noise levels than conventional rotary blowers. Specific recommendations on silencing can be obtained from your local ROOTS distributor.

Discharge piping requires a pressure relief valve, and should include a manual unloading valve to permit starting the unit under no-load conditions. Reliable pressure/vacuum gauges and good thermometers at both inlet and discharge are recommended to allow making the important checks on unit operating conditions. The back-pressure regulator shown in Figure 3 is useful mainly when volume demands vary while the unit operates at constant output. If demand is constant, but somewhat lower than the unit output, excess may be blown off through the manual unloading valve.

In multiple unit installations where two or more units operate with a common header, use of check valves is mandatory. These should be of a direct acting or free swinging type, with one valve located in each line between the unit and header. Properly installed, they will protect against damage from reverse rotation caused by air and material back-flow through an idle unit.

After piping is completed, and before applying power, rotate the drive shaft by hand again. If it does not move with uniform freedom, look for uneven mounting, piping strain, excessive belt tension or coupling misalignment.

DO NOT operate the unit at this time unless it has been lubricated per instructions.

Technical Supplement for 32, 33, 36, 42, 45, 47, 53, 56, 59, 65, 68, 615 Universal RAI-G blowers

ROOTS Universal RAI-G rotary positive gas blowers are a design extension of the basic Universal RAI blower model. URAI-G blower uses (4) mechanical seals in place of the standard inboard lip seals to minimize gas leakage into the atmosphere. The seal chambers are piped to plugged connections. These should be opened periodically to confirm that there is no build-up of oil due to leakage by the mechanical seal. Special traps may be required for vacuum operation. These units are intended for gases which are compatible with cast iron case material, steel shafts, 300/400 series stainless steel and carbon seal components, viton o-rings and the oil/grease lubricants. If there are any questions regarding application or operation of this gas blower, please contact factory.

Precaution: URAI-G blowers: Care must be used when opening the head plate seal vent chamber plugs (43) as some gas will escape–if it is a pressure system, or the atmospheric air will leak in-if the system is under vacuum. There is a possibility of some gas leakage through the mechanical seals. This leakage on the gear end will escape through the gear box vent, and on the drive end, through the grease release fittings. If the gas leakage is undesirable, each seal chamber must be purged with an inert gas through one purge gas hole (43) per seal . There are two plugged purge gas holes(1/8 NPT) provided per seal. The purge gas pressure must be maintained one psi above the discharge gas pressure. Also, there exists a possibility of gear end oil and drive end grease leakage into the gas stream.

The lubricants selected must be compatible with the gas.

URAI GAS Blower Oil and Grease Specifications

The specified oil should be ROOTS synthetic P/N 813-106- of the proper viscosity.

When servicing drive end bearings of a Gas blower, use the specified NLGI #2 premium grade aluminum complex* grease, ROOTS P/N T20019001, with 300°F (149°C) service temperature and moisture resistance and good mechanical stability.

*ROOTS Synthetic Oil & Grease is superior in performance to petroleum based products. It has high oxidation stability, excellent corrosion protection, extremely high film strength and low coefficient of friction. Typical oil change intervals are increased 2-3 times over petroleum based lubricants. Also, ROOTS Synthetic Oil is 100% compatible with petroleum based oils. Simply drain the oil in the blower and refill the reservoirs with ROOTS Synthetic Oil to maintain optimum performance of your ROOTS blower.

Due to sludge build-up and seal leakage problems, Roots recommendation is **DO NOT USE** Mobil SHC synthetic oils in Roots blowers.

For Units with a Grease Lubricated Drive End

A simple but very effective lubrication system is employed on the drive shaft end bearings. Hydraulic pressure relief fittings are provided to vent any excess grease, preventing pressure build-up on the seals. A restriction plug and metering orifice prevent loss of lubricant from initial surges in lubricant pressure but permit venting excess lubricant under steadily rising pressures.

For grease lubricated drive end blowers see page 16, table 4, regarding specified greasing intervals.

When servicing drive end bearings of Non Gas blower, use the specified NLGI #2 premium grade microgel grease with 250°F (121°C) service temperature and moisture resistance and good mechanical stability. ROOTS specifies Shell Darina EP NLGI Grade 2. Product Code 71522 or Shell Darina SD 2 product code 506762B.

URAI GAS Blower Oil and Grease Specifications

The specified oil should be ROOTS synthetic P/N 813-106- of the proper viscosity.

When servicing drive end bearings of a Gas blower, use the specified NLGI #2 premium grade aluminum complex* grease, ROOTS P/N T20019001, with 300°F (149°C) service temperature and moisture resistance and good mechanical stability.

NOTE: Lithium based greases are not compatible with the ROOTS Synthetic grease used when assembling a Gas blower or the non-soap base grease used when assembling a standard URAI blower. Lithium based grease is not approved for any ROOTS blowers.

Using a pressure gun, slowly force new lubricant into each drive end bearing housing until traces of clean grease comes out of the relief fitting. The use of an electric or pneumatic grease gun could force the grease in too rapidly and thus invert the seals and should not be used.

To fill the gearbox, remove the breather plug (25) and the oil overflow plug (21) - see page 14. Fill the reservoir up to the overflow hole. Place the breather and the overflow plug back into their respective holes.

After a long shutdown, it is recommended that the grease fittings be removed, the old grease flushed out with kerosene or #10 lubricating oil, drained thoroughly, and bearings refilled with new grease. Be sure grease relief fittings are reinstalled. Grease should be added using a hand operated grease gun to the drive end bearings at varying time intervals depending on duty cycle and RPM. Table 4 has been prepared as a general greasing schedule guide based on average operating conditions. More frequent intervals may be necessary depending on the grease operating temperature and unusual circumstances.

For Units with Splash Lubrication on Both Ends

Bearings and oil seals are lubricated by the action of the timing gears or oil slingers which dip into the main oil sumps causing oil to splash directly on gears and into bearings and seals. A drain port is provided below each bearing to prevent an excessive amount of oil in the bearings. Seals located inboard of the bearings in each headplate effectively retain oil within the sumps. Any small leakage that may occur should the seals wear passes into a cavity in each vented headplate and is drained downward.

Oil sumps on each end of the blower are filled by removing top vent plugs, Item (25), and filling until oil reaches the middle of the oil level sight gauge when the unit is not operating, Item (45 or 53), DO NOT FILL PAST THE MIDDLE OF THE SIGHT GLASS.

Initial filling of the sumps should be accomplished with the blower not operating, in order to obtain the correct oil level. Approximate oil quantities required for blowers of the various models and configurations are listed in Table 3. Use a good grade of industrial type non-detergent, rust inhibiting, anti-foaming oil and of correct viscosity per Table 2. ***ROOTS synthetic oil (ROOTS P/N 813-106-) is highly recommended and specified.** ROOTS does not recommend automotive type lubricants, as they are not formulated with the properties mentioned above.

The oil level may rise or fall on the gauge during operation, to an extent depending somewhat on oil temperature and blower speed.

Proper lubrication is usually the most important single consideration in obtaining maximum service life and satisfactory operation from the unit. Unless operating conditions are quite severe, a weekly check of oil level and necessary addition of lubricant should be sufficient. During the first week of operation, check the oil levels in the oil sumps about once a day, and watch for leaks. Replenish as necessary. Thereafter, an occasional check should be sufficient. It is recommended that the oil be changed after initial 100 hours of operation. Frequent oil changing is not necessary unless the blower is operated in a very dusty location.

Normal life expectancy of petroleum based oils is about 2000 hours with an oil temperature of about 180°F (82°C). As the oil temperature increases by increments of 15-18°F (8°C - 10°C), the life is reduced by half. Example: Oil temperatures of 210-216°F (99°C - 102°C) will produce life expectancy of 1/4 or 500 hours. Therefore, it is considered normal to have oil change periods of 500 hours with petroleum based oils.

Normal life expectancy of ROOTS™ Synthetic Oil is about 4000 to 8000 hours with an oil temperature of about 180°F (82°C). As the oil temperature increases by increments of 15-18°F (8°C - 10°C), the life is reduced by half. Example: Oil temperatures of 210-216°F (99°C - 102°C) will produce life expectancy of 1/4 or 1000 to 2000 hours.

NOTE: To estimate oil temperature, multiply the discharge temperature of the blower by 0.80. Example: if the discharge air temperature of the blower is 200° F, it is estimated that the oil temperature is 160° F.

*ROOTS™ Synthetic Oil & Grease is superior in performance to petroleum based products. It has high oxidation stability, excellent corrosion protection, extremely high film strength and low coefficient of friction. Typical oil change intervals are increased 2-3 times over petroleum based lubricants. Also, ROOTS™ Synthetic Oil is 100% compatible with petroleum based oils. Simply drain the oil in the blower and refill the reservoirs with ROOTS™ Synthetic Oil to maintain optimum performance of your ROOTS™ blower.

Operation

Before operating a blower under power for the first time, recheck the unit and the installation thoroughly to reduce the likelihood of avoidable troubles. Use the following procedure check list as a guide, but consider any other special conditions in the installation.

- ❑ Be certain that no bolts, tools, rags, or debris have been left in the blower air chamber or piping.
- ❑ If an outdoor intake without filter is used, be sure the opening is located so it cannot pick up dirt and is protected by a strong screen or grille. Use of the temporary protective screen as described under INSTALLATION is strongly recommended.
- ❑ Recheck blower leveling, drive alignment and tightness of all mounting bolts if installation is not recent. If belt drive is used, adjust belt tension correctly.
- ❑ Turn drive shaft by hand to make sure impellers still rotate without bumping or rubbing at any point.
- ❑ Ensure oil levels in the main oil sumps are correct.
- ❑ Check lubrication of driver. If it is an electric motor, be sure that power is available and that electrical overload devices are installed and workable.
- ❑ Open the manual unloading valve in the discharge air line. If a valve is in the inlet piping, be sure it is open.
- ❑ Bump blower a few revolutions with driver to check that direction of rotation agrees with arrow near blower shaft, and that both coast freely to a stop.

After the preceding points are cleared, blower is ready for trial operation under “no-load” conditions. The following procedure is suggested to cover this initial operation test period.

a. Start blower, let it accelerate to full speed, then shut off. Listen for knocking sounds, both with power on and as speed slows down.

b. After blower comes to a complete stop, repeat above, but let blower run 2 or 3 minutes. Check for noises, such as knocking sounds.

c. After blower comes to a complete stop, operate blower for about 10 minutes unloaded. Check oil levels. Observe cylinder and headplate surfaces for development of hot spots such as burned paint, indicating impeller rubs. Be aware of any noticeable increase in vibration.

Assuming that all trials have been satisfactory, or that necessary corrections have been made, the blower should now have a final check run of at least one hour under normal operating conditions. After blower is restarted, gradually close the discharge unloading valve to apply working pressure. At this point it is recommended that a pressure gauge or manometer be connected into the discharge line if not already provided, and that thermometers be in both inlet and discharge lines. Readings from these instruments will show whether pressure or temperature ratings of the blower are being exceeded.

During the final run, check operating conditions frequently and observe the oil levels at reasonable intervals. If excessive noise or local heating develops, shut down immediately and determine the cause. If either pressure rise or temperature rise across the blower exceeds the limit specified in this manual, shut down and investigate conditions in the piping system. Refer to the TROUBLESHOOTING CHECKLIST for suggestions on various problems that may appear.

The blower should now be ready for continuous duty operation at full load. During the first few days make periodic checks to determine whether all conditions remain steady, or at least acceptable. This may be particularly important if the blower is supplying air to a process system where conditions can vary. At the first opportunity, stop the blower and clean the temporary inlet protective screen. If no appreciable amount of debris has collected, the screen may be removed. See comments under INSTALLATION. At this same time, verify leveling, coupling alignment or belt tension, and mounting bolt tightness.

Should operating experience prove that blower capacity is a little too high for the actual air requirements, a small excess may be blown off continuously through the manual unloading or vent valve. Never rely on the pressure relief valve as an automatic vent. Such use may cause the discharge pressure to become excessive, and can also result in failure of the valve itself. If blower capacity appears to be too low, refer to the TROUBLESHOOTING CHECKLIST.

Vibration Assessment Criteria

With measurements taken at the bearing locations on the housings, see chart below for an appropriate assessment guide for rotary lobe blowers rigidly mounted on stiff foundations.

In general, blower vibration levels should be monitored on a regular basis and the vibration trend observed for progressive or sudden change in level. If such a change occurs, the cause should be determined through spectral analysis.

As shown on the chart below, the level of all pass vibration will determine the need to measure discrete frequency vibration levels and the action required.

