JAY'S LUCKY CLEANERS
3220-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK
NYSDEC BCP ID: C130219

INTERIM REMEDIAL MEASURE
WORK PLAN

SUBMITTED TO:

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

ON BEHALF OF:

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PWGC Project Number: UPC1702

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CERTIFICATION

I David W. Hermantin, PE certify that I am currently a NYS registered professional engineer and that this Interim Remedial Measure Work 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).

David W. Hermantin, PE
Name

085961
NYS PE License Number

Signature

6/2/17
Date

1.0 INTRODUCTION

1.1 Purpose

P.W. Grosser Consulting Engineer & Hydrogeologist, PC (PWGC) has prepared the following Interim Remedial Measure Work Plan (IRMWP) for the property known as Jay's Lucky Cleaners site located at 3220 to 3224 Long Beach Road, Oceanside, New York (the "Property" or "Site"). PWGC was contracted by United Properties Corp. (UPC) of East Meadow, New York to perform a Remedial Investigation (RI) at the Property. Based on the historical use of the Property as a drycleaner and the confirmed presence of chlorinated solvents in groundwater beneath the Site, the Site was accepted into the New York State Brownfields Cleanup Program (BCP) as a volunteer as set forth in a Brownfield Cleanup Agreement (BCA), dated December 10, 2015 (Site No. C130219).

As the Property owner is a volunteer, a RI was performed to delineate potential areas of concern within the Property boundary and evaluate whether off-site adjacent properties may be impacted. The RI results prompted the decision to execute an IRM at the site to address soil vapor in the locations where exceedances in the NYCDEC standards were observed.

1.2 Project Background

A Phase I Environmental Site Assessment (ESA) and a Focused Subsurface Site Investigation (FSSI) were conducted at the Site in 2014. The Phase I ESA identified prior and current use of one of the retail units located at 3220 Long Beach Road as a dry cleaner, and the presence of an above ground storage tank (AST) used to store fuel oil. Elevated concentrations of volatile organic compounds (VOCs) indicative of impact from dry cleaning operations were reported in groundwater at the southwestern portion of the Site. No evidence of impacts to soil and groundwater were reported in relation to fuel oil.

Additional investigation and groundwater sampling was conducted in September 2014. This effort was limited to the southern/southwestern portion of the Site, in the estimated down-gradient groundwater flow direction. Elevated concentrations of VOCs (acetone, tetrachloroethene [PCE], trichloroethene [TCE], and cis-1,2-dichloroethene [cis-1,2-DCE]) were reported in groundwater above New York State Department of Environmental Conservation (NYSDEC) standards.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Description

The subject site is located at 3220 to 3224 Long Beach Road, Oceanside, New York. The property is identified as Nassau County Section 43, Block 336, Lot 42. The site is bordered on the north by a commercial property, on the east by Long Beach Road, on the west by residential and commercial properties, and on the south by Montgomery Avenue.

The current property consists of one single-story retail strip building with three units and front and side parking lots. The entire property is approximately 0.23 acres in area. The building was originally constructed in 1959. There is currently no planned change to the usage of the Site.

A Vicinity Map is included as **Figure 1**. A Site Plan is included as **Figure 2**.

2.2 Site History

The building was constructed in 1959. Prior to construction of these buildings, the lot was vacant.

A review of available New York Telephone Address Directories, NYCDOB Certificates of Occupancy, and available Sanborn Fire Insurance Maps indicated the subject site was utilized in the past by a, convenience store, surf shop, massage parlor, and dry cleaner. A dry cleaner has occupied a unit within 3220 Long Beach Road unit since at least 1959.

2.3 Previous Environmental Investigations

The Remedial Investigation described in Section 2.3.5 was performed by PWGC and is summarized below. All other investigations and investigative reports have been prepared by others. PWGC has also reviewed and summarized these reports below.

2.3.1 Phase I ESA Report (11/18/1998)

Prepared by: Middleton, Kontokosta Associates, LTD (MKA)

A Phase I ESA was conducted by MKA in November 1998. The Phase I ESA identified the presence of the dry cleaner at the 3220 Long Beach Road unit and the above ground storage tank located in the western alley behind the 3220 Long Beach Road unit. MKA did not report any recognized environmental conditions. MKA stated that no further testing (subsurface or otherwise) was required on the subject site.

2.3.2 Phase I ESA Report (11/3/2004)

Prepared by: Middleton Environmental, Inc. (MEI)

A Phase I ESA was conducted by MEI in November 2004. The Phase I ESA identified the presence of the dry cleaner at the 3220 Long Beach Road unit and the above ground storage tank located in the western alley behind the 3220 Long Beach Road unit. MEI did not report any recognized environmental conditions.

2.3.3 Phase I ESA Report & Focused Subsurface Site Investigation (3/31/2014)

Prepared by: Merritt Environmental Consulting Corp. (MECC)

A Phase I ESA and FSSI was completed by MECC in March 2014. The purpose of the FSSI was to address the recognized environmental conditions specified in the Phase I ESA Report. The Phase I ESA identified prior and current use of one of the retail units located at 3220 Long Beach Road as a dry cleaner. Elevated concentrations of volatile organic compounds (VOCs) indicative of impact from dry cleaning operations were reported in groundwater at the southwestern portion of the site. PCE was reported in two groundwater samples (B1GW and B2GW) at 450 micrograms per liter (ug/L) and 11 ug/L respectively, above the NYSDEC TOGS 1.1.1 Ambient Groundwater Quality Standards (GWQS) and Guidance Values of 5 ug/L.

2.3.4 Groundwater Sampling and Laboratory Analysis (9/16/2014)

Prepared by: MECC

MECC completed a Groundwater Sampling and Laboratory Analysis summary in September 2014. The scope of work included the installation of three groundwater monitoring wells, groundwater sampling, and an elevation survey to determine site-specific groundwater flow direction.

Groundwater analytical results reported concentrations of VOCs (acetone, cis-1,2-DCE, TCE, and PCE) above GWQS. Groundwater flow direction was determined to flow west.

2.3.5 Remedial Investigation: Work Plan, Investigation Activities, and Report

Prepared by: PWGC

<u>Remedial Investigation Workplan and Remedial Investigation Activities</u>

PWGC prepared a Remedial Investigation Work Plan (RIWP) which was submitted to and approved by NYSDEC in September 2016. The Remedial Investigation commenced shortly thereafter and was completed in November of 2016. The purpose of the RI was to delineate soil, groundwater, and soil vapor impact within the Site boundary and to determine if any on site impacts have the potential to migrate off-site.

The scope of work included the installation and sampling 12 soil borings, installation of three new groundwater monitoring wells, installation of nine temporary groundwater sampling points, collection of a combined 16 air samples (soil vapor, ambient air, and indoor air), groundwater sampling of a combined 15 sample points, and performance of both a geophysical and elevation survey to determine site-specific groundwater flow direction.

The proposed activities were based upon the findings and data presented within the historical reports and data collected by previous consultants and detailed above. The activities were also performed to supplement the data and conclusions provided by MECC within the Phase I ESA Report/Focused Subsurface Site Investigation and subsequent groundwater sampling and laboratory analysis performed in 2014.

Draft Remedial Investigation Report

In March, 2017, a Draft Remedial Investigation Report (RIR) was prepared and submitted to the NYSDEC. The RIR summarized the findings of the remedial investigation activities performed in November 2016. The report identified specific contamination concentrations throughout each media (soil, groundwater, and indoor air/soil vapor), delineated the extent of contamination in soil and groundwater, evaluated potential exposure pathways, and provided conclusions and recommendations.

Soil sample results identified isolated instances of VOCs, pesticides, and metals exceeding Unrestricted Use SCOs. With exception of arsenic and lead in the 0 to 2 foot interval at boring location SB004, concentrations of VOCs, pesticides, and metals were observed to be below Commercial Use SCOs at the Site. PCE impacted soils appear to be limited to the northern portion of the Site in the immediate vicinity of the dry cleaning machine.

Several SVOCs, pesticides, and metals were detected in groundwater at concentrations exceeding their respective AWQS. Apart from one detection of cis-1,2-DCE, PCE was the sole VOC detected exceeding AWQSs at the Site. PCE exceedances were observed at multiple groundwater sample locations along the western portion of the Site. Locations where PCE concentrations were highest in groundwater (monitoring wells MW001, MW002) appear to be located directly downgradient of the dry-cleaning machine, based upon the site-specific groundwater flow direction as determined during the RI.

PCE was detected in soil vapor with the highest concentrations observed beneath the building slab, and along the western Property boundary. PCE was also detected in indoor air samples collected from within the building at concentrations below the NYSDOH guideline value of 30 $\mu g/m^3$. However, based on evaluation of PCE

concentrations in indoor air and sub-slab soil vapor using NYSDOH decision matrices, soil vapor intrusion appears to be occurring and requires mitigation measures.

The above soil, groundwater, and soil vapor data, site hydrology, geology, and potential pathways relative to the locations of adjacent properties was then considered to prepare a fate and transport evaluation for the contaminants of concern. The evaluation and the RIR concluded that impacted groundwater and soil vapor may be migrating off-site.

Historic soil vapor analytical results are presented on **Figure 3.**

2.4 Regional Geology/Hydrogeology

The geologic setting of Long Island is well documented and consists of crystalline bedrock composed of schist and gneiss overlain by layers of unconsolidated deposits. Immediately overlying the bedrock is the Raritan Formation, consisting of the Lloyd sand confined by the Raritan Clay Member. The Lloyd sand is an aquifer and consists of discontinuous layers of gravel, sand, sandy and silty clay, and solid clay. The Raritan Clay is a solid and silty clay with few lenses of sand and gravel; abundant lignite and pyrite; and gray, red or white in color.

Above the Raritan Clay lies the Magothy Formation. The Magothy Aquifer consists of layers of fine to coarse sand of moderate to high permeability, with inter-bedded lenses of silt and clay of low permeability resulting in areas of preferential horizontal flow. Therefore, this aquifer generally becomes more confined with depth. The Magothy Aquifer is overlain by the Jameco and Upper Glacial Aquifer systems. The Upper Glacial Aquifer is the water table aquifer at this location and is comprised of medium to coarse sand and gravel with occasional thin lenses of fine sand and brown clay. This aquifer extends from the land surface to the top of the Magothy and, therefore, is hydraulically connected to the Magothy Aquifer.

2.5 Site Geology/Hydrogeology

The subject site is located over the Long Island aquifer system, which underlies all of Nassau, Suffolk, Kings (Brooklyn), and Queens Counties. The unconsolidated aquifer formations form a southward-dipping wedge that attains a maximum thickness in Kings County about eight-hundred (800) feet in southeast area of Brooklyn. Overlying bedrock in the area is the Lloyd, Magothy, Jameco, and Upper Glacial aquifer systems. The Upper Glacial aquifer overlies all underlying units and is found at the surface in nearly all of Nassau County.

The site overlies an interconnected aquifer system consisting of the upper glacial deposits and the underlying Magothy Formation. Depth to groundwater in the underlying glacial aquifer is approximately 5-6 feet below ground surface (bgs). The lithologic description of the sediments from soil borings installed during previous investigations at the site identifies the materials as coarse brown sand.

Regional groundwater flow direction is south. Site-specific groundwater flow was observed to be southwest. The nearest surface water bodies are Bedell Creek, located approximately 0.4 miles east of the site and an unnamed canal located approximately 0.6 miles southwest of the site. Municipal water supply is provided by New York American Water.

2.6 Site Features

The project site elevation is approximately 7 feet above mean sea level, and is generally level. The site is developed with two (2) 1-story retail strip buildings with front and side parking lots and is approximately 0.55 acres in area. There are no exposed areas of vegetation.

2.7 Current and Future Site Use

The site is currently utilized as strip malls with several tenants and parking areas. Significant changes in use of the site are not planned for the near future. The goal of the cleanup at the site is to achieve Track 1 status; however, it is understood that the project may achieve Track 2 or Track 4.

3.0 DESCRIPTION OF REMEDIAL ACTION

Based on the findings presented within the Draft RIR prepared by PWGC in March 2017, PCE impacted groundwater and soil vapor are present beneath the northern and western portions of the site. Based on review of the Draft RI Report detailed in Section 2.3.5 above, NYSDEC has directed the Volunteer to implement an IRM at the site consisting of the installation of a Sub-Slab Depressurization System (SSDS) within the existing building to mitigate soil vapor intrusion occurring within the existing building due to elevated concentrations of PCE in soil vapor and groundwater at the site. NYSDEC's comments on the Draft RI Report and directive to implement the IRM are detailed in a letter dated April 19, 2017.

3.1 Sub-Slab Depressurization System (SSDS)

According to NYSDOH, "soil vapor can enter a building through cracks or perforations in slabs or basement floors and walls, and through openings around sump pumps or where pipes and electrical wires go through the foundation primarily because of a difference between interior and exterior pressures." Sub-Slab Depressurization Systems (SSDS) mitigate the potential soil vapor intrusion by utilizing a blower to create a negative pressure in the subsurface beneath the building floor slab. This negative pressure will be maintained at a pressure less than the pressure in the occupied building space which will prevent vapors present in the subsurface from migrating into the building. The system will also remove trapped/built-up vapors from below the slab, treating them, and discharging them above the roof of the project site. This prevents system effluent from migrating into building spaces through building openings or HVAC.