All Pass Vibration (in/sec)	Discrete Frequency Vibration (in/sec)	Action
0.45 or less	N/R	Acceptable
Greater than 0.45 but 1.0 or less	0.45 or less @ any frequency	Acceptable
	Greater than 0.45 @ any frequency	Investigate
Greater than 1.0	Less than 1.0	Investigate
	Greater than 1.0	Investigate

Troubleshooting Checklist

Trouble	Item	Possible Cause	Remedy
No flow	1	Speed too low	Check by tachometer and compare with published performance
	2	Wrong rotation	Compare actual rotation with Figure 1 Change driver if wrong
	3	Obstruction in piping	Check piping, valves, silencer to assure open flow path
Low capacity	4	Speed too low	See item 1, If belt drive, check for slippage and readjust tension
	5	Excessive pressure rise	Check inlet vacuum and discharge pressure and compare with Published performance
	6	Obstruction in piping	See item 3
	7	Excessive slip	Check inside of casing for worn or eroded surfaces causing excessive clearances
Excessive power	8	Speed too high	Check speed and compare with published performance
	9	Excessive pressure rise	See Item 5
	10	Impeller rubbing	Inspect outside of cylinder for high temperature areas, then check for impeller contact at these points. Correct blower mounting, drive alignment
	11	Scale, sludge, rust or product build up	Clean blower appropriately
Damage to bearings	12	Inadequate lubrication	Check oil sump levels in gear and drive end headplates
or gears	13	Excessive lubrication	Check oil levels. If correct, drain and refill with clean oil of recommended grade
	14	Excessive pressure rise	See Item 5
	15	Coupling misalignment	Check carefully. Realign if questionable
	16	Excessive belt tension	Readjust for correct tension
Vibration	17	Misalignment	See Item 15
	18	Impellers rubbing	See Item 10
	19	Worn bearings/gears	Check gear backlash and condition of bearings, and replace as indicated
	20	Unbalanced or rubbing impeller	Scale or process material may build up on casing and impellers, or inside impellers. Remove build-up to restore original clearances and impeller balance
	21	Driver or blower loose	Tighten mounting bolts securely
	22	Piping resonances	Determine whether standing wave pressure pulsations are present in the piping
	23	Scale/sludge build-ups	Clean out interior of impeller lobes to restore dynamic balance
	24	Casing strain	Re-work piping alignment to remove excess strain
Driver stops, or will not start	25	Impeller stuck	Check for excessive hot spot on headplate or cylinder. See item 10. Look for defective shaft bearing and/or gear teeth
	26	Scale, sludge, rust or product build-up	Clean blower appropriately
Excessive breather	27	Broken seal	Replace seals
Blow-by or excessive oil leakage to vent area	28	Defective O-ring	Replace seals and O-ring
Excessive oil leakage in vent area	29	Defective/plugged breather	Replace breather and monitor oil leakage
	30	Oil level too high	Check sump levels in gear and drive headplates.
	31	Oil type or viscosity incorrect	Check oil to insure it meets recommendations. Drain then fill with clean oil of recommended grade.
	32	Blower running hot	Check blower operating conditions to ensure they are within the operating limitations defined in this manual.

Inspection & Maintenance: Universal RAI® series blowers

A good program of consistent inspection and maintenance is the most reliable method of minimizing repairs to a blower. A simple record of services and dates will help keep this work on a regular schedule. Basic service needs are:

- Lubrication
- Checking for hot spots
- Checking for increases or changes in vibration and noise
- Recording of operating pressures and temperatures

Above all, a blower must be operated within its specified rating limits, to obtain satisfactory service life.

A newly installed blower should be checked often during the first month of full-time operation. Attention there after may be less frequent assuming satisfactory performance. Lubrication is normally the most important consideration and weekly checks of lubricant levels in the gearbox and bearing reservoirs should be customary. Complete oil change schedules are discussed under **LUBRICATION.**

Driver lubrication practices should be in accordance with the manufacturer's instructions. If direct connected to the blower through a lubricated type coupling, the coupling should be checked and greased each time blower oil is changed. This will help reduce wear and prevent unnecessary vibration. In a belted drive system, check belt tension periodically and inspect for frayed or cracked belts.

In a new, and properly installed, unit there is no contact between the two impellers, or between the impellers and cylinder or headplates. Wear is confined to the bearings (which support and locate the shafts) the oil seals, and the timing gears. All are lubricated and wear should be minimal if clean oil of the correct grade is always used. Seals are subject to deterioration as well as wear, and may require replacement at varying periods.

Shaft bearings are designed for optimum life under average conditions with proper lubrication and are critical to the service life of the blower. Gradual bearing wear may allow a shaft position to change slightly, until rubbing develops between impeller and casing. This will cause spot heating, which can be detected by observing these surfaces. Sudden bearing failure is usually more serious. Since the shaft and impeller are no longer supported and properly located, extensive general damage to the blower casing and gears is likely to occur.

Oil seals should be considered expendable items, to be replaced whenever drainage from the headplate vent cavity becomes excessive or when the blower is disassembled for any reason. Some oil seal leakage may occur since an oil film under the lip is required for proper operation. Periodically leaked oil should be wiped off from surfaces. Minor seal leakage should not be considered as indicating seal replacement.

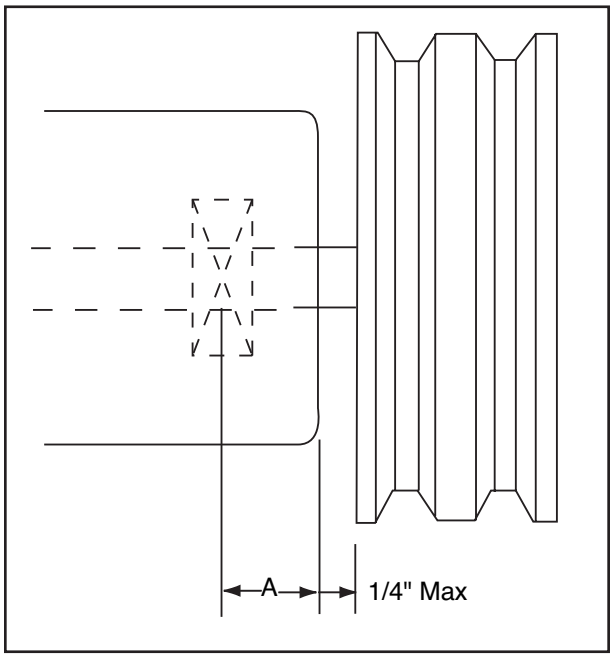
Timing gear wear, when correct lubrication is maintained, should be negligible. Gear teeth are cut to provide the correct amount of backlash, and gears correctly mounted on the shafts will accommodate a normal amount of tooth wear without permitting contact between lobes of the two impellers. However, too high an oil level will cause churning and excessive heating. This is indicated by unusually high temperature at the bottom of the gear housing. Consequent heating of the gears will result in loss of tooth-clearance , backlash and rapid wear of the gear teeth usually will develop. Continuation of this tooth wear will eventually produce impeller contacts (knocking), and from this point serious damage will be unavoidable if blower operation is continued. A similar situation can be produced suddenly by gear tooth fracture, which is usually brought on by sustained overloading or momentary shock loads.

Problems may also develop from causes other than internal parts failure. Operating clearances within a blower are only a few thousandths of an inch. This makes it possible for impeller interference or casing rubs to result from shifts in the blower mounting, or from changes in piping support. If this type of trouble is experienced, and the blower is found to be clean, try removing mounting strains. Loosen blower mounting bolts and reset the leveling and drive alignment. Then tighten mounting again, and make sure that all piping meets blower connections accurately and squarely Foreign materials in the blower will also cause trouble, which can only be cured by disconnecting the piping and thoroughly cleaning the blower interior.

A wide range of causes & solutions for operating troubles are covered in the **TROUBLE SHOOTING CHECKLIST.** The remedies suggested should be performed by qualified mechanics with a good background. Major repairs generally are to be considered beyond the scope of maintenance, and should be referred to an authorized ROOTS distributor.

Warranty failures should not be repaired at all, unless specific approval has been obtained through ROOTS before starting work. Unauthorized disassembly within the warranty period may void the warranty.

Figure 2 - Allowable Overhung Loads for V-Belt Drives Universal RAI®/URAI®-J Units



$$\text{Belt Pull lbs} = \frac{252100 \bullet \text{Motor HP}}{\text{Blower RPM} \bullet \text{Sheave Diameter}}$$

$$\text{Shaft Load (lb.in)} = \text{Belt Pull} \bullet \left(A + 1/4\text{"} + \frac{\text{Sheave Width}}{2}\right)$$

Frame Size	Dimension "A"	Max Allowable Shaft Load (lb-in.)	Min Sheave Diameter
22, 24	0.61	150	4.00
32, 33, 36	0.80	400	5.00
42, 45, 47	1.02	650	5.00
53, 56, 59	1.13	1,325	6.00
65, 68, 615	1.36	2,250	8.00
76, 711, 718	1.16	2,300	9.50

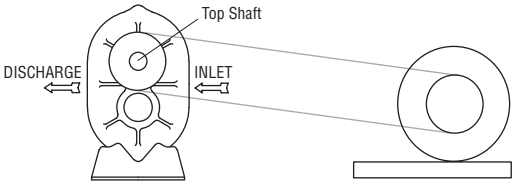
NOTE:
Arc of sheave belt contact on the smaller sheave not to be less than 170°

Driver to be installed on the inlet side for vertical units, and on the drive shaft side for horizontal units.

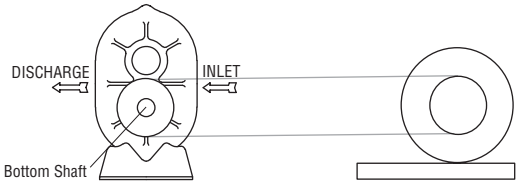
ROOTS recommends the use of two or more 3V, 5V or 8V belts and sheaves.

Acceptable Blower Drive Arrangement Options

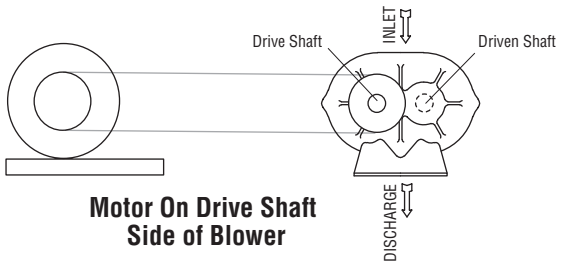
ACCEPTABLE



Motor On Inlet Side of Blower (Top Shaft)

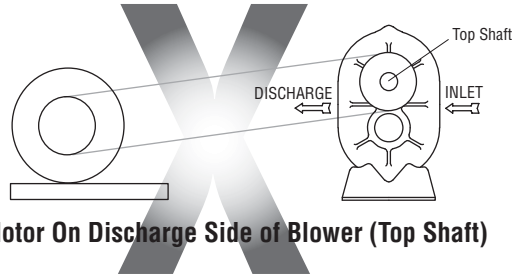


Motor On Inlet Side of Blower (Bottom Shaft)

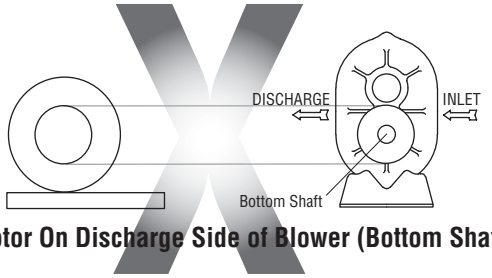


Motor On Drive Shaft Side of Blower

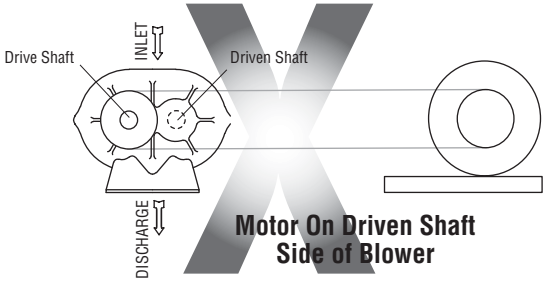
UNACCEPTABLE



Motor On Discharge Side of Blower (Top Shaft)

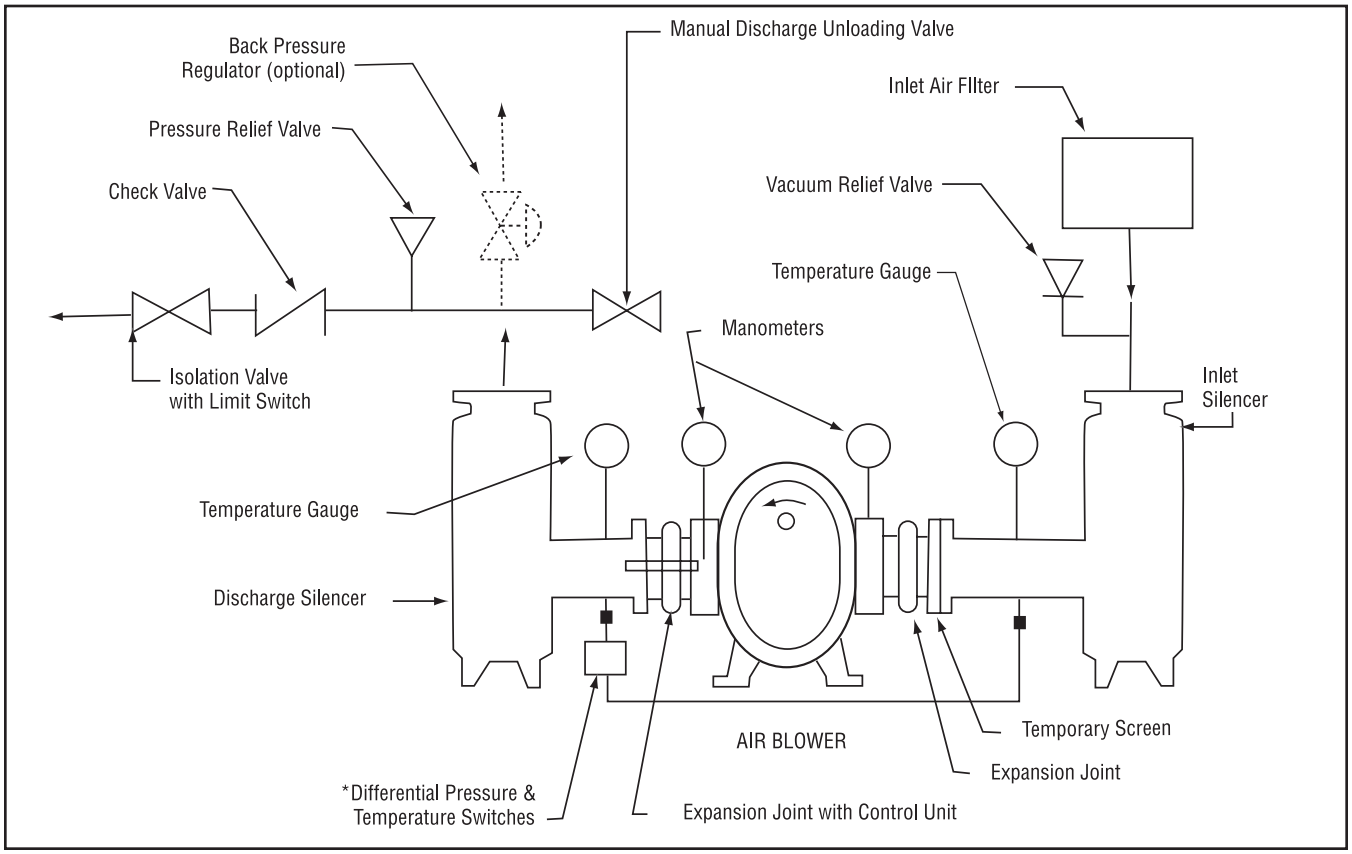


Motor On Discharge Side of Blower (Bottom Shaft)



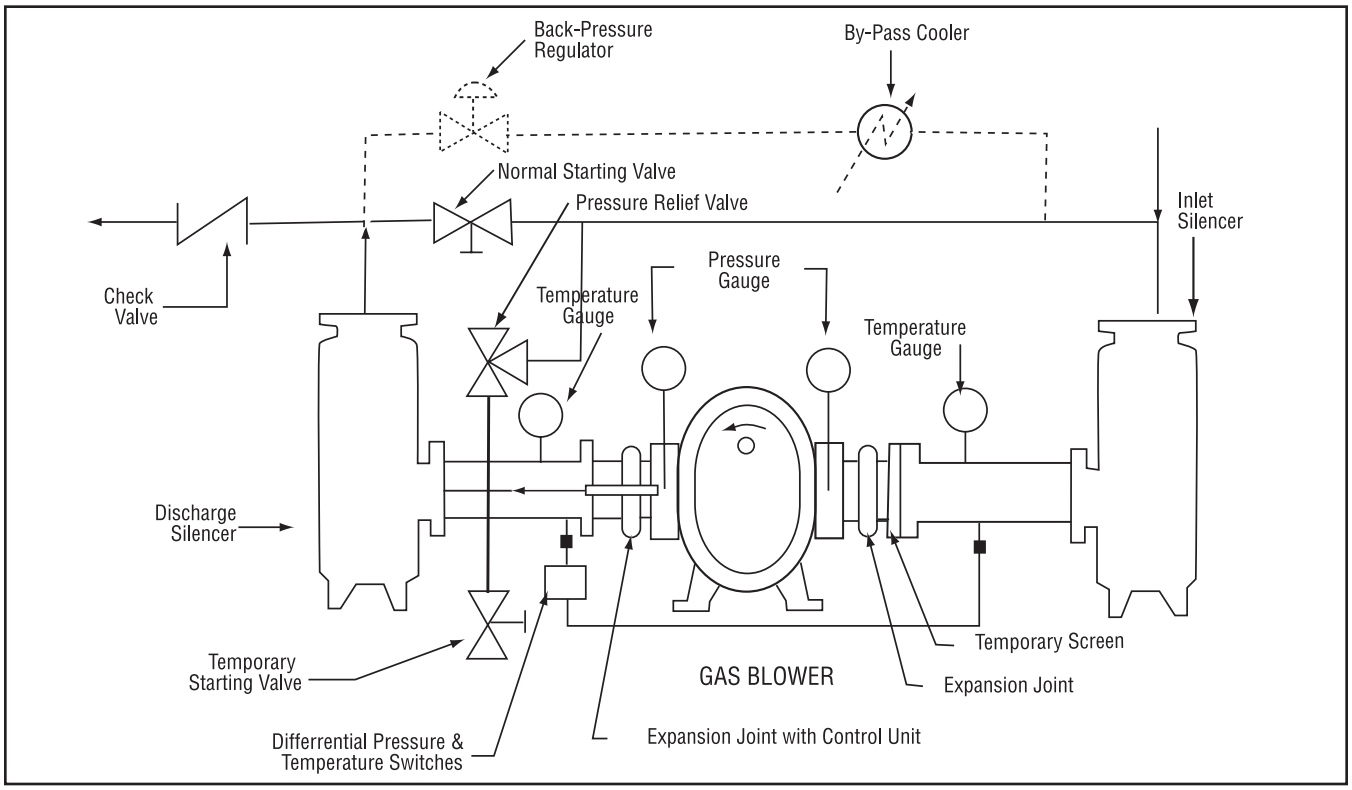
Motor On Driven Shaft Side of Blower

Figure 3a - Air Blower Installation with Accessories



Above are suggested locations for available accessories.

Figure 3b -Gas Blower Installation with Accessories



Above are suggested locations for available accessories.

Figure 4

Blower Orientation Conversion

Model	Reversible Rotation	Whispair™ Design
Universal RAI	yes	no
URAI-J Whispair™	no	yes
URAI-G	yes	no

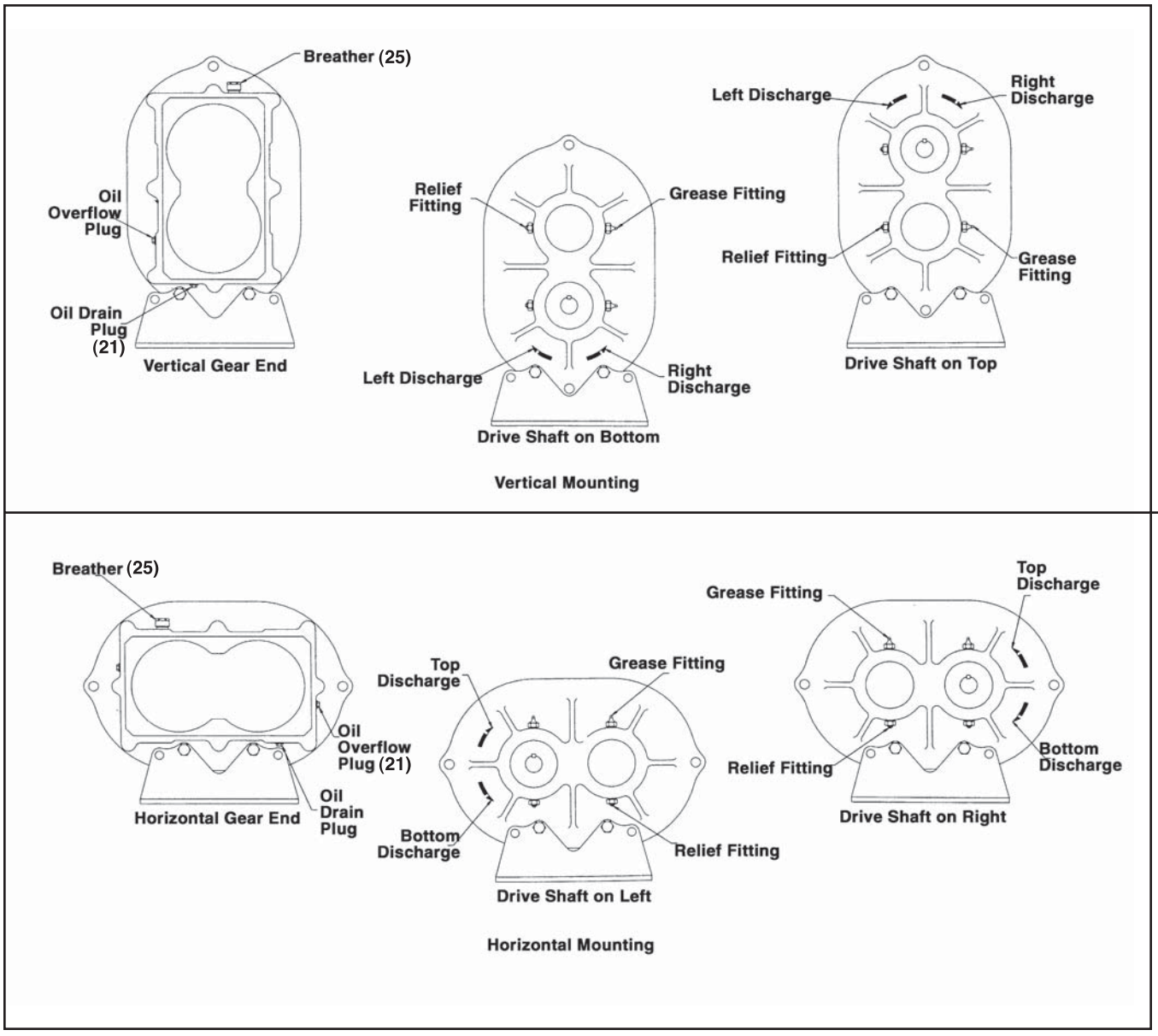
Special Note: WHISPAIR™ models are designed to operate with only one shaft rotation direction to take full advantage of the Whispair feature. Therefore, a WHISPAIR™ blower may be operated in the following combinations.

- CCW Rotation: Bottom Shaft; Right side discharge or a Left Shaft; Bottom discharge
- CCW Rotation: Top Shaft; Left side discharge or a Right Shaft; Top discharge

or

- CW Rotation: Bottom Shaft; Left side discharge or a Right Shaft Bottom discharge
- CW Rotation: Top Shaft; Right side discharge or a Left Shaft Top discharge

Blower Orientation and Lubrication Points: Grease Lubricated Drive End
Universal RAI series & URAI-G gas blowers



Drive End Breather Orientation for U-RAI series - DSL with Oil Lube

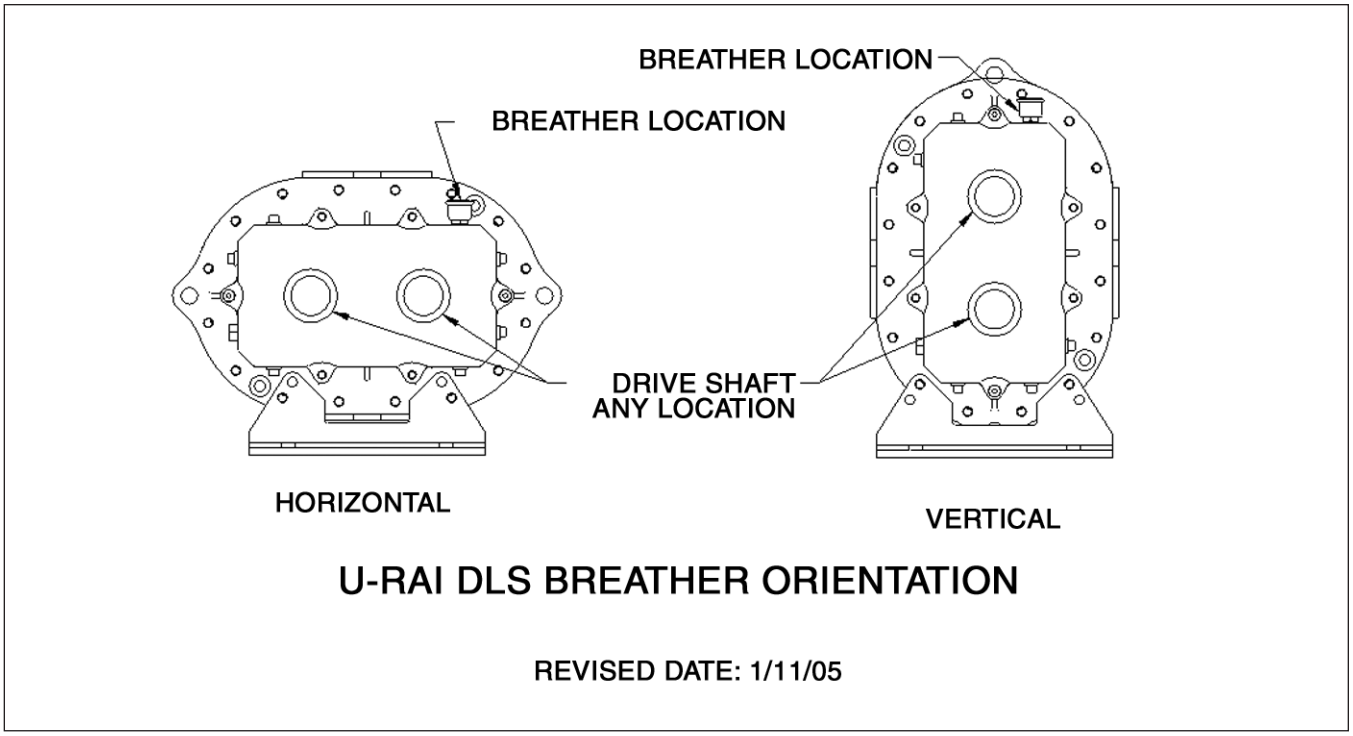


Table 1 - Universal RAI series, Universal URAI-DSI & URAI-G gas blower, Maximum Allowable Operating Conditions