The proposed SSDS will consist of a vacuum blower to be located behind the building in an acoustical attenuating enclosure, to produce a negative pressure under the building slab. Four vapor extraction pits will be utilized to distribute the vacuum beneath the building's slab. Recovered vapor will be treated utilizing granulated activated carbon (GAC) and vented above the roofline of the building. Vacuum monitoring points will be installed in three different locations across the building's slab to allow measurements of the vacuum under the slab. A low vacuum alarm will signal audially and visually if the system is not providing vacuum as designed. Engineering plans for the complete design and specifications of the proposed system are included as **Appendix A**.

Sizing of the system's components were based on the size of the area to be treated and PWGC's previous experience designing SSDS systems. The proposed system will utilize a large regenerative blower which will be operated by a variable speed controller to allow for adjusting the system recovery flow and optimizing operation and energy use. The locations of proposed vapor extraction pits are biased towards where soil vapor and groundwater sample results showed increased concentrations of the site's chemicals of concern, and to allow

optimal negative pressure distribution beneath the building slab. Currently, the system is expected to operate until NYSDEC approves a determination which demonstrates that the system is no longer needed to prevent potential exposures related to soil vapor intrusion.

4.0 ENGINEERING SPECIFICATIONS AND CONTROLS

4.1 Engineering Specifications

4.1.1 Mobilization and Site Security

Mobilization will include the delivery of construction equipment and materials to the site. Site workers will receive site orientation and training in accordance with the site-specific Health and Safety Plan (HASP), Community Air Monitoring Plan (CAMP) and established policies and procedures to be followed during the implementation of the IRM. The remediation contractor and all associated subcontractors will each receive a copy of the IRMWP, HASP and CAMP and will be briefed on their contents.

Much of the activities required to implement the IRM will be located inside the building at the Site. Therefore, site security should not be an issue for contractors and subcontractors implementing the proposed IRM. Equipment or materials pertaining to the IRM will either be stored inside the building or be secured within the contractor's equipment or vehicles used to mobilize to the Site each day. The remedial contractor will be responsible for providing and securing all equipment and materials to be used in implementing the proposed IRM.

Open excavations and/or trenching will be clearly marked with temporary orange construction fencing (or equivalent) during non-work hours.

4.1.2 Waste Management and Disposal

IRM derived waste and soils will be sampled in accordance with the procedures described under Section 5.3 of this document to meet the waste acceptance criteria of the selected disposal facility. IRM derived waste materials and soil to be removed from the site will be directly loaded into 55-gallon drums and/or roll-off containers. Wastes will be transported to the disposal facility by a licensed waste transport company. No IRM waste material or excavated soil will be stored outside of 55-gallon drums/roll-offs (i.e., no stockpiling of soils).

As necessary, waste disposal will be coordinated with NYSDEC Division of Solid and Hazardous Materials, to allow for wastes to be disposed of as hazardous or non-hazardous waste based upon their characteristic qualities. Non-hazardous waste streams will be approved by NYSDEC in advance.

4.1.3 Backfill and Site Restoration

Following installation of the SSDS piping, support trenches and/or excavations will be restored in accordance with the engineering plans and note specifications included as **Appendix A**. Fill material components of the

specified SSDS design will utilize clean fill. Clean fill, as defined by 6NYCRR Part 360, may be brought in from off-site to backfill the excavations and will be in compliance with 6NYCRR Part 375-6.7(d). The NYSDEC will be consulted, and must approve in advance, the return of excavated soil and the use of off-site fill. Foundation slabs and exterior pavement will be restored in areas where disturbed due to the installation of SSDS vapor extraction pits and piping.

4.1.4 Demobilization

Following the completion of interim remedial activities at the site, equipment and excess materials will be collected and removed from the site. If solid wastes are generated during IRM activities (e.g., polyethylene sheeting), they will be properly disposed of.

4.2 Engineering Controls

4.2.1 Sub-Slab Depressurization System

Installation of the SSDS will be conducted in accordance with the engineering design drawings included as **Appendix A**. The remedial contractor shall follow all note specifications located on the design documents and shall field verify all site conditions prior to construction. Notification will be made to building tenants prior to installation of the system.

The remedial contractor will be required to submit for approval by the project engineer equipment which deviates from that specified in the engineering drawings. Following completion of installation, as-built plans will be submitted by the contractor to the project engineer.

The remedial contractor will be required to obtain necessary permits for system installation prior to construction, and will abide by all requirements of this IRM Work Plan including the Health and Safety Plan located in Section 7.0 and Community Air Monitoring Plan located in Section 8.0.

4.2.2 Dust Suppression

Dust generation from excavation activities and stockpiled soils will be monitored as described under Section 7.0. If dust generation approaches action levels, suppression will be accomplished by:

- Covering/capping exposed soil area with mulch, rubber mats, etc.
- Wetting equipment and excavation faces;
- Water spray dust suppression;
- Hauling materials in properly covered containers; and,

Impacted soils will be loaded directly into 55-gallon drums and/or covered roll-off containers for off-site disposal to reduce the potential for generating dust during intrusive activities.

4.2.3 Odor Control

In the event odor suppression becomes necessary, techniques to be implemented for control of odors from the open excavation will include one or more of the following:

- Cover with plastic
- Cover with "clean soil"
- Application of hydro-mulch or encapsulating foam
- Limit working hours to favorable wind and temperature conditions

Hydro-mulch or encapsulating foam can be sprayed over open excavation area, as necessary. This is a highly effective method for controlling odors as the release of odors is sealed immediately at the source.

4.2.4 Sediment and Erosion Control

Only limited intrusive activities are planned to occur outside of the building during the implementation of the proposed IRM. Storm water control measures, such as straw hay bales or polyethylene sheeting, may be utilized during the installation of exterior SSDS piping to prevent storm water runoff from impacting the excavation area and neighboring sites.

5.0 MONITORING AND MAINTENANCE

5.1 Construction Phase Monitoring

During intrusive activities, monitoring will be performed to protect the health of site workers and the surrounding community. A Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) have been developed for this project which will be followed in conjunction with any additional procedures or measures presented within this workplan. These plans specify the monitoring procedures, action levels, and contingency measures that are required to protect public health and site workers. Air monitoring will include real-time measurement of volatile organic compound (VOC) concentrations and dust levels within the breathable space of each active work area.

Copies of the project HASP and CAMP are included as **Appendix B** and **Appendix C**, respectively.

5.2 Waste Characterization

If necessary, waste characterization samples will be collected from excess soils generated while implementing the IRM to determine whether it must be disposed as hazardous or non-hazardous material prior to demobilization. The specific sample frequencies, and laboratory analyses for waste characterization samples will be determined based upon the requirements of the selected disposal facilities (to be determined).

Soil sampling and equipment decontamination (if necessary) will be performed in accordance with the Quality Assurance Project Plan (QAPP) detailed in Section 5.0 of the Approved RIWP, USEPA SOP # 2001 General Field Sampling Guidelines, SOP# 2012 Soil Sampling, and SOP# 2006 Sampling Equipment Decontamination.

A copy of the QAPP is included as **Appendix D**.

5.3 SSDS System Startup, Operations, and Maintenance

An Operation, Maintenance & Monitoring Plan (OM&M Plan) has been developed for the SSDS which includes; SSDS Start-up Plan, Depressurization System Operation, Maintenance & Testing Requirements (OM&T), Vacuum Monitoring Schedule, Annual Certification and Notification Requirements, and requirements for termination of mitigation system operations. The OM&M Plan is included as **Appendix E**.

6.0 INTERIM REMEDIAL MEASURE COMPLETION REPORT PREPARATION

An IRM Construction Completion Report will be prepared to incorporate the details and findings of the IRM activities performed as outlined in this work plan consistent with NYSDEC DER-10, Section 5.8. At minimum, the report will include analytical data, post-construction details for the proposed engineering controls, and site restoration details (if any). The results of CAMP monitoring will also be provided if intrusive activities are necessary to implement the proposed IRM. In addition, if any waste materials or soils are generated during the implementation of this IRM, documentation associated with its characterization, transportation, and disposal will be provided which may include analytical data, soil/waste disposal volumes, and waste disposal manifests.

Electronic copies of the IRM Construction Completion Report will be submitted to the NYSDEC along with hard copies. Analytical results of the investigation will be submitted in the electronic data delivery (EDD) format through the Departments environmental information management system (EIMS).

7.0 HEALTH AND SAFETY PLAN

Field operations will be performed in accordance with the health and safety requirements to be provided in the site-specific Health and Safety Plan (HASP). The HASP outlines the requirements for training, medical surveillance, daily tailgate meetings, emergency response, and accident and injury reporting. Activities performed under the HASP will comply with applicable parts of OSHA Regulations, primarily 29 CFR Parts 1910 and 1926, and the PWGC Corporate Environmental Health and Safety policy.

The PWGC Field Team Leader will be responsible for implementing the HASP, completing the daily tailgate safety meetings and performing necessary Industrial Hygiene (IH) monitoring as specified in the HASP. Modifications to the HASP may be made with the approval of the PWGC Health and Safety Manager (HSM) and/or Project Manager (PM).

A copy of the project HASP is included as **Appendix B**.

8.0 COMMUNITY AIR MONITORING PLAN

A site-specific Community Air Monitoring Plan (CAMP) has been prepared to provide measures for protection for on-site workers and the downwind community from potential airborne contaminants as a direct result of activities which were proposed for the Remedial Investigation. The primary concerns for those working at the site will be VOCs and dust particulates.

The possible on-site exposure pathways are by ingestion, inhalation, or dermal exposure by a person on the Site. However, since the entire Site is capped by impervious surfaces (existing building foundation and asphalt paved parking lot), ingestion, and dermal exposure of workers at the Site would be unlikely unless intrusive activities are performed to implement the IRM. Therefore, the CAMP and onsite monitoring activities will only be performed when the potential for exposure and offsite migration of VOCs or potentially impacted dust could occur while performing intrusive activities. Particulate monitors and photo ionization meters will be provided to field staff overseeing the implementation of the IRM.

The CAMP will be implemented and executed in accordance with 29 CFR 1910.120(h), the New York State Department of Health's (NYSDOH) Generic CAMP, and NYSDEC DER10.

A copy of the project CAMP is included within **Appendix C**.

9.0 QUALITY ASSURANCE PROJECT PLAN

A project Quality Assurance Project Plan (QAPP) was prepared and included in Section 5.0 of the approved RIWP to detail the objectives, functional activities, methods, and quality assurance / quality control (QA/QC) requirements associated with sample collection and laboratory analysis for remedial activities. The QAPP follows requirements detailed in DER-10, Section 2.

The components of the QAPP include:

- Project Organization,
- Sampling requirements, including methodology, identification, quantity, volumes, locations, frequency, chain of custody procedures, and sample packaging,
- Field/Laboratory data control requirements,
- Equipment decontamination, and
- Field documentation.

The project QAPP is detailed in Section 5.0 of the approved RIWP; the relevant portions of the RIWP have been excerpted and included as **Appendix D**.

10.0 SCHEDULE

The preliminary schedule for the major project milestones is presented in **Table 1**. Site preparation and pre-construction activities will begin upon approval of the Final IRM Work Plan. Construction of the SSDS is anticipated to take approximately four weeks. Upon completion of SSDS installation, a Draft IRM Construction Completion Report will be submitted to NYSDEC.