Frame Size	Gear Diameter (Inch)	Speed RPM	Temp. Rise F°	(C°)	Delta Pressure PSI	(mbar)	Inlet Vacuum INHG	(mbar)
22	2.5	5275	225	(125)	12	(827)	15	(500)
24	2.5	5275	210	(117)	7	(483)	15	(500)
32	3.5	3600	240	(133)	15	1034	16	(539)
33	3.5	3600	225	(125)	12	(827)	15	(500)
36	3.5	3600	225	(125)	7	(483)	15	(500)
42	4.0	3600	240	(133)	15	(1034)	16	(539)
45	4.0	3600	225	(125)	10	(690)	16	(539)
47	4.0	3600	225	(125)	7	(483)	15	(500)
53	5.0	2850	225	(125)	15	(1034)	16	(539)
56	5.0	2850	225	(125)	13	(896)	16	(539)
59	5.0	2850	225	(125)	7	(483)	15	(500)
65	6.0	2350	250	(130)	15	(1034)	16	(539)
68	6.0	2350	240	(133)	14	(965)	16	(539)
615	6.0	2350	130	(72)	7	(483)	14	(472)
76	7.0	2050	250	(139)	15	(1034)	16	(539)
711	7.0	2050	225	(125)	10	(690)	16	(539)
718	7.0	2050	130	(72)	6	(414)	12	(405)

Table 2 - Recommended Oil Grades

Ambient Temperature °F (°C)	ISO Viscosity No.
Above 90° (32°)	320
32° to 90° (0° to 32°)	220
0° to 32° (-18° to 0°)	150
Below 0° (-18°)	100

URAI GAS Blower Oil and Grease Specifications

The specified oil should be ROOTS synthetic P/N 813-106- of the proper viscosity.

Table 3 - Approximate Oil Sump Capacities

These capacities are provided to assist in stocking the correct amount of oil. Exact sump capacities may differ slightly. See "Lubrication" section for proper filling instructions.

UNIVERSAL RAI, URAI-J, URAI-G

Frame Size	Gear End Capacity Fl. Oz. (Liters)	
	Vertical	Horizontal
22	3.4 (.1)	6.1 (.18)
24	3.4 (.1)	6.1 (.18)
32	8.5 (.25)	16.0 (.47)
33	8.5 (.25)	16.0 (.47)
36	8.5 (.25)	16.0 (.47)
42	12.7 (.37)	14.5 (.43)
45	12.7 (.37)	14.5 (.43)
47	12.7 (.37)	14.5 (.43)
53	16.0 (.47)	27.6 (.82)
56	16.0 (.47)	27.6 (.82)
59	16.0 (.47)	27.6 (.82)
65	28.3 (.84)	52.1 (1.54)
68	28.3 (.84)	52.1 (1.54)
615	28.3 (.84)	52.1 (1.54)
76	32.3 (.96)	59.5 (1.76)
711	32.3 (.96)	59.5 (1.76)
718	32.3 (.96)	59.5 (1.76)

See page 14 and 15 for illustration of vertical and horizontal configurations.

UNIVERSAL URAI series-DSL Splash Lubricated Drive End

Note that the gear end sump capacity is provided on the adjacent table.

Frame Size	Drive End Capacity Fl. Oz. (Liters)	
	Vertical	Horizontal
32	4.0 (.12)	6.5 (.19)
33	4.0 (.12)	6.5 (.19)
36	4.0 (.12)	6.5 (.19)
42	5.5 (.16)	10.8 (.32)
45	5.5 (.16)	10.8 (.32)
47	5.5 (.16)	10.8 (.32)
53	7.5 (.22)	14.8 (.44)
56	7.5 (.22)	14.8 (.44))
59	7.5 (.22)	14.8 (.44)
65	16 (0.47)	31 (0.91)
68	16 (0.47)	31 (0.91)
615	16 (0.47)	31 (0.91)

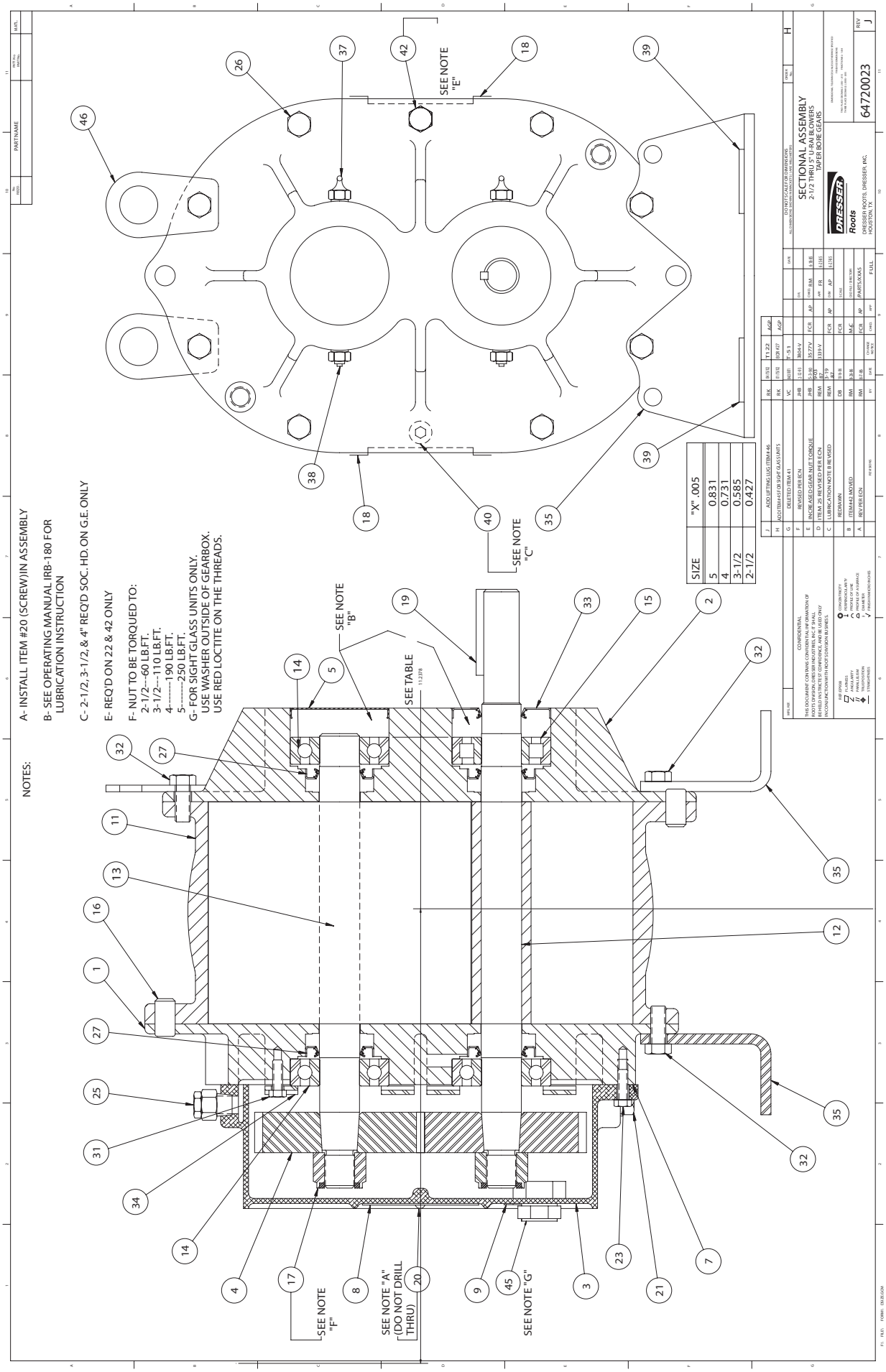
Table 4 - Universal URAI series with Grease Lubricated Drive End: Specified Bearing Greasing Intervals

Speed In RPM	Operating Hours Per Day		
	8	16	24
	Greasing Intervals in Weeks		
750-1000	7	4	2
1000-1500	5	2	1
1500-2000	4	2	1
2000-2500	3	1	1
2500-3000	2	1	1
3000 and up	1	1	1

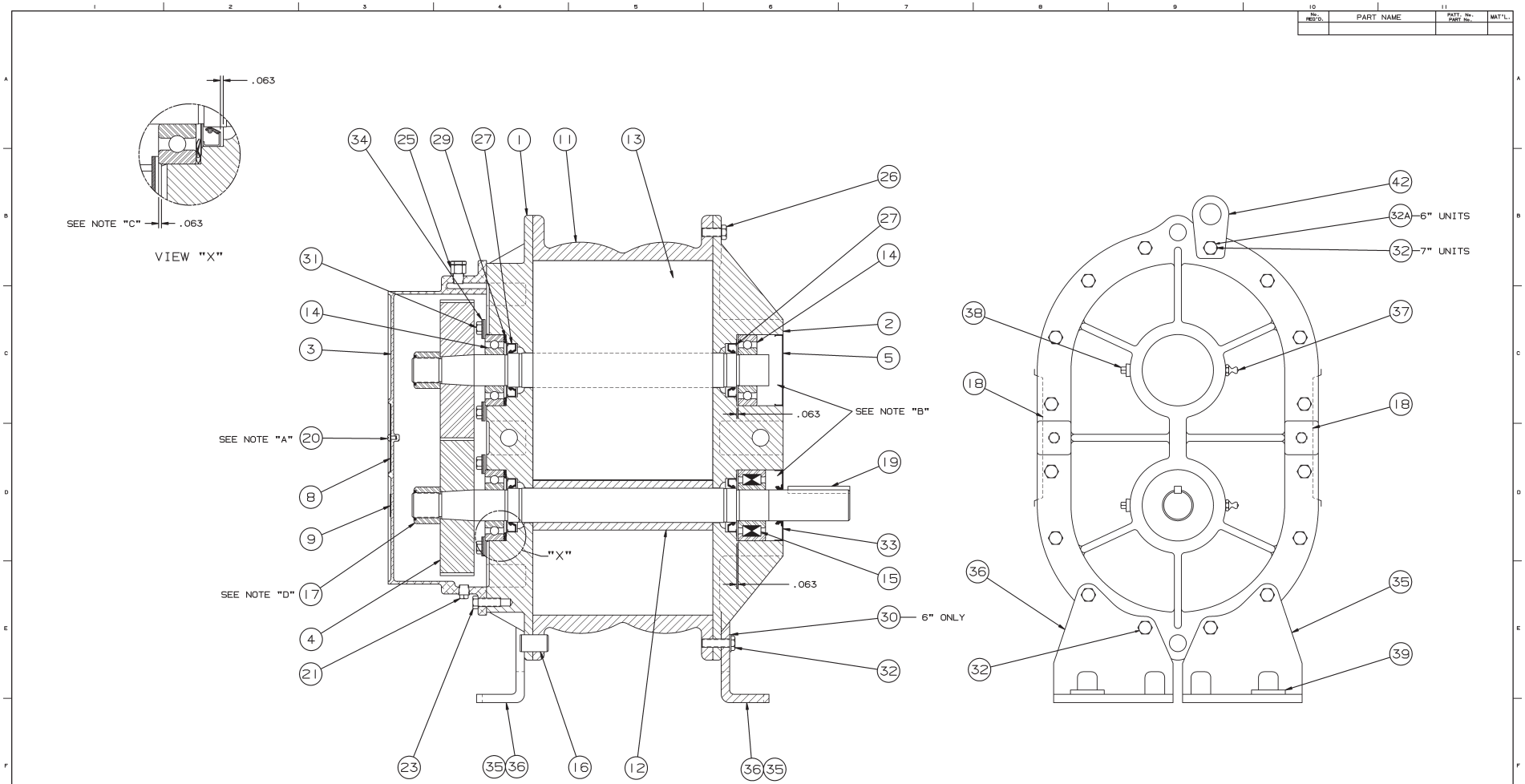
The specified grease for servicing drive end bearings of a Gas blower, use a NLGI #2 premium grade aluminum complex* grease, ROOTS P/N T20019001 with 300°F (149°C) service temperature and moisture resistance and good mechanical stability.

When servicing drive end bearings of Non Gas blower, use a NLGI #2 premium grade microgel grease with 250°F (121°C) service temperature and moisture resistance and good mechanical stability. ROOTS specifies Shell Darina EP NLGI Grade 2. Product Code 71522.

NOTE: Lithium based greases are not compatible with the ROOTS Synthetic grease used when assembling a Gas blower or the non-soap base grease used when assembling a standard URAI blower. Lithium based grease is not approved for any ROOTS blowers.



Assembly of UNIVERSAL RAI Series, Air Blowers, 2-1/2" Through 5" Gear Diameter



NOTES

A INSTALL ITEM #20 (SCREW) IN ASSEMBLY

B SEE OPERATING MANUAL IRB-103 FOR LUBRICATION INSTRUCTION

C INSTALL BEARINGS AS SHOWN BEFORE SETTING END CLEARANCE

D NUT TO BE TORQUED TO:
6"---400 LB. FT.
7"---550 LB. FT.

No. REQ'D.	PART NAME	PATT. No. PART No.	MAT'L.

MFG. REF. 62600023

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REF: ASME Y14.5M-1994
FLATNESS — STRAIGHTNESS
ANGULARITY — PERPENDICULARITY
PARALLELISM — PROFILE OF LINE
TRUE POSITION — PROFILE OF A SURFACE
CONCENTRICITY — DIAMETER
FINISH IN MICRO INCHES

	REVISIONS	BY	DATE	CHANGE NOTICE	CHKD.	APP
H	ADDED ITEM 32A	AKP	12/12/05	76311V		
G	REMOVED ITEM 44	AJK	8/21/05	75271V	AGP	
F	ADDED ITEM 44	RDR	3/4/05	74191V		

DATE
DR. REM 12/8/95
CHKD. FCR 3/12/96
APP. AP 8/8/96
DEV
SCALE 6"=1'-0"
CAD FILE / DIRECTORY 64792A23
XASR

DO NOT SCALE FOR DIMENSIONS
ALL DIMENSIONS SHOWN IN BRACKETS [ ] ARE MILLIMETERS
ORDER No. 55-1242-2

SECTIONAL ASSEMBLY
FOR 6" & 7" U-RAI BLOWER
WITH TAPER GEAR FIT

DRESSER ROOTS
ROOTS DIVISION
DRESSER EQUIPMENT GROUP
A HALLIBURTON COMPANY
HOUSTON, TX USA

COMMERCIAL TOLERANCES UNLESS OTHERWISE SPECIFIED
FINISHED DIMENSIONS
TWO PLACE DECIMALS [.XX]---±.010
THREE PLACE DECIMALS [.XXX]---±.005
FRACTIONAL---±1/64

64792023 REV H

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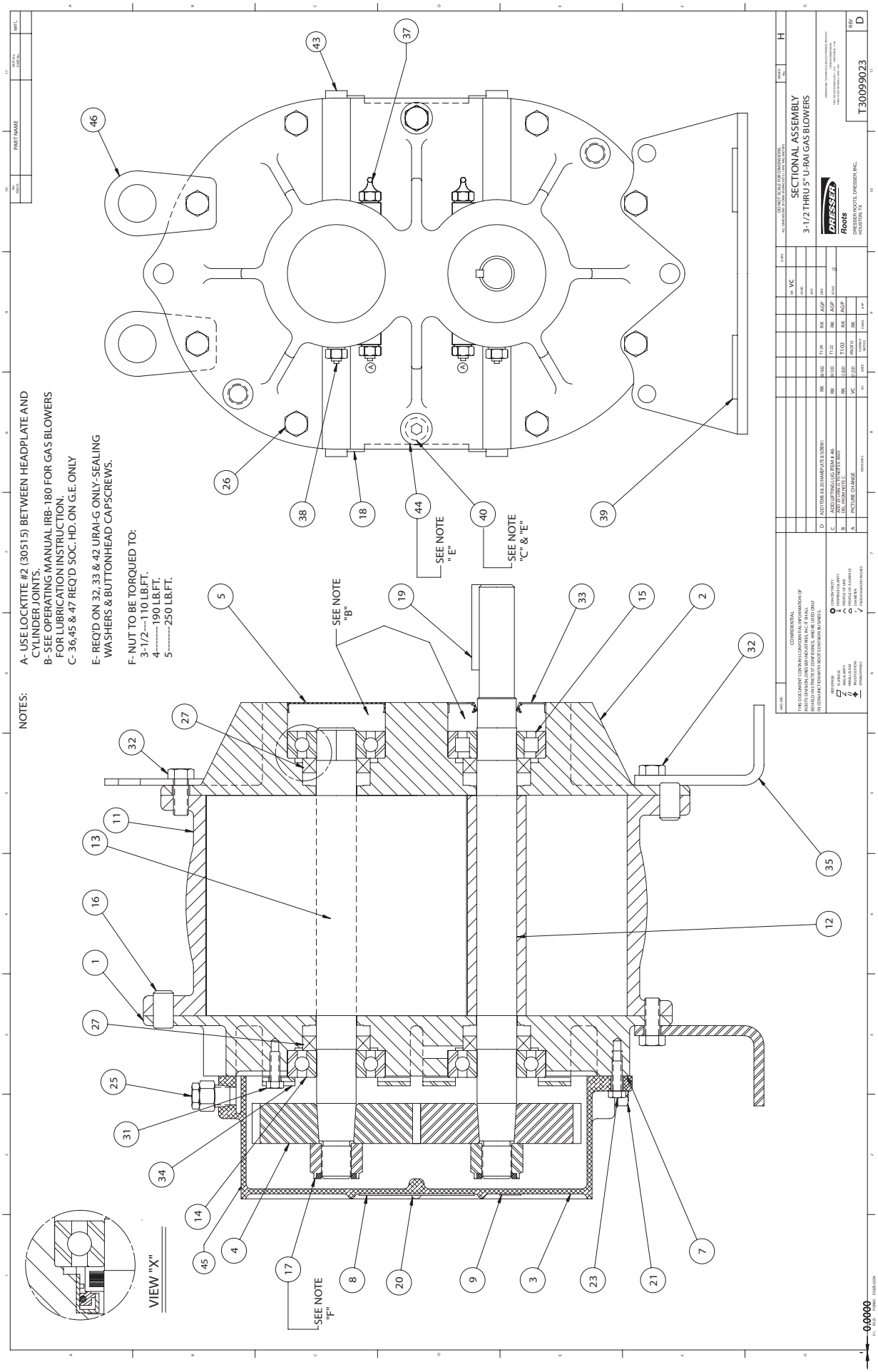
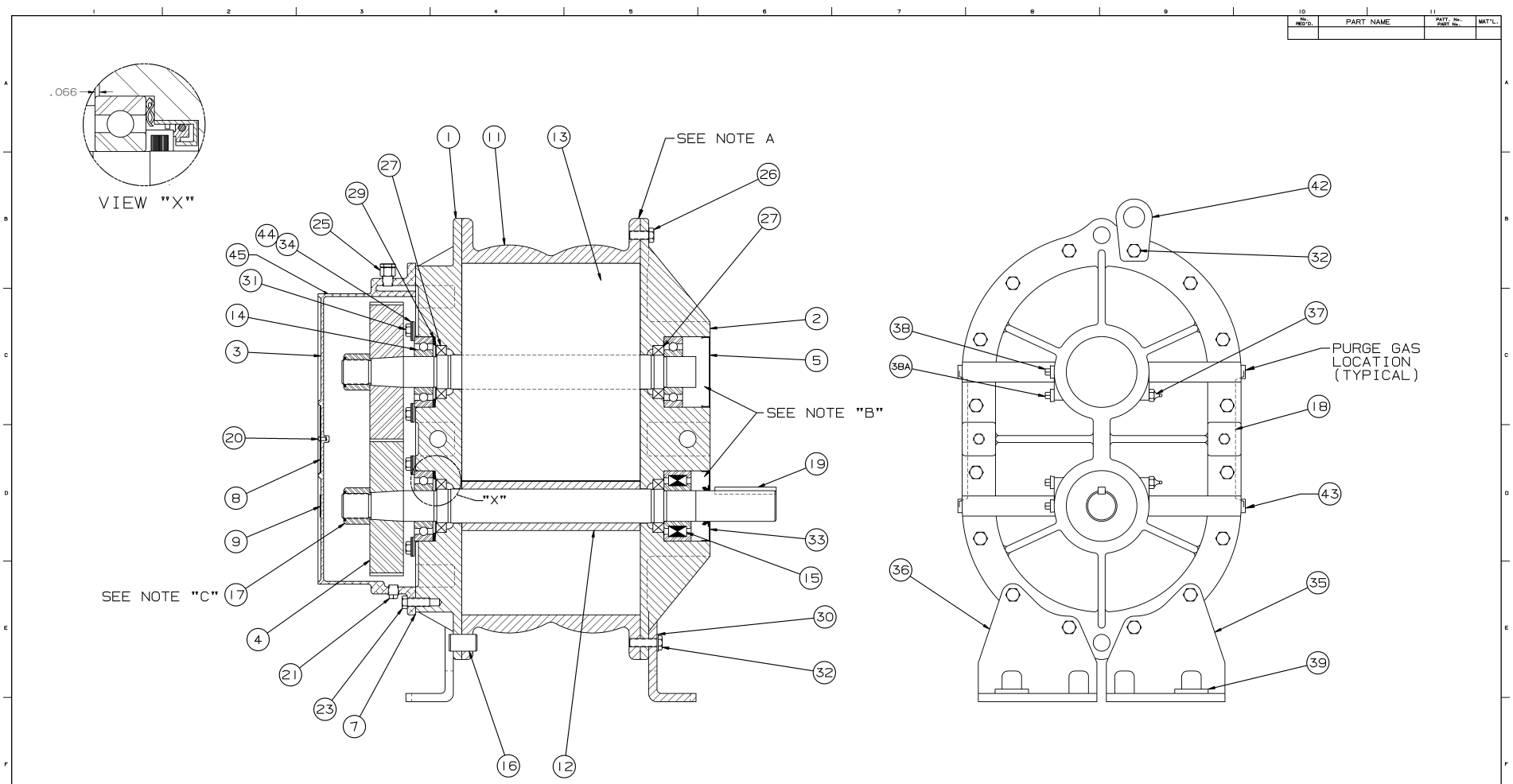
Assembly of UNIVERSAL RAI Blowers, 6” and 7” Diameter



Assembly of UNIVERSAL RAI-G Series Gas Blowers, 3-1/2"Through 5" Gear Diameter



NOTES

A USE LOCKTITE #2 (30515) BETWEEN HEADPLATE AND CYLINDER JOINTS.

B SEE OPERATING MANUAL IRB-180 FOR LUBRICATION INSTRUCTION

C NUT TO BE TORQUED TO: 400 LB. FT.

No. REQ'D.	PART NAME	PATT. No. / PART No.	MAT'L.

REV	REVISIONS	BY	DATE	CHANGE NOTICE	CHKD.	APP.
E	REV TO MECHANICAL SEAL	AKP	5/4/06	7457V		
D	ADDED ITEM #38A	RDR	5/3/05	7457V		AGP
C	ADD ITEMS # 8 & 20	RK	8/8/02	T129		
B	PICTURE CHANGE	VC	7/25/01	PROTO		
A	ADDED DIMENSION .066	VC	6/26/01	PROTO		

DR. VC 1/12/01
CHKD.
APP.
DEV
SCALE 6"=1'-0"
CAD FILE / DIRECTORY T30110A23

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PARALLELISM
TRUE POSITION
STRAIGHTNESS
CONCENTRICITY
PERPENDICULARITY
PROFILE OF LINE
PROFILE OF A SURFACE
DIAMETER
FINISH IN MICRO INCHES

MFG. REF.

DO NOT SCALE FOR DIMENSIONS
ALL DIMENSIONS SHOWN IN BRACKETS [ ] ARE MILLIMETERS
ORDER No.