11.0 REFERENCES

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- NYSDEC, Division of Environmental Remediation, May 2010, DER-10, Technical Guidance for Site Investigation and Remediation.
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- PWGC Draft Remedial Investigation Report, Jay's Lucky Cleaners, March 2017
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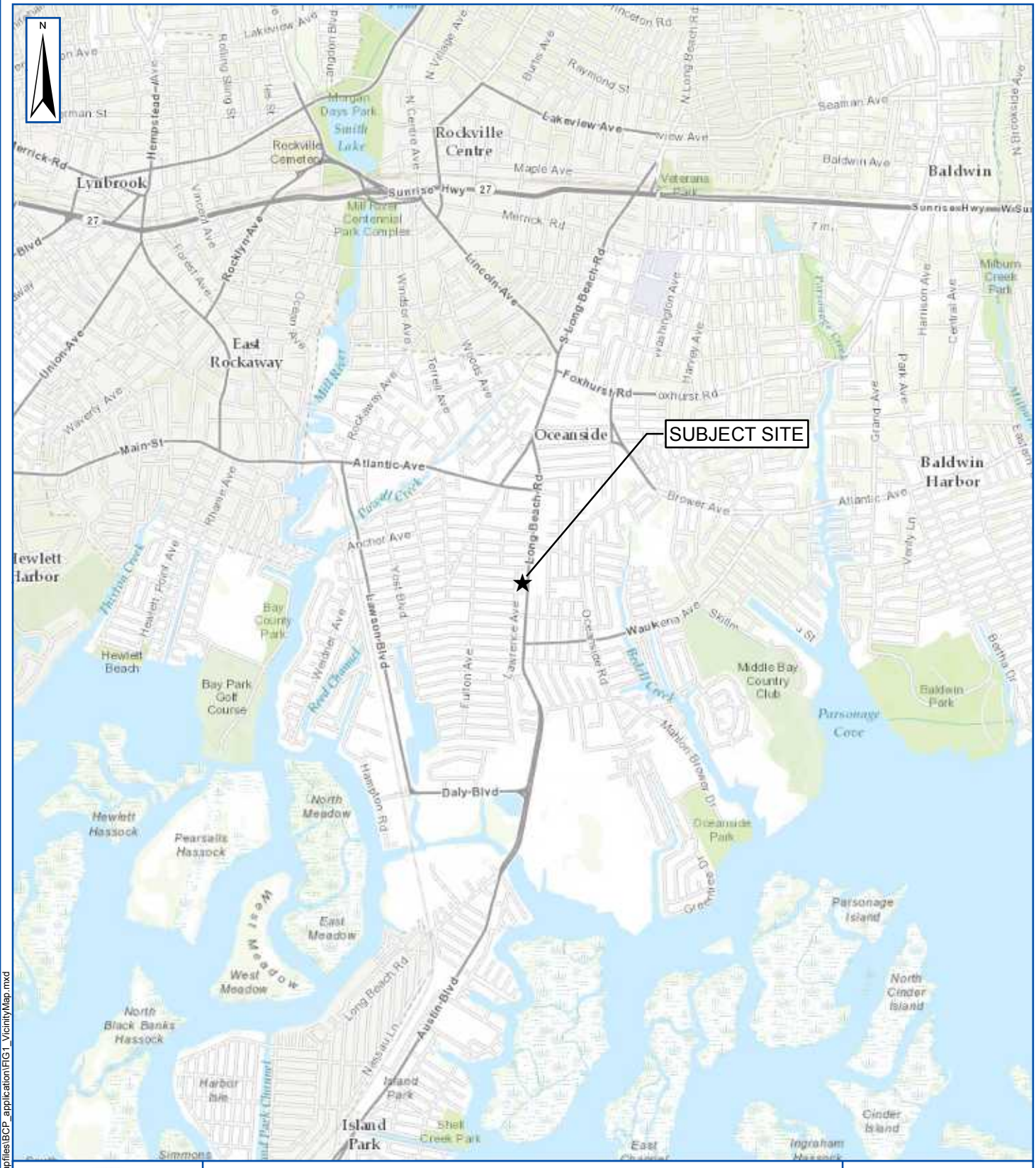
FIGURES



SUBJECT SITE VICINITY

JAY'S LUCKY CLEANERS
3220-3224 LONG BEACH ROAD
OCEANSIDE, NY

0 ½ 1 1½ 2 Miles

Project:	UPC1502
Date:	6/18/2015
Designed by:	BB
Drawn by:	BB
Approved by:	JF
Figure No:	1

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DRAWING PREPARED FOR:

REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project:	UPC1502	Designed by:	BB
Date:	6/19/2015	Drawn by:	BB
Scale:	AS SHOWN	Approved by:	JF

SITE PLAN

JAY'S LUCKY CLEANERS
3220-3224 LONG BEACH ROAD
OCEANSIDE, NY

FIGURE NO:
2

SHEET:

Document Path: G:\Projects\S-Z\UPC\1502\mapfiles\BCP_application\FIG6_SitePlan.mxd

N

Sample ID:	SS001	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	6.29	U
1,1-Dichloroethene	3.96	U
cis-1,2-Dichloroethene	3.96	U
PCE (Tetrachloroethene)	2,640	
1,1,1-Trichloroethane	5.46	U
Trichloroethene	25.5	
Vinyl chloride	2.56	U

Sample ID:	SV006	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	3.15	U
1,1-Dichloroethene	1.98	U
cis-1,2-Dichloroethene	1.98	U
PCE (Tetrachloroethene)	367	
1,1,1-Trichloroethane	2.73	U
Trichloroethene	6.13	
Vinyl chloride	1.28	U

Sample ID:	SV003	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	12.6	U
1,1-Dichloroethene	7.93	U
cis-1,2-Dichloroethene	163	
PCE (Tetrachloroethene)	3,210	
1,1,1-Trichloroethane	10.9	U
Trichloroethene	155	
Vinyl chloride	5.11	U

Sample ID:	SV001	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	26	U
1,1-Dichloroethene	16	U
cis-1,2-Dichloroethene	44	0
PCE (Tetrachloroethene)	14,600	
1,1,1-Trichloroethane	22	U
Trichloroethene	180	0
Vinyl chloride	10	U

Sample ID:	IA001	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	0.465	
1,1-Dichloroethene	0.079	U
cis-1,2-Dichloroethene	0.079	U
PCE (Tetrachloroethene)	7.26	
1,1,1-Trichloroethane	0.109	U
Trichloroethene	0.107	U
Vinyl chloride	0.051	U

Sample ID:	SS003	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	89	U
1,1-Dichloroethene	56	U
cis-1,2-Dichloroethene	56	U
PCE (Tetrachloroethene)	69,200	
1,1,1-Trichloroethane	77	U
Trichloroethene	168	0
Vinyl chloride	36	U

Sample ID:	SS002	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	25	
1,1-Dichloroethene	16	
cis-1,2-Dichloroethene	16	
PCE (Tetrachloroethene)	15,300	
1,1,1-Trichloroethane	22	
Trichloroethene	33	
Vinyl chloride	10	

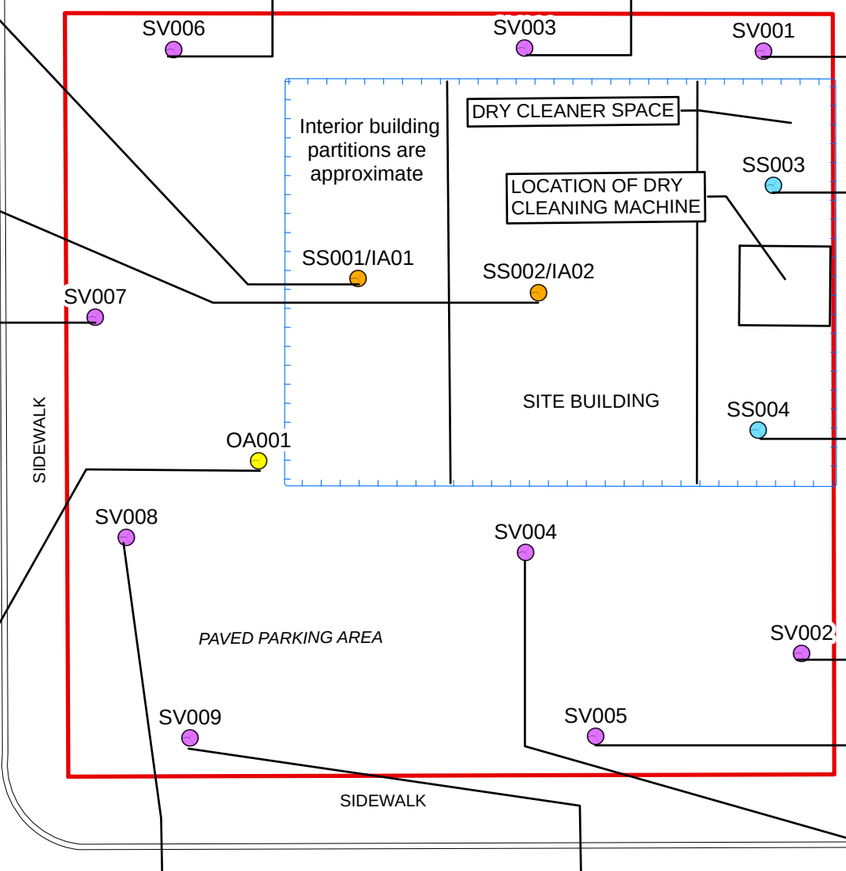
Sample ID:	SS004	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	25	U
1,1-Dichloroethene	16	U
cis-1,2-Dichloroethene	16	U
PCE (Tetrachloroethene)	15,800	
1,1,1-Trichloroethane	22	U
Trichloroethene	21	U
Vinyl chloride	10	U

Sample ID:	IA002	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	0.447	
1,1-Dichloroethene	0.079	U
cis-1,2-Dichloroethene	0.079	U
PCE (Tetrachloroethene)	29.4	
1,1,1-Trichloroethane	0.109	U
Trichloroethene	0.505	
Vinyl chloride	0.051	U

Sample ID:	SV002	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	4.2	U
1,1-Dichloroethene	2.64	U
cis-1,2-Dichloroethene	2.64	U
PCE (Tetrachloroethene)	1530	
1,1,1-Trichloroethane	3.64	U
Trichloroethene	64	
Vinyl chloride	1.71	U

Sample ID:	SV007	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	12.6	U
1,1-Dichloroethene	7.93	U
cis-1,2-Dichloroethene	7.93	U
PCE (Tetrachloroethene)	395	
1,1,1-Trichloroethane	10.9	U
Trichloroethene	35	
Vinyl chloride	5.11	U

Sample ID:	SV005	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	2.52	U
1,1-Dichloroethene	1.59	U
cis-1,2-Dichloroethene	1.59	U
PCE (Tetrachloroethene)	1,110	
1,1,1-Trichloroethane	2.18	U
Trichloroethene	19	
Vinyl chloride	1.02	U



Sample ID:	OA001	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	0.491	
1,1-Dichloroethene	0.079	U
cis-1,2-Dichloroethene	0.079	U
PCE (Tetrachloroethene)	0.237	
1,1,1-Trichloroethane	0.109	U
Trichloroethene	0.107	U
Vinyl chloride	0.051	U

Sample ID:	SV008	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	3	U
1,1-Dichloroethene	2	U
cis-1,2-Dichloroethene	47	
PCE (Tetrachloroethene)	1,030	
1,1,1-Trichloroethane	3	U
Trichloroethene	254	
Vinyl chloride	1	U

Sample ID:	SV009	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	2.52	U
1,1-Dichloroethene	1.59	U
cis-1,2-Dichloroethene	1.59	U
PCE (Tetrachloroethene)	184	
1,1,1-Trichloroethane	2.18	U
Trichloroethene	2.19	
Vinyl chloride	1.02	U

Sample ID:	SV004	
Sampling Date:	11/22/2016	
Analyte	Result Value	Lab Qualifier
Carbon Tetrachloride	2.52	U
1,1-Dichloroethene	1.59	U
cis-1,2-Dichloroethene	2.69	
PCE (Tetrachloroethene)	366	
1,1,1-Trichloroethane	2.18	U
Trichloroethene	10	
Vinyl chloride	1.02	U

Note: All concentrations are ug/m3

- Soil Vapor Samples
- Outdoor Air Sample
- Sub-slab Soil Vapor/Indoor Air Sample
- Sub-Slab Soil Vapor Sample
- Building Footprint
- Subject Site Bounds

LONG BEACH ROAD

0 20 40 60 80 Feet

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DRAWING PREPARED FOR:

REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project:	UPC1702	Designed by:	TM
Date:	6/1/2017	Drawn by:	TS
Scale:	AS SHOWN	Approved by:	TM

VOC CONCENTRATIONS IN INDOOR AIR/SOIL VAPOR

3206-3224 LONG BEACH ROAD
OCEANSIDE, NY

FIGURE NO:

3

SHEET:

TABLES

Table 1
Project Schedule - IRM Implementation

Month	1				2				3				4				5				6				7				8				9				10			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Task																																									
Submit Draft IRM Work Plan																																								
NYSDEC Review of DRAFT IRM Work Plan																																								
NYSDEC Issues Comments on Draft IRM Work Plan																																								
Revise and Submit Final IRM Work Plan																																								
NYSDEC Review of Final IRM Work Plan																																								
NYSDEC Approval of Final IRM Work Plan																																								
Pre-Construction Activities (Solicit Contractor Bids, Order System Components, etc.)																																								
SSDS Construction																																								
Submit Draft Construction Completion Report																																								
NYSDEC Review of Draft Construction Completion Report																																								
NYSDEC Issues Comments on Draft Construction Completion Report																																								
Revise and Submit Final Construction Completion Report																																								
NYSDEC Review of Final Construction Completion Report																																								
NYSDEC Approval of Final Construction Completion Report																																								

APPENDIX A
SSDS DESIGN DOCUMENTS

SCOPE:

INSTALLATION OF ACTIVE SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS) AT 3206-3224 LONG BEACH ROAD IN OCEANSIDE, NEW YORK AS SHOWN ON THESE PLANS. THE WORK INCLUDES:

1. DEMOLITION AND RESTORATION OF CONCRETE SLAB FOR PITS AND VACUUM MONITORING POINTS
2. INSTALLATION OF SUB-SLAB PITS
3. INSTALLATION OF RISER PIPING
4. INSTALLATION OF FAN UNIT AND ASSOCIATED ELECTRICAL EQUIPMENT
5. INSTALLATION OF CARBON FILTRATION UNIT
6. DISPOSAL OF ANY EXCESS SOIL MATERIAL
7. INSTALLATION OF VACUUM MONITORING LOCATIONS

NOTES:

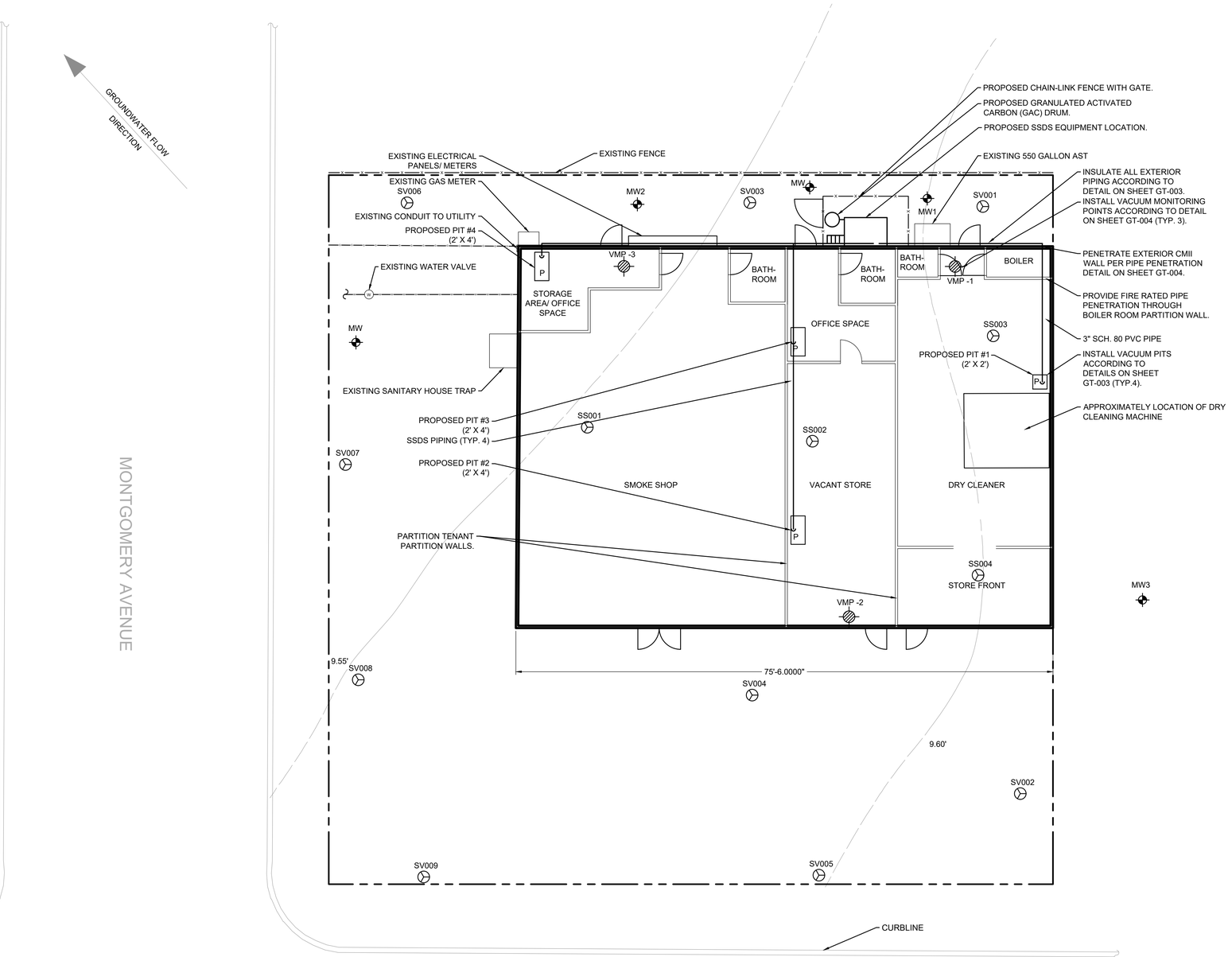
1. TOP OF EFFLUENT STACK AT LEAST 10' FROM ANY WINDOWS, DOORS OR OTHER BUILDING OPENINGS, OR FROM ANY WINDOWS OR OTHER OPENINGS IN ADJACENT BUILDINGS, INCLUDING AIR INTAKES, LOUVERS, VENTS, ETC.
2. MOUNT LOW VACUUM ALARM / MONITOR MOUNTED IN TREATMENT SYSTEM W/ WATERTIGHT SEALS. INSTALL ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
3. FIELD CONDITIONS TO BE VERIFIED BY CONTRACTOR PRIOR TO ANY WORK.
4. SOLID PIPING SLOPED TOWARDS PITS AT 3/10" PER FOOT (3% SLOPE).
5. CONTRACTOR TO SEAL ALL CRACKS IN SLAB, PENETRATIONS IN SLAB, EDGES OF SLAB, AND EXISTING PITS IN CONCRETE SLAB SEALED WITH HYDRAULIC CEMENT AND/OR A POLYURETHANE SEALANT.
6. PITS SHOULD BE EXCAVATED CAREFULLY TO AVOID DAMAGE TO EXISTING PLUMBING/ UTILITIES. PIT EXCAVATION MUST BE INSPECTED BY THE ENGINEER.

ELECTRICAL NOTES:

1. ALL ELECTRICAL TO BE INSTALLED BY LICENSED ELECTRICIAN.
2. POWER SUPPLY FOR ALARM / MONITOR HAS DEDICATED CIRCUIT.
3. INTERIOR CONDUIT TO BE SCHEDULE 40 PVC. EXTERIOR CONDUIT TO BE EMT.
4. ALL EXTERIOR PENETRATIONS FOR ELECTRICAL BOOTED AND WATER TIGHT.

LEGEND

- MONITORING WELL
- BUILDING FOOTPRINT
- PROPERTY LINE
- PROPOSED VACUUM MONITORING POINT
- EXISTING SOIL VAPOR MONITORING POINT
- P — PIT LOCATION
- W — WATER VALVE
- 9.55' — GROUNDWATER ELEVATION
- ACTUAL
- INFERRED



SSDS SITE PLAN
SCALE: 1"=10'

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CONSULTANTS

Number	Revision Description	Revision Date
7		
6		
5		
4		
3		
2		
1	INTERM REMEDIAL MEASURE	06/02/17

Designed By	DWH	Date Submitted	06/02/17
Drawn By	GMG	Date Created	05/18/17
Approved By	DWH	Scale	1" = 10'

Client:
UNITED PROPERTIES CORP.
1975 HEMPSTEAD TURNPIKE, SUITE 309
EAST MEADOW, NEW YORK 11554

Project:
SUB SLAB DEPRESSURIZATION SYSTEM

Project Address:
3206-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK

County Tax Map Number:
Contract Number:
Regulatory Reference Number:

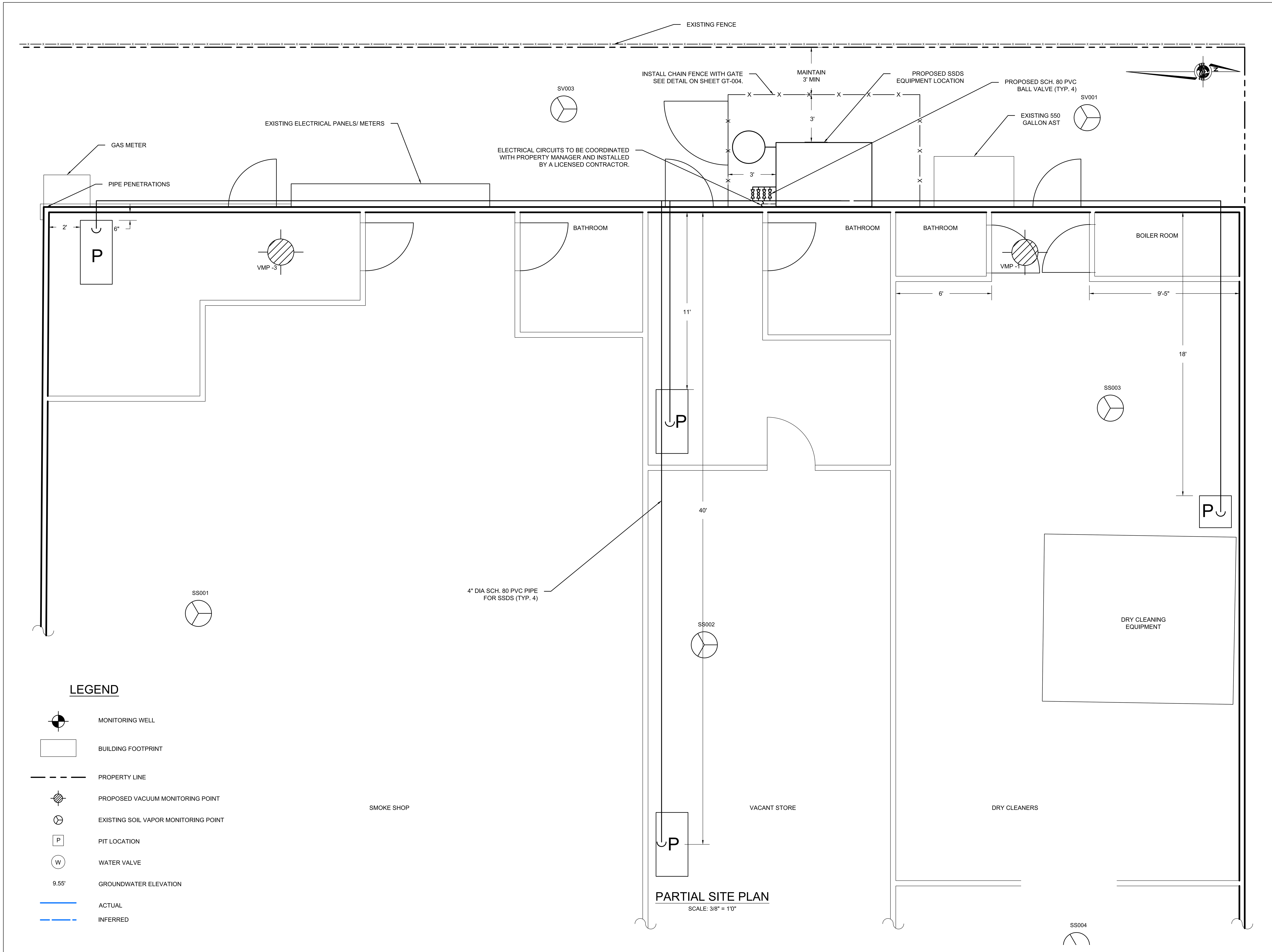
Title of Drawing:
SSDS SITE PLAN

Drawing Number:
G-001

Sheet 1 of 5

PWGC Project Number:
UPC1702

PWGC FILE NAME: J:\Projects S-Z\UPC1702 - JAN Lucky Clueens RM\SSDS\CAD\2017-06-01 - UPC1701 RM SSDS DRAFT.dwg (J:\001 Site Plan)
PLOT DATE/TIME: Jun 01, 2017 5:06pm By: jgallotti



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CONSULTANTS

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7		
6		
5		
4		
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2		
1	INTERM REMEDIAL MEASURE	06/02/17

Designed By	DWH	Date Submitted	06/02/17
Drawn By	GMG	Date Created	05/18/17
Approved By	DWH	Scale	3/8"=1'0"

Client:

UNITED PROPERTIES CORP.
1975 HEMPSTEAD TURNPIKE, SUITE 309
EAST MEADOW, NEW YORK 11554

Project:

SUB SLAB DEPRESSURIZATION SYSTEM

Project Address:

3206-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK

County Tax Map Number:

Contract Number:

Regulatory Reference Number:

Title of Drawing:

SSDS PARTIAL SITE PLAN

Drawing Number:

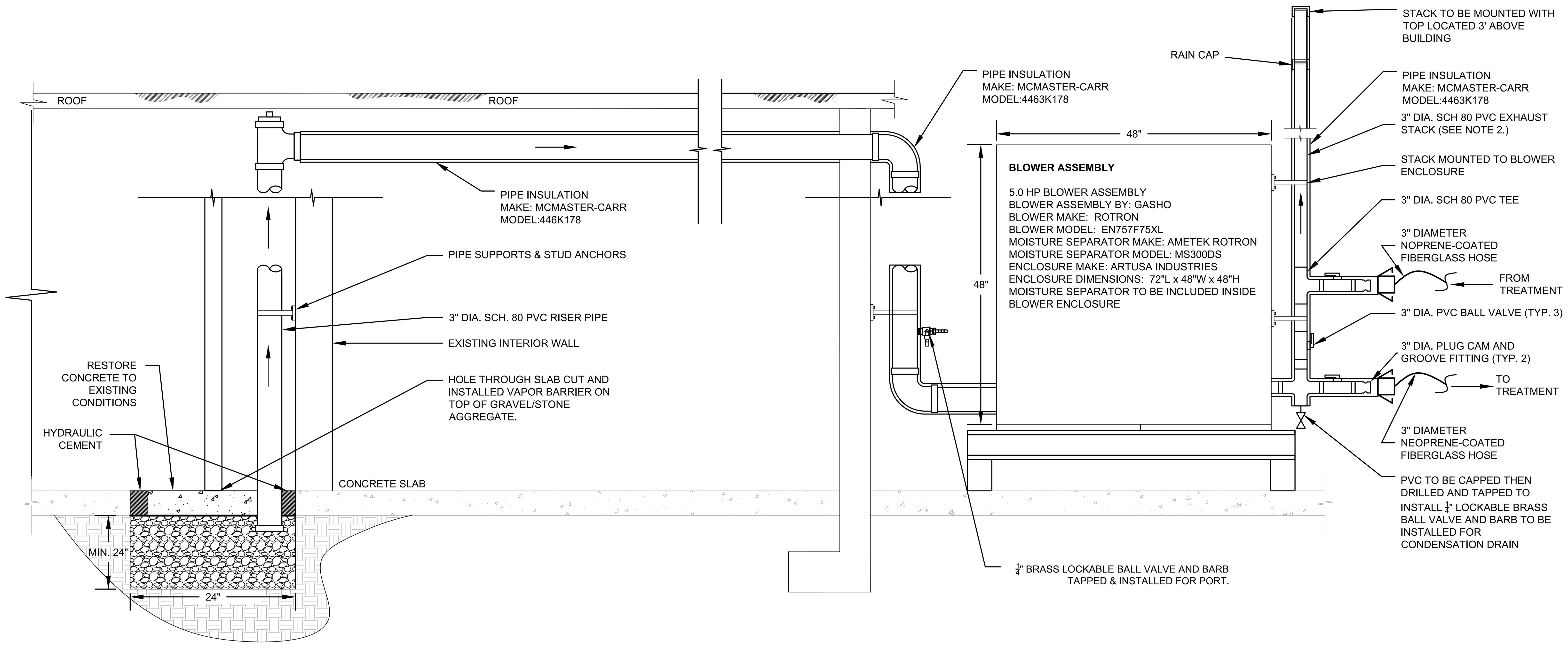
G-002

Sheet 2 of 5

PWGC Project Number:

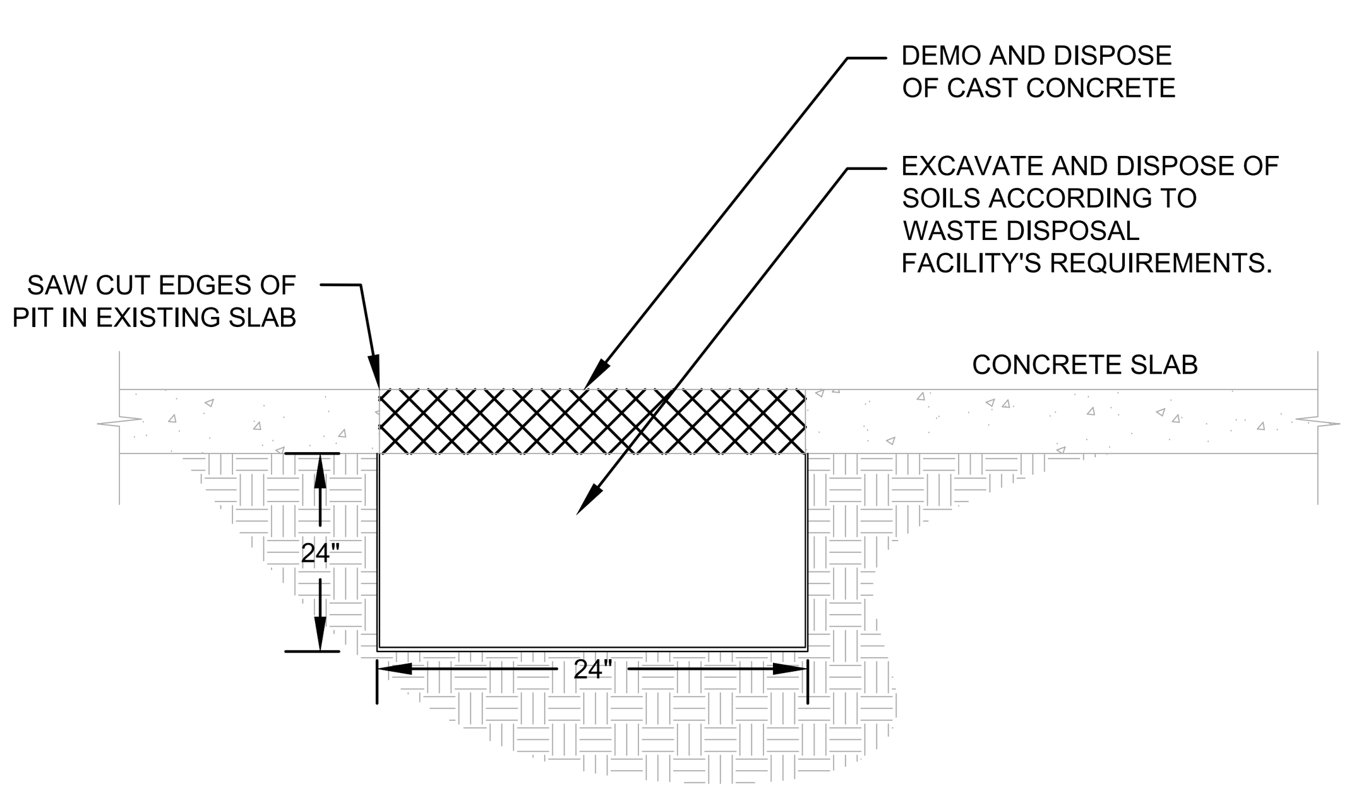
UPC1702

PWGC FILE NAME: J:\Projects S-Z\UPC\1702 - Jay's Lucky CLeaners IRM\SSDS\CAD\2017-05-31 - UPC1701 IRM SSDS DRAFT.dwg (G-002 Partial Site Plan)
PLOT DATE/TIME: Jun 01, 2017-5:00pm By: ggobillot



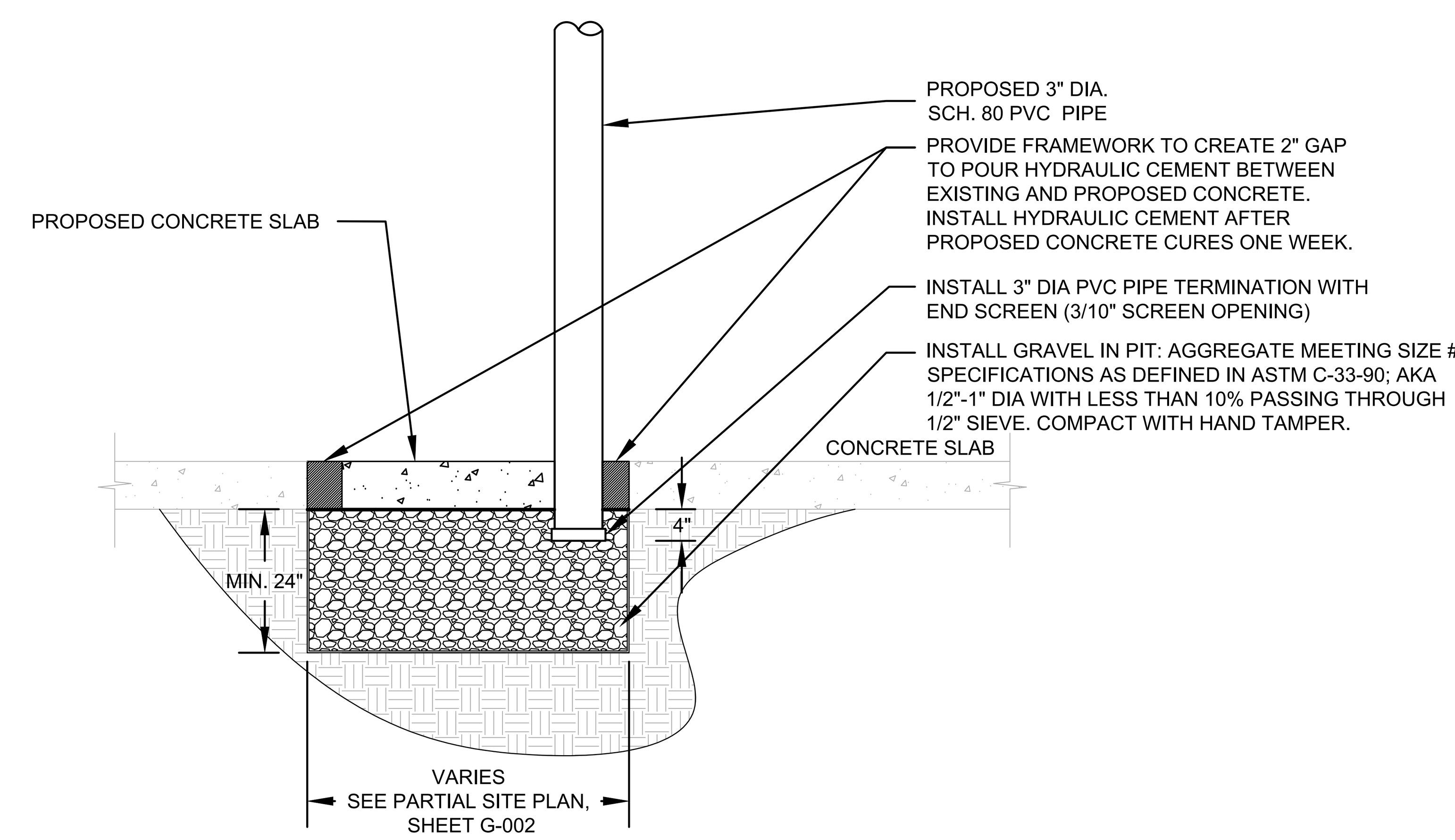
DETAIL A: CONNECTOR PIPING AND ROOFTOP EQUIPMENT

SCALE: NOT TO SCALE



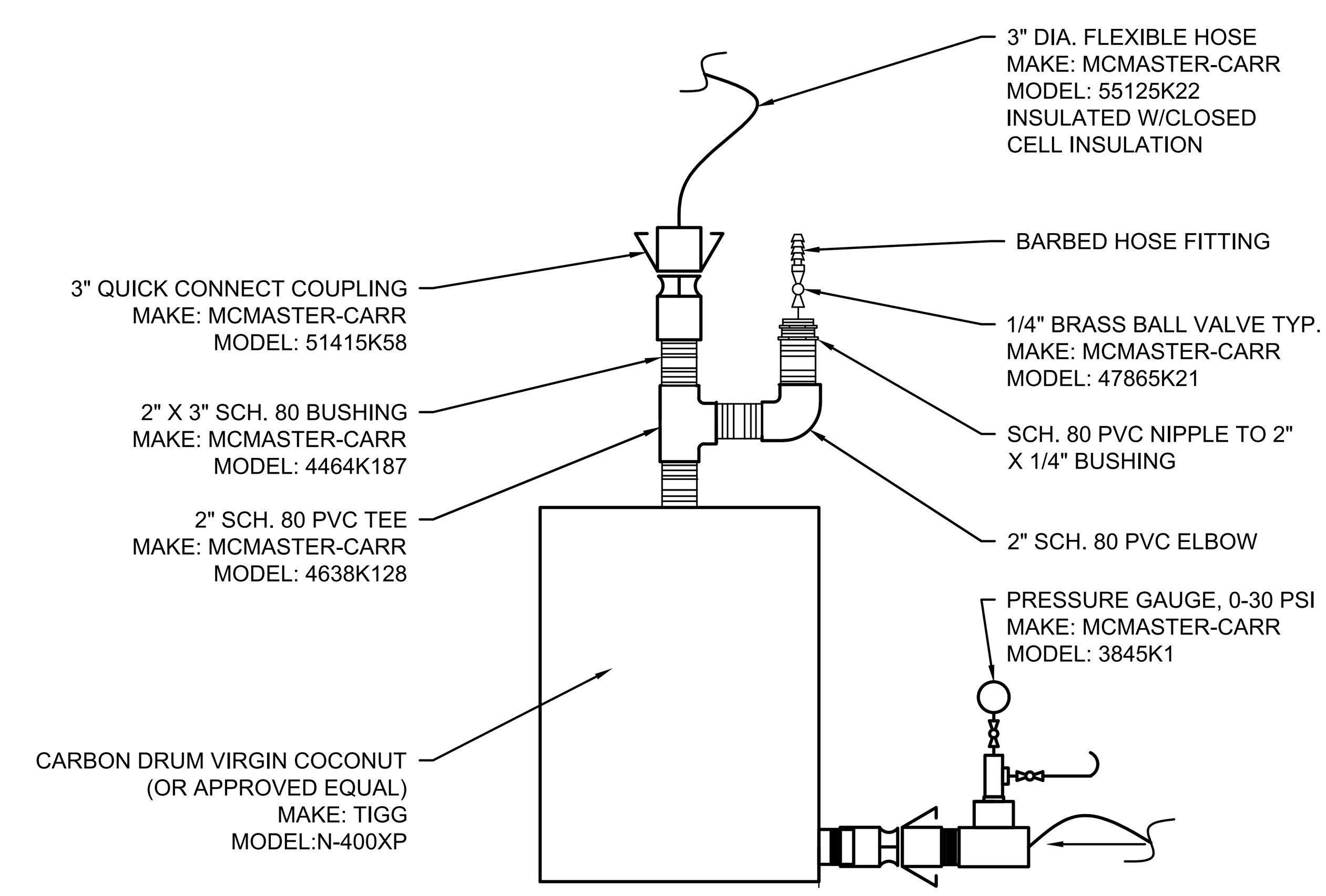
DETAIL B: CONCRETE DEMOLITION FOR PIT DETAIL