SECTIONAL ASSEMBLY
FOR 6" U-RAI GAS BLOWERS

DRESSER Roots
Dresser ROOTS, Dresser, Inc.
Connersville, IN USA

T30110023 REV E

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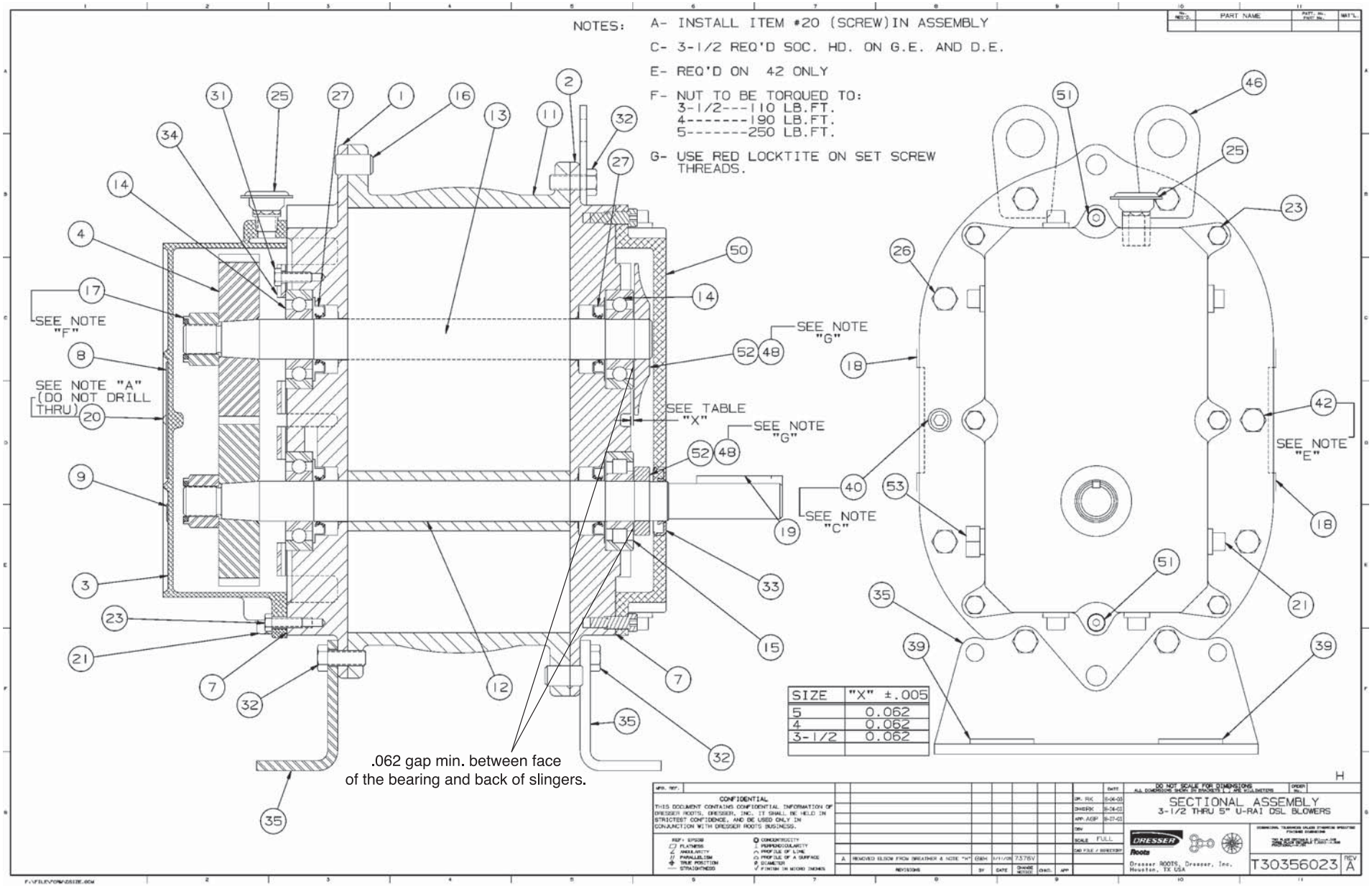
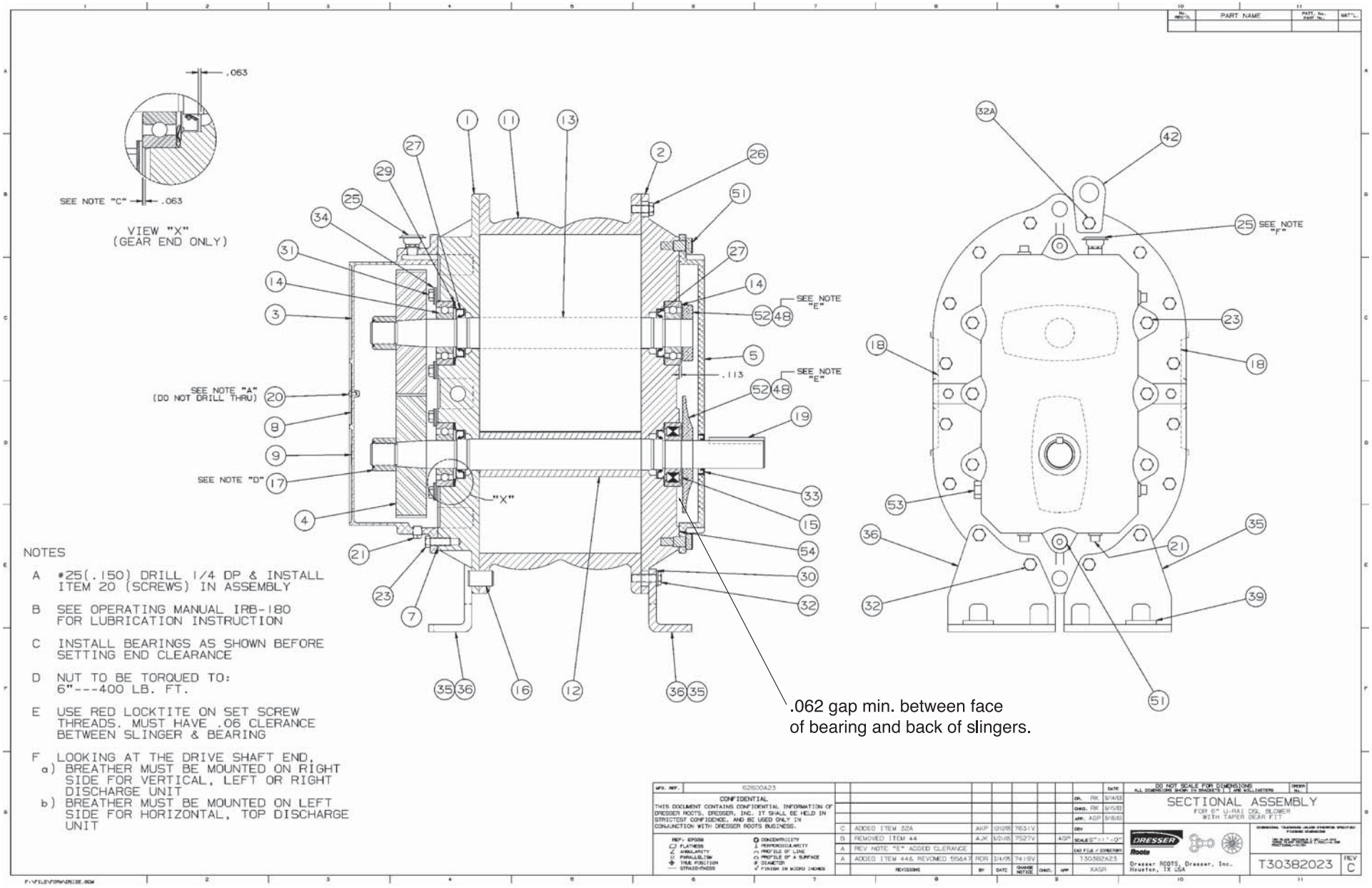
Assembly of UNIVERSAL RAI Series Gas Blowers, 6" Gear Diameter



Assembly of UNIVERSAL RAI Series - DSL with Splash Lubricated Drive End 3-5" Gear Diameter



Assembly of UNIVERSAL RAI Series - DSL with Splash Lubricated Drive End 6” Gear Diameter

Universal RAI Series Blowers Parts List 2-1/2" – 5" Gear Diameter

(Refer to drawing #64720023)

Item #	Part Name	Qty.
1	Headplate Gear End	1
2	Headplate Drive End	1
3	Gearbox	1
4	Timing Gears	2
5	Cover-Blind (Plug Opening)	1
7	Gasket, Gear Box	1
11	Cylinder	1
12	Impeller & Shaft Drive	1
13	Impeller & Shaft Driven	1
14	Bearing, Ball	3
15	Bearing, Roller	1
16	Pin, Dowel	4
17	Gear Nut	2
19	Key	1
21	Plug, Pipe	3
23	Screw Hex	6
25	Breather (Plug Vent)	1
26	Screw, Hex	*
27	Seal, Lip Bearing	4
31	Screw, Hex, Nylock	4
32	Screw, Hex	6
33	Seal Lip-Drive	1
34	Clamp Plate	2
35	Foot	2
37	Fitting, Grease	2
38	Fitting, Relief	2
39	Washer Mounting	4
40	Screw Socket	2
42	Screw Hex	2

*Quantities vary by blower.

Universal RAI Series Blowers Parts List 6" & 7" Gear Diameter

(Refer to drawing #64792023)

Item #	Part Name	Qty.
1	Headplate Gear End	1
2	Headplate Drive End	1
3	Gearbox	1
4	Timing Gears	2
5	Cover-Blind (Plug Opening)	1
7	Gasket, Gear Box	1
11	Cylinder	1
12	Impeller & Shaft Drive	1
13	Impeller & Shaft Driven	1
14	Bearing, Ball	3
15	Bearing, Roller	1
16	Pin, Dowel	4
17	Gear Nut	2
19	Key	1
21	Plug, Pipe	3
23	Screw Hex Nylock	8
25	Breather (Plug Vent)	1
26	Screw, Hex	*
27	Seal, Lip Bearing	4
29	Washer, Spring Wavy	2
31	Screw, Hex, Nylock	4
32	Screw, Hex	10
33	Seal Lip-Drive	1
34	Clamp Plate	2
35	Foot	2
37	Fitting, Grease	2
38	Fitting, Relief	2
39	Washer Mounting	4

*Quantities vary by blower.

Universal RAI-DSL Series Blowers Parts List 3-1/2" – 5" Gear Diameter

(Refer to drawing #T30356023)

Item #	Part Name	Qty.
1	Headplate Gear End	1
2	Headplate Drive End	1
3	Gearbox	1
4	Timing Gears	2
7	Gasket, Gear Box, DE Cover	1
11	Cylinder	1
12	Impeller & Shaft Drive	1
13	Impeller & Shaft Driven	1
14	Bearing, Ball	3
15	Bearing, Roller	1
16	Pin, Dowel	4
17	Gear Nut	2
19	Key	1
21	Plug, Pipe	3
23	Screw Hex	6
25	Breather (Plug Vent)	1
26	Screw, Hex	*
27	Seal, Lip Bearing	4
31	Screw, Hex, Nylock	4
32	Screw, Hex	6
33	Seal Lip-Drive	1
34	Clamp Plate	2
35	Foot	2
39	Washer Mounting	4
40	Screw Socket	2
42	Screw Hex	2
48	DE Oil Slinger Set Screw	4
50	Drive End Cover	1
52	Drive End Oil Slinger	2
53	Oil Sight Glass	2

*Quantities vary by blower.

Universal RAI®-DSL Series Blowers Parts List 6" Gear Diameter

(Refer to drawing #T30382023)

Item #	Part Name	Qty.
1	Headplate Gear End	1
2	Headplate Drive End	1
3	Gearbox	1
4	Timing Gears	2
7	Gasket, Gear Box	1
11	Cylinder	1
12	Impeller & Shaft Drive	1
13	Impeller & Shaft Driven	1
14	Bearing, Ball	3
15	Bearing, Roller	1
16	Pin, Dowel	4
17	Gear Nut	2
19	Key	1
21	Plug, Pipe	3

Item #	Part Name	Qty.
23	Screw Hex Nylock	8
25	Breather (Plug Vent)	1
26	Screw, Hex	*
27	Seal, Lip Bearing	4
31	Screw, Hex, Nylock	4
32	Screw, Hex	10
33	Seal Lip-Drive	1
34	Clamp Plate	2
35	Foot	2
39	Washer Mounting	4
48	DE Oil Slinger Set Screw	4
50	Drive End Cover	1
52	Drive End Oil Slinger	2
53	Oil Sight Glass	2

*Quantities vary by blower.

Universal RAI Series Gas Blowers Parts List
3-1/2" & 5" Gear Diameter

(Refer to drawing #T30099023)

Item #	Part Name	Qty.
1	Headplate Gear End	1
2	Headplate Drive End	1
3	Gearbox	1
4	Timing Gears	2
5	Cover-Blind (Plug Opening)	1
7	Gasket, Gear Box	1
11	Cylinder	1
12	Impeller & Shaft Drive	1
13	Impeller & Shaft Driven	1
14	Bearing, Ball	3
15	Bearing, Roller	1
16	Pin, Dowel	4
17	Gear Nut	2
19	Key	1
21	Plug, Pipe	3
23	Screw Hex	8
25	Breather (Plug Vent)	1
26	Screw, Hex	14*
27	Seal, Bearing	4
31	Screw, Hex	4
32	Screw, Hex	4
33	Seal Lip-Drive	1
34	Clamp Plate	2
35	Foot	2
37	Fitting, Grease	2
38	Fitting, Relief	2
39	Washer Mounting	4
40	Screw Socket	2
42	Screw Hex	2

*Quantities vary by blower.

Universal RAI Series Gas Blowers Parts List
6" Gear Diameter

(Refer to drawing #T3011023)

Item #	Part Name	Qty.
1	Headplate Gear End	1
2	Headplate Drive End	1
3	Gearbox	1
4	Timing Gears	2
5	Cover-Blind (Plug Opening)	1
7	Gasket, Gear Box	1
7*	Gasket DE Cover	1
11	Cylinder	1
12	Impeller & Shaft Drive	1
13	Impeller & Shaft Driven	1
14	Bearing, Ball	3
15	Bearing, Roller	1
16	Pin, Dowel	4
17	Gear Nut	2
19	Key	1
21	Plug, Pipe	3
23	Screw Hex Nylock	8
25	Breather (Plug Vent)	1
26	Screw, Hex	14**
27	Seal, Bearing	4
31	Screw, Hex	4
32	Screw, Hex	10
33	Seal Lip-Drive	1
34	Clamp Plate	2
35	Foot	2
37	Fitting, Grease	2
38	Fitting, Relief	2
39	Washer Mounting	4
40	Screw Socket	2
42	Screw Hex	2
43	Plug	8
51	Shoulder Bolt	2
53	Oil Sight Glass	2

*DE cover gasket is not the same as the gasket used on the GE. You must specify the gasket required when ordering.
**Quantities vary by blower.

Specified Lubricants

ROOTS Synthetic Oil: ISO-VG-220 Grade

	Part Number
Quart	813-106-001
Gallon	813-106-002
Case (12 qts)	813-106-008

ROOTS Synthetic Oil: ISO-VG-320 Grade

	Part Number
Quart	813-106-004
Gallon	813-106-005
Case (12 qts)	813-106-007

ROOTS Synthetic Grease: NLGI #2

	Part Number
14.5 oz. Tube	T200019-001
5 Gallon Pail	T200019-003
Case (30 tubes)	T200019-002

UNIVERSAL RAI (URAI) AIR BLOWERS

URAI AIR BLOWERS (with Grease Lubricated Drive End)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
65102020	22	1" NPT	0.625"	32
65103020	24	2" NPT	0.625"	43
71048020	32	1.25" NPT	0.750"	69
65105020	33	2" NPT	0.750"	74
65106020	36	2.5" NPT	0.750"	102
65108020	42	1.5" NPT	0.875"	88
65109020	45	2.5" NPT	0.875"	109
65110020	47	3" NPT	0.875"	128
65112020	53	2.5" NPT	1.125"	143
65113020	56	4" NPT	1.125"	170
65114020	59	4" NPT	1.125"	204
65116020	65	3" NPT	1.375"	245
65117020	68	5" NPT	1.375"	285
65118020	615	6" Flange	1.375"	425
65120020	76	4" NPT	1.562"	400
65121020	711	6" Flange	1.562"	530
65122020	718	8" Flange	1.562"	650

Refer to Specification Sheet S-12K84

URAI-DSL AIR BLOWERS (with Dual Splash Lubrication *DSL*)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
T30378020	32	1.25" NPT	0.750"	72
T30379020	33	2" NPT	0.750"	77
T30380020	36	2.5" NPT	0.750"	105
T30352020	42	1.5" NPT	0.875"	92
T30353020	45	2.5" NPT	0.875"	113
T30354020	47	3" NPT	0.875"	132
T30359020	53	2.5" NPT	1.125"	148
T30360020	56	4" NPT	1.125"	175
T30361020	59	4" NPT	1.125"	209
T30384020	65	3" NPT	1.375"	250
T30385020	68	5" NPT	1.375"	290
T30386020	615	6" Flange	1.375"	430

Refer to Specification Sheet S-27S03

Universal RAI air blowers include detachable mounting feet which permit vertical or horizontal installation. The units are center timed for rotation in either direction. The bearings on the URAI are grease lubricated on the drive end and splash lubricated on the gear end. The URAI-DSL is splash lubricated on BOTH ends.

UNIVERSAL RAI (URAI) GAS BLOWERS

URAI-G™ GAS BLOWERS (with Grease Lubricated Drive End)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
710480G0	32	1.25" NPT	0.750"	69
651050G0	33	2" NPT	0.750	74
651060G0	36	2.5" NPT	0.750	102
651080G0	42	1.5" NPT	0.875"	88
651090G0	45	2.5" NPT	0.875	109
651100G0	47	3" NPT	0.875	128
651120G0	53	2.5" NPT	1.125"	143
651130G0	56	4" NPT	1.125	170
651140G0	59	4" NPT	1.125	204
651160G0	65	3" NPT	1.375"	245
651170G0	68	5" NPT	1.375	285
651180G0	615	6" NPT	1.375	425

Refer to Specification Sheet S-60A01

Universal RAI-G™ gas blowers include detachable mounting feet which permit vertical or horizontal installation. **Feet are different for vertical and horizontal mounting**.

The units are center timed for rotation in either direction. The bearings on the Universal RAI-GTM are grease lubricated on the drive end and splash lubricated on the gear end. ROOTS Synthetic lubricant is recommended.

UNIVERSAL RAI (URAI-J) WHISPAIR AIR BLOWERS

URAI-J WHISPAIR AIR BLOWERS (with Grease Lubed Drive End)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
74065020	33J	2" NPT	0.750"	84
74086020	36J	2.5" NPT	0.750	112
74066020	45J	2.5" NPT	0.875"	119
74087020	47J	3" NPT	0.875	138
74067020	56J	4" NPT	1.125"	180

Refer to Specification Sheet S-33A93

URAI-J-DSL WHISPAIR AIR BLOWERS (with Dual Splash Lubrication *DSL*)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
T30417020	33J	2" NPT	0.750"	87
T30418020	36J	2.5" NPT	0.750	115
T30410020	45J	2.5" NPT	0.875"	122
T30412020	47J	3" NPT	0.875	141
T30415020	56J	4" NPT	1.125"	185

Refer to Specification Sheet S-30S03

URAI-J METRIC WHISPAIR AIR BLOWERS (with Grease Lubed Drive End)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
TBD	33J	2" BSP	19 mm	84
740860M0	36J	2.5" BSP	19 mm	112
TBD	45J	2.5" BSP	24 mm	119
TBD	47J	3" BSP	24 mm	138
TBD	56J	4" BSP	28 mm	180

URAI-J-DSL METRIC WHISPAIR AIR BLOWERS (with Dual Splash Lubrication *DSL*)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
TBD	33J	2" BSP	19 mm	87
T304660M0	36J	2.5" BSP	19 mm	115
TBD	45J	2.5" BSP	24 mm	122
T304550M0	47J	3" BSP	24 mm	141
TBD	56J	4" BSP	28 mm	185

Universal RAI-J air blowers incorporate the patented WhispairTM design in addition to the same features as the original URAI blowers. The URAI-J's are center timed, however the WhispairTM benefits can only be realized when the jet is located in the discharge position.

UNIVERSAL RAI METRIC (URAI-M) AIR BLOWERS

NOTE: METRIC URAI product has metric shaft diameter and connection sizes

URAI-METRIC AIR BLOWERS (with Grease Lubricated Drive End)

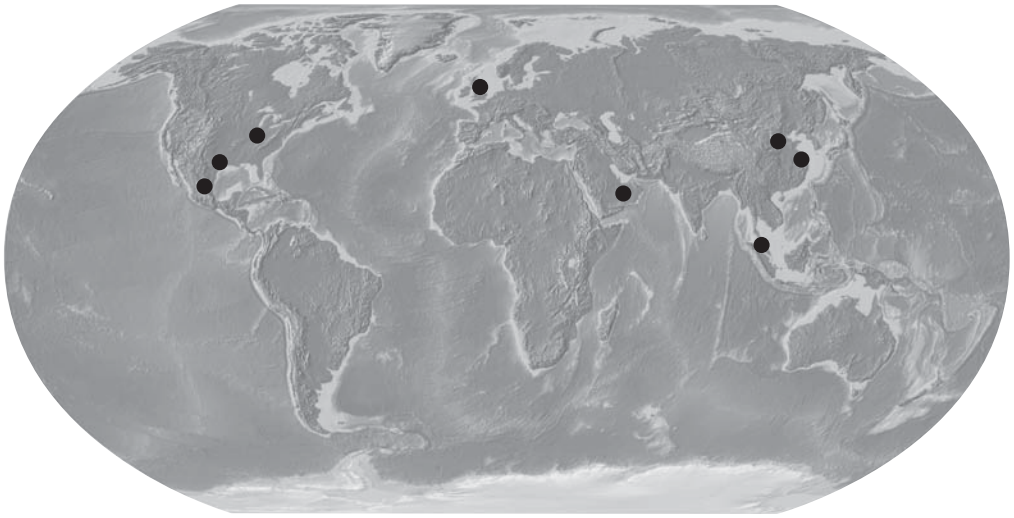
BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
651020M0	22	1" BSP	16 mm	32
651030M0	24	2" BSP	16 mm	43
710480M0	32	1 1/4" BSP	19 mm	69
651050M0	33	2" BSP	19 mm	74
651060M0	36	2 1/2" BSP	19 mm	102
651080M0	42	1 1/2" BSP	24 mm	88
651090M0	45	2 1/2" BSP	24 mm	109
651100M0	47	3" BSP	24 mm	128
651120M0	53	2 1/2" BSP	28 mm	143
651130M0	56	4" BSP	28 mm	170
651140M0	59	4" BSP	28 mm	204
T30392060	65	3" BSP	32 mm	245
T30394060	68	5" BSP	32 mm	285
T30390060	615	150 NP10	32 mm	425
T30396060	76	4" BSP	38 mm	400
T30398060	711	150 NP10	38 mm	530
T30400060	718	200 NP10	38 mm	650

URAI-DSL-METRIC AIR BLOWERS (with Dual Splash Lubrication *DSL*)

BOM # *	FRAME SIZE	INLET/DISCH CONN.	SHAFT DIAMETER	BARE WEIGHT
T30463060	32	1 1/4" BSP	19 mm	72
T30464060	33	2" BSP	19 mm	77
T30465060	36	2 1/2" BSP	19 mm	105
T30451060	42	1 1/2" BSP	24 mm	92
T30452060	45	2 1/2" BSP	24 mm	113
T30453060	47	3" BSP	24 mm	132
T30459060	53	2 1/2" BSP	28 mm	148
T30460060	56	4" BSP	28 mm	175
T30461060	59	4" BSP	28 mm	209
T30472060	65	3" BSP	32 mm	250
T30473060	68	5" BSP	32 mm	290
T30474060	615	150 NP 10	32 mm	430

Universal RAI air blowers include detachable mounting feet which permit vertical or horizontal installation. The units are center timed for rotation in either direction. The bearings on the URAI are grease lubricated on the drive end and splash lubricated on the gear end. The URAI-DSL is splash lubricated on BOTH ends.

Dresser Roots Sales, Factory Service & Repair



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Kuala Lumpur, Malaysia • Ph: +60 3 2163 0480

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Connersville, IN • Ph: 765-827-9200

Huddersfield, UK • Ph: +44 (0) 1484 487 669

Mexico City, Mexico • Ph: +52 55 5889 5811

Dubai, UAE • Ph: +971 4-8830831

Shanghai, China • Ph: +86 21 5858 7638

DRESSER
Roots

Headquarters
16240 Port Northwest Drive
Houston, TX 77041
Toll Free (US): 1-877-363-7668
Ph: 832-590-2305
Toll Free Fax: 1-877-357-7238
Fx: 832-590-2326

Connersville Operations
900 West Mount Street
Connersville, IN 47331
Ph: 765-827-9200
Fx: 765-827-9266

Huddersfield Operations
PO Box B7
Off St. Andrews Rd
Turnbridge, Huddersfield
England HD1 6RB
Ph: +44 (0) 1484 422 222
Fx: +44 (0) 1484 423 429

ISRB-2002 rev.0207

website: www.rootsblower.com • US email: roots@dresser.com • UK email: dmd_roots@dresser.co.uk

ATTACHMENT J
Remedial System Optimization
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REMEDIAL SYSTEM OPTIMIZATION FOR TOMAT SERVICE STATION

ATTACHMENT K
Community Air Monitoring Plan

COMMUNITY AIR MONITORING PLAN

TOMAT SERVICE STATION
1815-1825 OCEAN AVE
BROOKLYN, NY

AUGUST- 2017

Prepared on behalf of:

OCEAN UNITS LLC
1274 49TH Street. Suite 443
Brooklyn, NY 11219

Prepared by:

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
RIDGE, NY 11961

COMMUNITY AIR MONITORING PLAN
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APPENDICES

1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) has been prepared for use during activities that disturb the building slab/foundation of the new building under a Site Management Plan (SMP) at the Tomat Service Station. The CAMP provides measures for protection for the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the investigation activities) from potential airborne contaminant releases resulting from investigative activities at the site.

Compliance with this CAMP is required during all activities associated with drilling and sampling activates that have the potential to generate airborne particulate matter and volatile organic compounds (VOCs). These activities include groundwater sampling, soil vapor sampling and installation of the Air Sparge / Soil Vapor Extraction System (drilling or trenching). This CAMP has been prepared to ensure that investigation activities do not adversely affect passersby, residents, or workers in the area immediately surrounding the Site and to preclude or minimize airborne migration of investigation-related contaminants to off-site areas.