SCALE: NOT TO SCALE



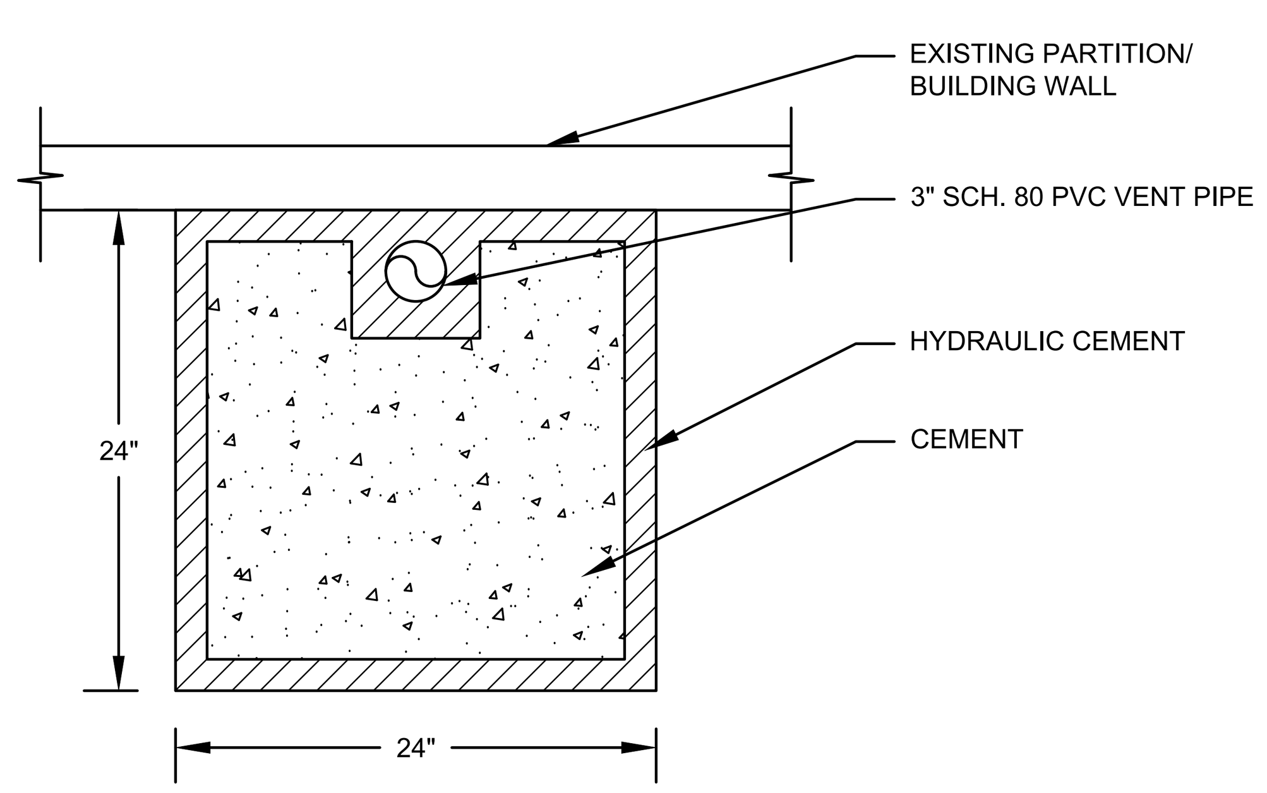
DETAIL C: PIT RESTORATION DETAIL

SCALE: NOT TO SCALE



DETAIL D: CARBON VESSEL

SCALE: NOT TO SCALE



DETAIL E: PLAN VIEW FOR PIT DETAIL

SCALE: NOT TO SCALE

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CONSULTANTS

Number	Revision Description	Revision Date
7		
6		
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1	INTERM REMEDIAL MEASURE	06/02/17

Designed By	DWH	Date Submitted	06/02/17
Drawn By	GMG	Date Created	05/18/17
Approved By	DWH	Scale	NTS

Client:
UNITED PROPERTIES CORP.
1975 HEMPSTEAD TURNPIKE, SUITE 309
EAST MEADOW, NEW YORK 11554

Project:
SUB SLAB DEPRESSURIZATION SYSTEM

Project Address:
3206-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK

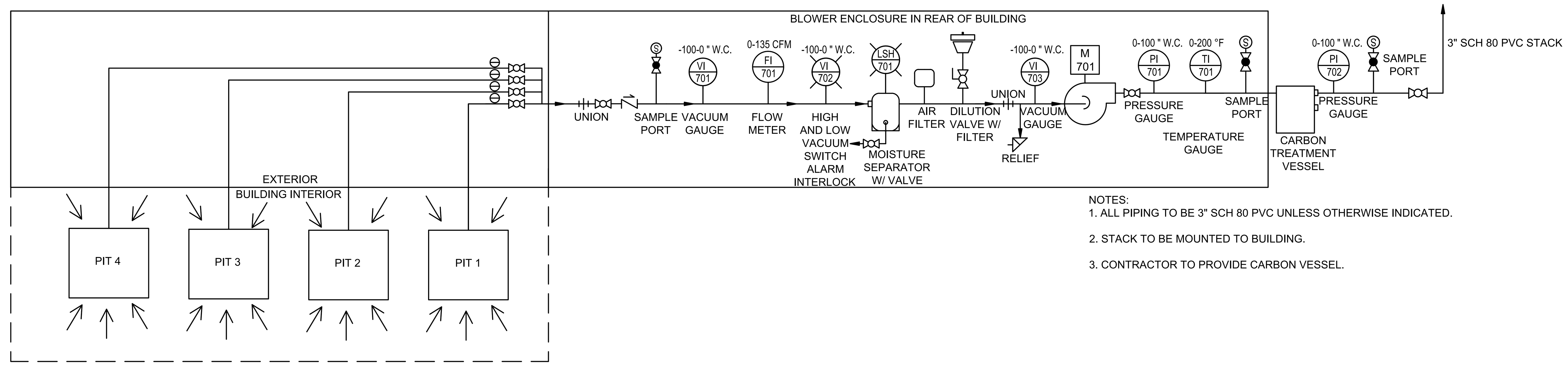
County Tax Map Number:
Contract Number:
Regulatory Reference Number:

Title of Drawing:
SSDS SECTIONS

Drawing Number:
G-003

Sheet 3 of 5

PWGC Project Number:
UPC1702



NOTES:
1. ALL PIPING TO BE 3" SCH 80 PVC UNLESS OTHERWISE INDICATED.
2. STACK TO BE MOUNTED TO BUILDING.
3. CONTRACTOR TO PROVIDE CARBON VESSEL.

PROCESS AND INSTRUMENTATION DIAGRAM
SCALE: NOT TO SCALE

LEGEND

VALVES AND PIPING	NO	NC
BALL VALVE		
SAMPLE PORT		
PRESSURE RELIEF VALVE		
VACUUM RELIEF VALVE		
CAMLOCK CONNECTION		
UNION		
PARTICULATE FILTER		
CARBON VESSEL		
MOISTURE SEPARATOR		

INSTRUMENT IDENTIFICATION
- INDICATING INSTRUMENT (LOCAL)
- ALARM

EXAMPLE: INSTRUMENT TYPE; SETPOINT OF INSTRUMENT; INSTRUMENT DESIGNATION (PRESSURE SWITCH); SYSTEM POSITION NUMBER

EQUIPMENT
- CENTRIFUGAL, REGENERATIVE BLOWER

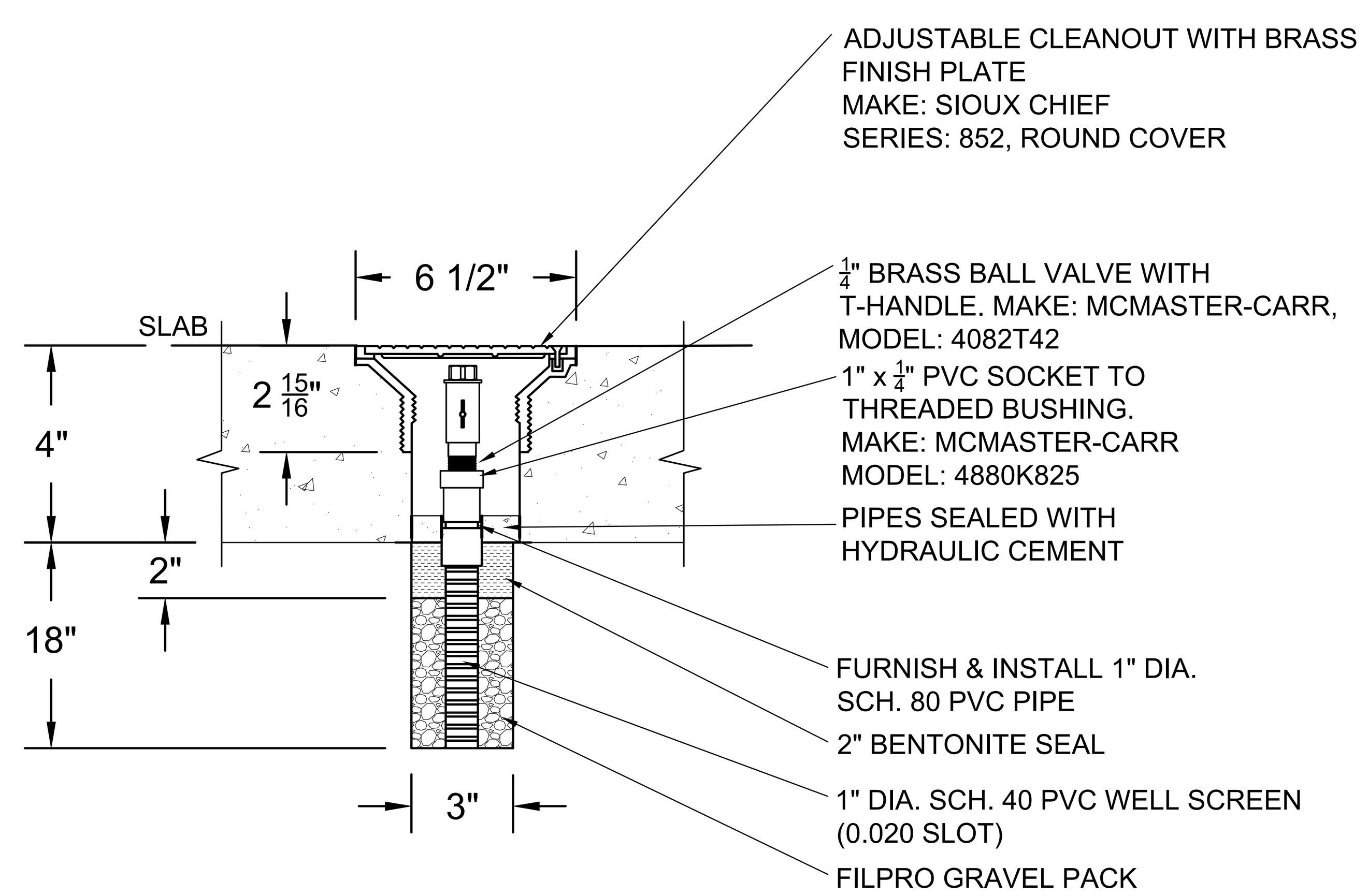
EQUIPMENT ABBREVIATIONS
- FI - FLOW INDICATOR
- M - MOTOR
- PI - PRESSURE INDICATOR
- TI - TEMPERATURE INDICATOR
- VA - VACUUM ALARM

SYSTEM POSITION DESIGNATION
- 700 - SOIL VAPOR EXTRACTION

PROPOSED

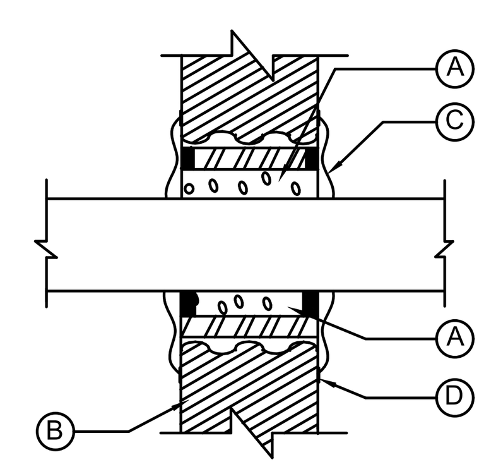
ALARM INTERLOCK TABLE

ALARM INTERLOCK	P & ID DESCRIPTION	ALARM DESCRIPTION	SYSTEM RESPONSE	NOTES
1	LSH-701	MOISTURE SEPARATOR HIGH	CRITICAL ALARM SYSTEM SHUT DOWN	
2	VI-702	VACUUM LOW	CRITICAL ALARM SYSTEM SHUT DOWN	
3	VI-702	VACUUM HIGH	CRITICAL ALARM SYSTEM SHUT DOWN	