1.1 Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan as presented in DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC May 3, 2010). This guidance specifies that a community air-monitoring program shall be implemented to protect the surrounding community and to confirm that the work does not spread contamination off-site through the air;

- New York State Department of Environmental Conservation (NYSDEC) DER-10 Technical Guidance for Site Investigation and Remediation: This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2.0 AIR MONITORING

Petroleum related VOCs are the constituents of concern at the Site. The appropriate method to monitor air for these constituents during investigation activities is through real-time VOC and air particulate (dust) monitoring.

The continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

2.1 Meteorological Data

At a minimum, wind direction will be evaluated at the start of each workday, noon of each workday, and the end of each workday. These readings will be utilized to position the monitoring equipment in appropriate upwind and downwind locations.

2.2 Community Air Monitoring Requirements

To establish ambient air background concentrations, air will be monitored at several locations around the site perimeter before activities begin. These points will be monitored continuously in series during the site work. The perimeter monitoring points will be located to represent the nearest potentially exposed individuals at the downwind location.

Fugitive respirable dust will be monitored using a MiniRam Model PDM-3 aerosol monitor (or equivalent). Air will be monitored for VOCs with a portable Ionscience 3000 photoionization detector (PID), or equivalent. All air monitoring data will be documented in a site log book by the designated site safety officer. The site safety officer or delegate must ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. All instruments will be zeroed daily and checked for accuracy. A daily log will be kept. If additional monitoring is required, the protocols will be developed and appended to this plan.

3.0 VOC MONITORING, RESPONSE LEVELS, AND ACTIONS

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present.

The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

- If total VOC concentrations opposite the walls of occupied structures or next to the intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s) (if access is granted by owner or occupants). Background readings in the occupied spaces must be taken prior to the commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to the commencement of the work.

All readings will be recorded and made available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report, as shown in Appendix A, will be completed.

3.1 Potential Corrective Measures and VOC Suppression Techniques

If the 15-minute integrated VOC level at the downwind location persists at a concentration that exceeds the upwind level by more than 5 ppm but less than 25 ppm during remediation activities, then vapor suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive organic vapors:

- Collection of purge water in covered containers;
- storage of excess sample and drill cuttings in drums or covering with plastic

4.0 PARTICULATE MONITORING

Air monitoring for particulates (i.e., dust) will be performed continuously during drilling activities using both air monitoring equipment and visual observation at upwind and downwind locations. Monitoring equipment capable of measuring particulate matter smaller than 10 microns (PM_{10}) and capable of integrating (averaging) over periods of 15 minutes or less will be set up at upwind (i.e., background) and downwind locations, at heights approximately four to five feet above land surface (i.e., the breathing zone). Monitoring equipment will be MIE Data Ram monitors, or equivalent. The audible alarm on the particulate monitoring device will be set at 90 micrograms per cubic meter ($\mu g/m^3$). This setting will allow proactive evaluation of worksite conditions prior to reaching the action level of 100 $\mu g/m^3$ above background. The monitors will be calibrated at least once per day prior to work activities and recalibrated as needed thereafter. In addition, fugitive dust migration will be visually assessed during all intrusive work activities.

The following summarizes particulate action levels and the appropriate responses:

- If the downwind PM-10 particulate level is 100 $\mu g/m^3$ greater than background (upwind perimeter) for the 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu g/m^3$ above the upwind level, work must be stopped and an evaluation of activities initiated. Work can resume provided that dust suppression measures (as described in Section 2.3.1 below) and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

- If the total particulate concentrations opposite the walls of occupied structures or next to intake vents exceeds 150 $\mu g/m^3$, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 $\mu g/m^3$ or less at the monitoring point.

All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report as shown in **Appendix A** will be completed.

4.1 Potential Particulate Suppression Techniques

If the integrated particulate level at the downwind location exceeds the upwind level by more than 100 $\mu g/m^3$ at any time during drilling activities, then dust suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive dusts:

- Placement of drill cuttings in drums or covering stockpiles with plastic;

- Misting of the drilling area with a fine water spray from a hand-held spray bottle

Work may continue with dust suppression techniques provided that downwind PM_{10} levels are not more than 150 µg/m^3 greater than the upwind levels.

There may also be situations where the dust is generated by drilling activities and migrates to downwind locations, but is not detected by the monitoring equipment at or above the action level. Therefore, if dust is observed leaving the working area, dust suppression techniques such as those listed above will be employed.

If dust suppression techniques do not lower particulates to below 150 µg/m^3, or visible dust persists, work will be suspended until appropriate corrective measures are identified and implemented to remedy the situation.

All air monitoring readings will be recorded in the field logbook and will be available for the NYSDEC and NYSDOH personnel to review.

5.0 DATA QUALITY ASSURANCE

5.1 Calibration

Instrument calibration shall be documented on instrument calibration and maintenance sheets or in the designated field logbook. All instruments shall be calibrated as required by the manufacturer. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

5.2 Operations

All instruments shall be operated in accordance with the manufacturer's specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained on-site by the SSO for reference.

5.3 Data Review

The SSO will interpret all monitoring data based the established criteria and his/her professional judgment. The SSO shall review the data with the PM to evaluate the potential for worker exposure, upgrades/downgrades in level of protection, comparison to direct reading instrumentation and changes in the integrated monitoring strategy.

Monitoring and sampling data, along with all sample documentation will be periodically reviewed by the PM.

6.0 RECORDS AND REPORTING

All air readings must be recorded on daily air monitoring log sheets and made available for review by personnel from NYSDEC and NYSDOH.

APPENDIX A
ACTION LIMIT REPORT

CAMP
ACTION LIMIT REPORT

Project Location: _____

Date: _____ Time: _____

Name: _____

Contaminant: _____ PM-10: _____ VOC: _____

Wind Speed: _____ Wind Direction: _____

Temperature: _____ Barometric Pressure: _____

DOWNWIND DATA

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

UPWIND DATA

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

BACKGROUND CORRECTED LEVELS

Monitor ID #: Location: _____ Level Reported: Level Reported: _____

ACTIONS TAKEN

_____
_____
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ATTACHMENT L
Excavation Work Plan

EXCAVATION WORK PLAN (EWP)

1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the site owner or their representative will notify the NYSDEC. Table B-1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in **Attachment A**.

Table 1: Notifications*

Name	Contact Information
Jeffrey Dyber	518-402-9621, jeffrey.dyber@dec.ny.gov
Jane O'Connell	718-482-4599, Jane.Oconnell@dec.ny.gov
Kelly Lewandowski	518-402-9553; kelly.lewandowski@dec.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;

- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in **Attachment G** of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed by a qualified environmental professional during all excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Section B-5 of this Attachment.

3 SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes are as follows:

> ENTERING SITE - from the Brooklyn Queens Expressway take the 65th street. Make a left on to Avenue P and then a right on to Ocean Avenue. The Site entrance will be on the right.
>
> EXITING SITE – Head south on Ocean Avenue. Make the first right onto Avenue P. Turn right onto 65th Street and head toward Brooklyn Queens Expressway. Follow the signs for the Brooklyn Queens Expressway on-ramp.

All trucks loaded with site materials will exit the vicinity of the Site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited. A truck route is included as **Figure 10 of the SMP**.

6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the Site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of material from this Site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility

if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

7 MATERIALS REUSE ON-SITE

The qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. This soil will undergo a testing program to confirm that it meets unrestricted SCOs prior to unregulated disposal or reuse on-site. Confirmation testing of clean soils will be in accordance with DER-10 as follows:

Contaminant	**VOCs**	**SVOCs, Inorganics & PCBs/Pesticides**	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	Each composite sample for analysis is created from 3-5 discrete samples from representative locations in the fill.
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

8 FLUIDS MANAGEMENT

All liquids to be removed from the Site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the short term (during remediation) cover system will be restored in a manner that complies with the decision document. The existing cover system is comprised of a minimum of the 6 inch thick concrete building slab in the cellar. If the type of cover system changes from that which exists prior to the excavation, this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP.

10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the Site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the Site.

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are listed in Table 1. Soils that

meet ‘exempt’ fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

11 STORMWATER POLLUTION PREVENTION

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

12 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient

justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

13 COMMUNITY AIR MONITORING PLAN

The CAMP provides measures for protection for the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial work) from potential airborne contaminant releases resulting from remedial activities at construction sites.

The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial work did not spread contamination off-site through the air. The primary concerns for this site are nuisance odors and dust particulates.

A figure showing the location of air sampling stations based on generally prevailing wind conditions will be provided. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-site and on-site, if. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls,

including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

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

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

15 DUST CONTROL PLAN

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved though the use of a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.

On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

16 OTHER NUISANCES

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

ATTACHMENT M
Responsibilities of Owner and Remedial Party

Responsibilities

The responsibilities for implementing the Site Management Plan ("SMP") for the Tomat Service Station site (the "site"), number C224217, are divided between the site owner(s) and a Remedial Party, as defined below. The owner(s) is/are currently listed as:

Ocean Units LLC
1274 49th Street; Suite 443
Brooklyn, NY 11219
(718) 972-9830
(the "owner").

Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out, the term Remedial Party ("RP") refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation ("NYSDEC") is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RP is:

Ocean Units LLC
1274 49th Street; Suite 443
Brooklyn, NY 11219
(718) 972-9830

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the site.

Site Owner's Responsibilities:

1) The owner shall follow the provisions of the SMP as they relate to future construction and excavation at the site.

2) In accordance with a periodic time frame determined by the NYSDEC, the owner shall periodically certify, in writing, that all Institutional Controls set forth in a(n) Environmental Easement remain in place and continue to be complied with. The owner shall provide a written certification to the RP, upon the RP's request, in order to allow the RP to include the certification in the site's Periodic Review Report (PRR) certification to the NYSDEC.

3) In the event the site is delisted, the owner remains bound by the Environmental Easement, and shall submit, upon request by the NYSDEC, a written certification that the Environmental Easement is still in place and has been complied with.

4) The owner shall grant access to the site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.

5) The owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. In the event that damage to the remedial components or vandalism is evident, the owner shall notify the site's RP and the NYSDEC in accordance with the timeframes indicated in Section 1.3 Notifications.

6) In the event some action or inaction by the owner adversely impacts the site, the owner must notify the site's RP and the NYSDEC in accordance with the time frame indicated in Section 1.3 Notifications and (ii) coordinate the performance of necessary corrective actions with the RP.

7) The owner must notify the RP and the NYSDEC of any change in ownership of the site property (identifying the tax map numbers in any correspondence) and provide contact information for the new owner of the site property. 6 NYCRR Part contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 2.4 of the SMP. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

8) The owner will maintain fences, etc on behalf of the RP. The RP remains ultimately responsible for maintaining the engineering controls.

9) Until such time as the NYSDEC deems the vapor mitigation system unnecessary, the owner shall operate the system, pay for the utilities for the system's operation, and report any maintenance issues to the RP and the NYSDEC.

10) In accordance with the tenant notification law, within 15 days of receipt, the owner must supply a copy of any vapor intrusion data, that is produced with respect to structures and that exceeds NYSDOH or OSHA guidelines on the site, whether produced by the NYSDEC, RP, or owner, to the tenants on the property. The owner must otherwise comply with the tenant and occupant notification provisions of Environmental Conservation Law Article 27, Title 24.

Remedial Party Responsibilities

1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the site.

2) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.

3) Before accessing the site property to undertake a specific activity, the RP shall provide the owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the owner, upon the owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the site visit and/or any final report produced.

4) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the owner(s).

5) The RP shall notify the NYSDEC and the owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html .

6) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under Section 1.3 Notifications of the SMP.

7) The RP is responsible for the proper maintenance of any installed vapor intrusion mitigation systems associated with the site, as required in Section 5 Operation, Monitoring and Maintenance Manual of the SMP.

8) The RP is responsible for the proper monitoring and maintenance of any installed drinking water treatment system associated with the site, as required in Section 5 Operation, Monitoring and Maintenance Manual.

9) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.

10) Any change in use, change in ownership, change in site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the Department to discuss the need to update such documents.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.

ATTACHMENT N
Permits and/or Permit Equivalence

Permit	***Permit Number***	***Originating Agency***	***Issued***	***Expires***
Full Demolition of Building	321361682-01-DM	NYCDOB	09/23/2016	06/02/2017
Full Demolition of Building- Fence	321361682-01-EQ-FN	NYCDOB	09/23/2016	09/23/2017
NEW BUILDING - CONSTRUCTION EQUIPMENT - FENCE	321173984-01-EQ FN	NYCDOB	2/15/17	2/15/28
NEW BUILDING - PROPOSED EIGHT STORY RESIDENTIAL BUILDING AS PER PLANS.	321173984-01-NB	NYCDOB	07/14/2017	07/14/2018
ALTERATION TYPE 2 - STANDPIPE TEMPORARY STANDPIPE APPLICATION	321282054-01-EW-SD	NYCDOB	12/15/2015	12/14/2016
ALTERATION TYPE 2 - SOE	321422260-01-EW-OT	NYCDOB	07/18/2017	06/10/2018
PLUMBING - ALTERATION TYPE 2	340403496-01-PL	NYCDOB	09/08/2017	09/08/2018
ALTERATION TYPE 3 – CONSTRUCTION EQUIPMENT - OTHER	340551432-01-EQ-OT	NYCDOB	10/06/2017	10/06/2018