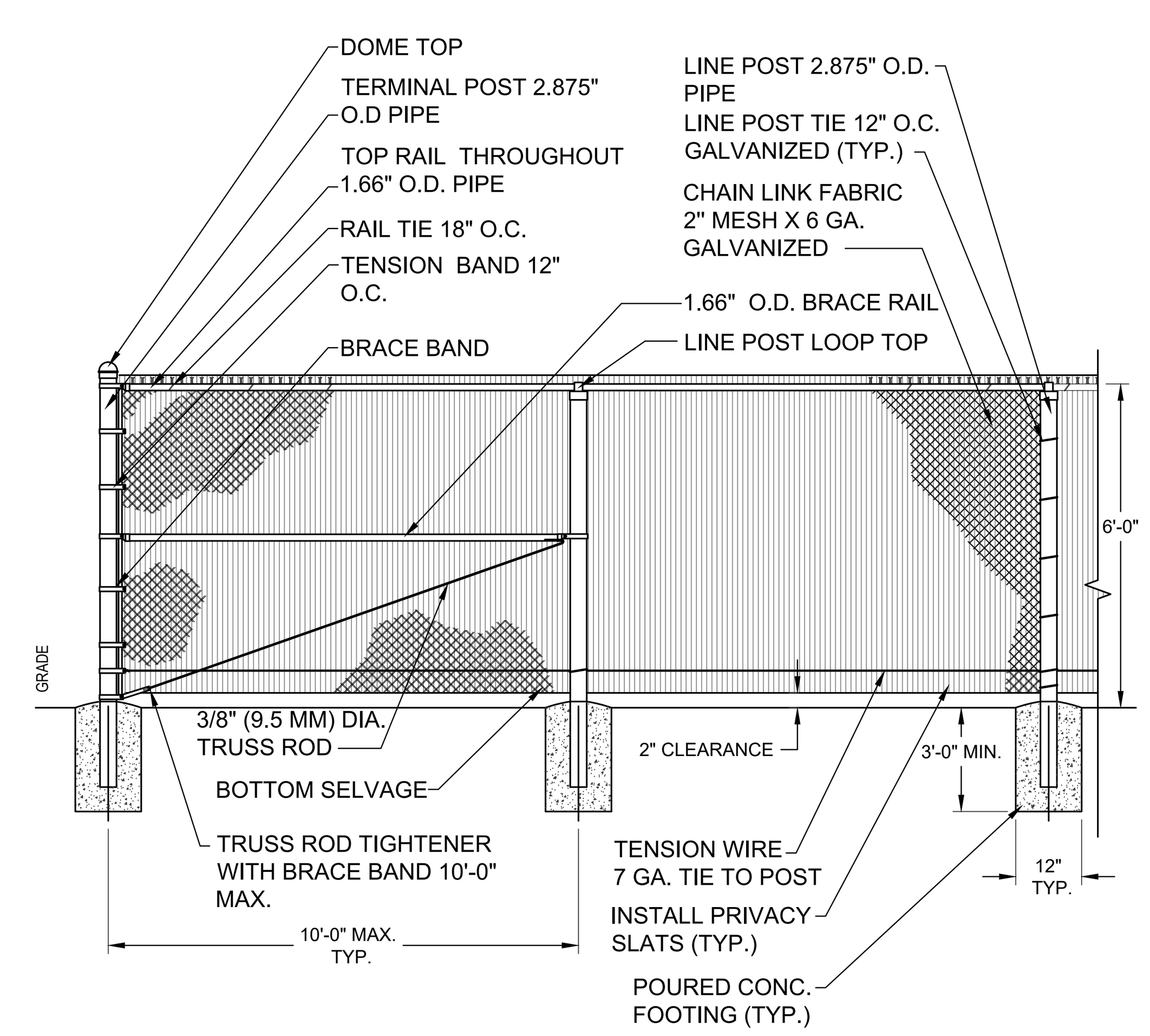
NOTE: SEE SHEET G-001 FOR VAPOR MONITORING POINT LOCATIONS.

DETAIL F: VACUUM MONITORING POINT
SCALE: NOT TO SCALE

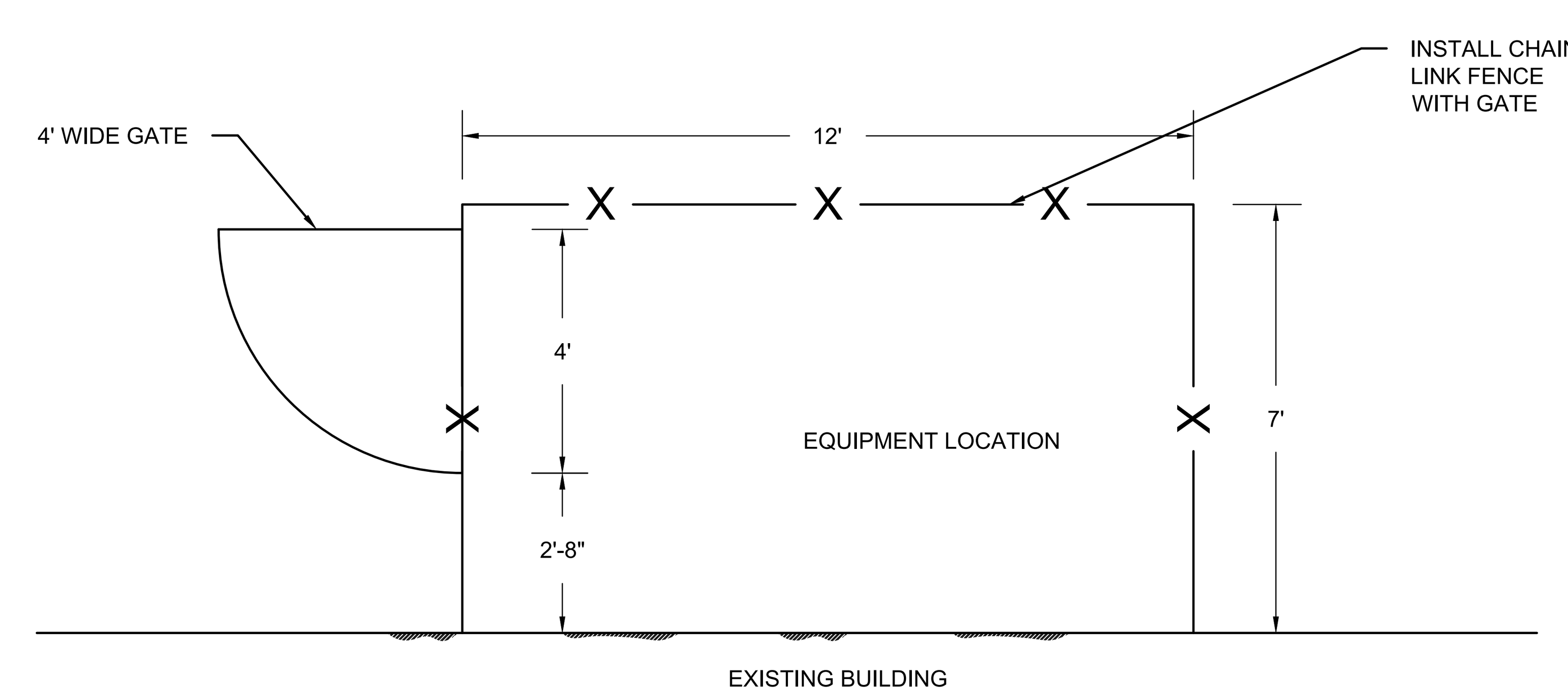


(A) ALL SPACES PACKED FULL DEPTH WITH MINERAL WOOL OR OTHER EQUALLY APPROVED FIRE RESISTIVE MATERIAL (ASBESTOS OR FIBERGLASS SHALL NOT BE USED).
(B) EXTERIOR CMU BLOCK WALL.
(C) ESCUTCHEON RING
(D) WATER TIGHT SEAL

DETAIL G: PIPE PENETRATION DETAIL
SCALE: NOT TO SCALE



DETAIL H: NEW CHAINLINK FENCE DETAIL
SCALE: NOT TO SCALE



DETAIL J: PLAN VIEW FOR CHAINLINK FENCE
SCALE: NOT TO SCALE

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1	INTERM REMEDIAL MEASURE	06/02/17

Designed By: DWH — Date Submitted: 06/02/17
Drawn By: GMG — Date Created: 5/18/17
Approved By: DWH — Scale: NTS

Client:
UNITED PROPERTIES CORP.
1975 HEMPSTEAD TURNPIKE, SUITE 309
EAST MEADOW, NEW YORK 11554

Project:
SUB SLAB DEPRESSURIZATION SYSTEM

Project Address:
3206-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK

County Tax Map Number:
Contract Number:
Regulatory Reference Number:
Title of Drawing:

SSDS DETAILS & DIAGRAMS

Drawing Number: G-004
Sheet 4 of 5
PWGC Project Number: UPC1702

GENERAL NOTES:

1. SITE PLAN IS BASED UPON DRAWINGS DEVELOPED BY PWGC. INFORMATION ON THIS PLAN IS APPROXIMATE AND IS TO BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION, ALONG WITH UTILITY LOCATIONS, AS PER THESE GENERAL NOTES.
2. BEFORE START OF WORK THE CONTRACTOR SHALL FURNISH CERTIFICATES OF INSURANCE TO COMPLY WITH THE OWNER'S REQUIREMENTS. CERTIFICATES WILL INDICATE THE AMOUNTS DESIGNATED ON THE APPLICATION AND WORKERS' COMPENSATION NUMBER.
3. NO WORK IS TO START UNTIL CLEARANCE IS RECEIVED FROM THE OWNER AND ENGINEER.
4. CONTRACTOR SHALL NOTIFY THE ENGINEER'S OFFICE 48 HOURS PRIOR TO THE START OF WORK.
5. THE CONTRACTOR MUST CHECK JOB SITE AND VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO SUBMITTING HIS PROPOSAL AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES FOUND. THE CONTRACTOR SHALL ESTABLISH THE EXACT LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE ANY EXCAVATION WITH THE LOCATION OF EXISTING UTILITIES.
6. ALL WORK SHALL COMPLY WITH THE N.Y.S. BUILDING CODE, NYSDEC, E.P.A., N.Y.S. ELECTRIC CODE, N.Y.S. FIRE PREVENTION CODE, NATIONAL ELECTRIC CODE, NATIONAL FIRE PROTECTION ASSOCIATION, U.L., AND ALL GOVERNING AGENCIES HAVING JURISDICTION.
7. THE EXISTENCE AND LOCATION OF AERIAL, SURFACE, OR SUBSURFACE UTILITIES IS NOT SHOWN ON THESE PLANS. PRIOR TO ANY DEMOLITION, EXCAVATION, OR SOIL BORINGS, CONTACT THE NYS ONE CALL NUMBER (800) 272-4480 SO THAT UTILITIES CAN BE MARKED OUT.
8. ALL ELECTRIC WORK IS TO BE PERFORMED BY A LICENSED ELECTRICIAN.
9. THE CONTRACTOR SHALL REPAIR ANY DAMAGED SURFACES OR MATERIALS IN THE PERFORMANCE OF THIS CONTRACT.
10. CONTRACTOR TO FURNISH TO OWNER REPRODUCIBLE AS-BUILT DRAWINGS OF ALL COMPLETED WORK.
11. ALL MATERIALS TO BE REMOVED ARE TO BE LEGALLY DISPOSED OF, OFF SITE, EACH DAY EXCEPT WHERE OTHERWISE NOTED. EXTREME CARE IS TO BE TAKEN TO AVOID SPILLAGE OF DEBRIS.
12. THIS WORK IS TO BE PERFORMED TO PROTECT ADJOINING AREAS, EQUIPMENT, AND OCCUPANTS FROM DAMAGE AND HARM, AND TO PRODUCE MINIMUM DISTURBANCE TO SITE OPERATIONS. PROVIDE ALL PROTECTIVE METHODS AND SCHEDULE WORK WITH OWNER.
13. ANY CONSTRUCTION TO BE LEFT IN PLACE THAT IS WEAKENED OR DAMAGED SHALL BE RESTORED TO THE CONDITION WHICH EXISTED PRIOR TO SUCH DAMAGE.
14. CONSTRUCTION THAT IS TO BE REPLACED AFTER REMOVAL WORK SHALL BE REPLACED WITH CONSTRUCTION OF EQUAL OR BETTER STRENGTH AND DESIGN.
15. CONTRACTOR SHALL EMPLOY A PRIVATE UNDERGROUND UTILITY LOCATING COMPANY TO PERFORM UNDERGROUND UTILITY MARKOUTS. UTILITIES SHALL BE MARKED OUT WITH PAINT ON GROUND SURFACE, THEN SKETCHED AND DIMENSIONED TO SCALE. COPIES OF UTILITY SKETCHES SHALL BE PROVIDED TO THE ENGINEER OF RECORD.
16. SUBGRADE PIPING, CONCRETE, AND MASONRY ARE SUBJECT TO CONTROLLED INSPECTIONS.
17. IT SHALL BE ASSUMED THAT THE EXISTING UTILITIES IN AND ADJACENT TO THE CONSTRUCTION WORK ARE IN WORKING ORDER. IN THE EVENT OF UTILITY BREAKDOWNS IN THE AREA, THE CONTRACTOR SHALL MAKE IMMEDIATE REPAIRS WITHOUT COST TO THE OWNER.
18. ALL FIELD WORK SHOULD PROCEED ONLY AFTER EACH UTILITY THAT IS SHOWN ON THE CONTRACT DRAWINGS IS CLEARLY MARKED IN THE FIELD. THEN WORK IS TO PROCEED WITH CONTROLLED EXCAVATION (WITH HAND DIGGING TO EXPOSE KNOWN UTILITIES) UNTIL THE AREA HAS BEEN OPENED SUFFICIENTLY TO UTILIZE MASS OR MECHANICAL EXCAVATION.

EXCAVATION NOTES:

1. AREA OF DISTURBANCE SHALL BE MINIMIZED. CONTRACTOR TO COORDINATE ACCESS AND STAGING AREA WITH OWNER.
2. EXISTING UTILITIES SHALL NOT BE UNDERMINED. CONTRACTOR SHALL MAINTAIN EXISTING UTILITIES DURING THE WORK.
3. CONTRACTOR SHALL LEGALLY DISPOSE OF ALL CONTAMINATED SOILS AS PER APPLICABLE FEDERAL, STATE, AND LOCAL LAWS.

SSDS PIT BACKFILL NOTES:

1. PROVIDE 1/2" - 3/4" CRUSHED STONE WITH NO FINES TO REPLACE SOIL MATERIALS REMOVED FROM PIT CONSTRUCTION, UNLESS OTHERWISE INDICATED. CONTRACTOR TO PROVIDE CERTIFICATIONS FROM SOURCE OF STONE FILL.
2. CONTRACTOR SHALL PROVIDE ENGINEER AND OWNER ALL, BILLS OF LADING AND DISPOSAL MANIFEST FOR ALL MATERIAL TAKEN OFF SITE.
3. THE CONTRACTOR SHALL PROPERLY DISPOSE OF ALL DEMOLITION AND CONSTRUCTION MATERIAL OFF-SITE. CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR THE DISPOSAL OF THE MATERIAL AND BEAR ALL COSTS OR RETAIN ANY PROFIT INCIDENTAL TO SUCH DISPOSAL.

UNDERGROUND UTILITIES:

1. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES ARE NOT KNOWN BASED UPON AVAILABLE DRAWINGS. THE CONTRACTOR ASSUMES ALL LIABILITY AND RESPONSIBILITY FOR LOCATION AND PROTECTION OF THE UTILITY PIPES, CONDUITS, OR STRUCTURES SHOWN OR NOT SHOWN ON THESE DRAWINGS.

ELECTRICAL INSTALLATIONS:

1. ELECTRICAL INSTALLATION SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH NFPA 70 - NATIONAL ELECTRIC CODE.
2. CONTRACTOR TO COORDINATE WITH OWNER FOR POWER SOURCE FOR TREATMENT SYSTEM.
3. CONTRACTOR TO COORDINATE WITH OWNER FOR PLACEMENT OF CONDUIT FOR MONITORING EQUIPMENT / POWER.
4. ALL ELECTRICAL WORK SHALL BE PERFORMED BY A LICENSED ELECTRICAL CONTRACTOR. CONTRACTOR TO PROVIDE UNDERWRITER'S CERTIFICATE FOR ALL ELECTRIC WORK.

SYSTEM NOTES:

1. SYSTEM CONTROL PANEL SHALL INCLUDE:
   A. VARIABLE SPEED CONTROLLER FOR BLOWER.
   B. H-O-A SWITCHES FOR BLOWER.
   C. RUN AND FAULT INDICATORS FOR ALL MOTORS AND INTERLOCKS.
   D. HI/LOW VACUUM ALARM INDICATOR W/REMOTE INDICATOR MOUNTED ON ENCLOSURE.
2. SYSTEM CONTROLS SHALL BE EQUIPPED WITH AN EMERGENCY STOP BUTTON LOCATED WITHIN 5 FEET OF THE BLOWER.
3. ALL ELECTRICAL WORK SHALL COMPLY WITH NEC DESIGN STANDARDS AND LOCAL REQUIREMENTS.
4. ALL EQUIPMENT SHALL BE INDIVIDUALLY GROUNDED, AS PER NEC REQUIREMENTS.
5. ALL PRESSURE SENSOR ALARMS SHALL BE FIELD ADJUSTABLE IN ON CONTROLLER AND HAVE A RANGEOF 0-100" W.C..

TESTING:

1. ALL NEW OR MODIFIED PIPING MUST BE PRESSURE TESTED FOR 1 HOUR @ 30 PSI. TESTING MUST BE WITNESSED BY ENGINEER.
2. ALL NEW EQUIPMENT WILL BE TESTED TO ENSURE PROPER OPERATION.
3. TESTING MUST BE WITNESSED BY ENGINEER.

PIPING NOTES:

1. RISER PIPE TO BE 3" DIA. SCH 80 PVC. JOINTS SHALL BE CEMENTED.
2. ALL EXTERIOR PIPING TO BE INSULATED WITH 1/2" CLOSED CELL INSULATION.

SYSTEM DETAILS

SVE BLOWER AND INSTRUMENTATION PACKAGE TO BE PROVIDED BY GASHO CORPORATION OF CHESTER PA. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THE DETAILS AND REQUIREMENTS OF THESE PLANS REFLECT THE EQUIPMENT VENDORS PROPOSAL. CARBON VESSELS ARE TO BE PROVIDED BY THE CONTRACTOR.

1. NEMA 4 CONTROL PANEL, 208 VOLT, 3 PHASE, WITH;
   - 1.1. ELECTRICAL DISCONNECT SWITCH
   - 1.2. VARIABLE SPEED CONTROLLER
   - 1.3. MOTOR RUN LIGHT
   - 1.4. HOA SELECTOR SWITCH
   - 1.5. CONTROL INTERLOCK (SEE P&ID)
   - 1.6. MANUAL RESET BUTTON
   - 1.7. AUTOMATIC TELEPHONE DIALER
   - 1.8. HI/LOW ALARM INDICATION LIGHTS W/REMOTE INDICATOR
2. ELECTRICAL DISTRIBUTION PANEL FOR LIGHTING ENCLOSURE, FANS , HEATER ENCLOSURE, RECEPTACLE.
3. AMETEK MOISTURE SEPARATOR, MODEL MS300DS W/LIQUID LEVEL SWITCH FOR INTERLOCK.
4. 2" DILUTION VALVE W/INLET FILTER/ SILENCER
5. 2" INLINE FILTER W/ POLYESTER ELEMENT
6. AMETEK ROTRON ENVIRONMENTAL BLOWER MODEL: EN757F72XL, P/N 081174 5 HP, XP, 230/460/3/60
7. 400 LB CARBON VESSEL, MAKE: TIGG CORPORATION, MODEL: N-400 XP, VIRGIN COCONUT. PROVIDED BY GENERAL CONTRACTOR
8. 3" CAM LOCK TYPE SYSTEM EFFLUENT CONNECTION AND 3" DIAMETER SCH. 80 PVC EFFLUENT PIPING TO STACK.
9. TEFC VENTILATION FAN WITH THERMOSTAT

PWGC

Strategic Environmental and Engineering Solutions

P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.

630 Johnson Avenue. • Suite 7
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CONSULTANTS

Number	Revision Description	Revision Date
7		
6		
5		
4		
3		
2		
1	INTERM REMEDIAL MEASURE	06/02/17

Designed By: DWH	Date Submitted: 06/02/17
Drawn By: GMG	Date Created: 5/18/17
Approved By: DWH	Scale: NTS

Client:
**UNITED PROPERTIES CORP.
1975 HEMPSTEAD TURNPIKE, SUITE 309
EAST MEADOW, NEW YORK 11554**

Project:
SUB SLAB DEPRESSURIZATION SYSTEM

Project Address:
**3206-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK**

County Tax Map Number:

Contract Number:

Regulatory Reference Number:

Title of Drawing:

SSDS NOTES

Unauthorized alteration or addition to this drawing and related documents is a violation of Section 7209 of the New York State Education Law

Drawing Number: **G-005**

Sheet 5 of 5

PWGC Project Number: **UPC1702**

PWGC FILE NAME: J:\Projects S-Z\UPC\1702 - Jay's Lucky CLeaners IRM\SSDS\CAD\2017-05-31 - UPC1701 IRM SSDS DRAFT.dwg (G-005 Notes)
PLOT DATE/TIME: Jun 01, 2017-5:00pm By: ggobillot

APPENDIX B
HEALTH AND SAFETY PLAN

JAY'S LUCKY CLEANERS
3220-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK

HEALTH AND SAFETY PLAN

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7016

PREPARED FOR:

United Properties Corp.
1975 Hempstead Turnpike, Suite 309
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PWGC Project Number: UPC1502

MARCH 2016

P.W. GROSSER CONSULTING, INC.
PROJECT No. UPC1502

HEALTH AND SAFETY PLAN

Jay's Lucky Cleaners
3220-3224 Long Beach Road
Oceanside, New York

SUBMITTED:

March 2016

PREPARED FOR:

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

ON BEHALF OF:

United Properties Corp.
1975 Hempstead Turnpike, Suite 309
East Meadow, New York 11554

PREPARED BY:

P.W. Grosser Consulting, Inc.
630 Johnson Avenue, Suite 7
Bohemia, New York 11716

HEALTH AND SAFETY PLAN
JAY'S LUCKY CLEANERS
3220-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK

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1.0 STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to chemical, biological and physical hazards during the planned Remedial Investigation (RI) to be performed the site known as Jay's Lucky Cleaners located at 3220-3224 Long Beach Road, Oceanside, New York. P.W. Grosser Consulting Inc.'s (PWGC's) policy is to minimize the possibility of work-related exposure through awareness and qualified supervision, health and safety training, medical monitoring, use of appropriate personal protective equipment, and the following activity specific safety protocols contained in this HASP. PWGC has established a guidance program to implement this policy in a manner that protects personnel to the maximum reasonable extent.

This HASP, which applies to persons present at the site actually or potentially exposed to safety or health hazards, describes emergency response procedures for actual and potential physical, biological and chemical hazards. This HASP 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.

2.0 INTRODUCTION

2.1 Purpose

This HASP addresses the regulatory requirements of health and safety practices that will be employed by site workers participating in RI activities at the project site known as Jay's Lucky Cleaners located at 3220-3224 long Beach Road, Oceanside, New York.

The HASP takes into account the specific hazards inherent to the site and presents the minimum requirements which are to be met by P.W. Grosser Consulting, Inc. (PWGC), its' subcontractors, and other on-site personnel in order to avoid and, if necessary, protect against health and/or safety hazards. PWGC sub-contractors will have the option of adopting this HASP or developing their own site-specific document. If a subcontractor chooses to prepare their own HASP, it must meet the minimum requirements as detailed in this HASP and must be made available to PWGC.

Activities performed under this HASP will comply with applicable parts of Occupational Safety and Health Administration (OSHA) Regulations, primarily 29 CFR Parts 1910 and 1926 and all other applicable federal, state, and local regulations. Modifications to the HASP may be made with the approval of the PWGC Health and Safety Manager (HSM) and/or Project Manager (PM). A copy of this HASP will be maintained on-site during all work activities.

Refusal to comply with the HASP or violation of any safety procedures by field personnel may result in their immediate removal from the site following consultation with the HSM and the Field Team Leader (FTL).

2.2 Scope

This HASP addresses the potential hazards related to the RI activities. The primary RI activities include the following:

- Site Mobilization/Demobilization;
- Soil Sampling, and
- Monitoring Well Installation

The potential hazards associated with this scope are listed below and are discussed in more detail in this HASP after the project organization and responsibilities section.

- Chemical Hazards
- Biological Hazards
- Physical Hazards

2.3 Application

The HASP applies to all personnel involved in the above tasks who wish to gain access to active work areas, including but not limited to:

- PWGC employees and subcontractors;
- Client representatives; and
- Federal, state or local representatives.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section specifies the project organization and responsibilities.

3.1 Project Manager

- Participates in major incident investigations;
- Ensures that the HASP has all of the required approvals before site work is conducted; and
- Has the overall project responsibility for project health and safety.

3.2 Field Team Leader (FTL)/ Site Health and Safety Officer (SHSO)

- Ensures that the HASP is implemented in conjunction with the Health and Safety Manager (HSM);
- Ensures that field work is scheduled with adequate equipment to complete the job safely;
- Enforces site health and safety rules;
- Ensures that proper personal protective equipment is utilized;
- Ensures that the HSM is informed of project changes that require modifications to the HASP;
- Ensures that the procedure modifications are implemented;
- Investigates incidents;
- Conducts the site safety briefing;
- Reports to HSM to provide summaries of field operations and progress; and
- Acts as Emergency Coordinator (EC).

3.3 Health and Safety Manager

- Provides for the development of the HASP;
- Serves as the primary contact to review health and safety matters that may arise;
- Approves individuals who are assigned SHSO responsibilities;
- Coordinates revisions of this HASP with field personnel; and
- Assists in the investigation of major accidents.

3.4 Site Personnel

- Report any unsafe or potentially hazardous conditions to the FTL/SHSO;
- Maintain knowledge of the information, instructions and emergency response actions contained in this HASP; and
- Comply with rules, regulations and procedures as set forth in this HASP and any revisions.

4.0 SITE HISTORY AND PROJECT DESCRIPTION

4.1 Project Background

This Health and Safety Plan (HASP) has been prepared by PWGC, on behalf of United Properties Corp. Volatile Organic Compounds (VOCs) have been identified above guidance levels and/or standards in groundwater at the site.

4.2 Site Location and Description

The site is located at 3220-3224 Long Beach Road, Oceanside, New York. The site consists of one (1) 1-story retail strip building with three retail units and front and side parking lots. The site is approximately 0.23 acres in area. The building was constructed in 1959.

The site is identified as Nassau County Section 43, Block 336, Lot 42. The site is bordered on the north by a commercial property, on the east by Long Beach Road, on the west by residential and commercial properties, and on the south by Montgomery Avenue.

5.0 POTENTIAL HAZARDS OF THE SITE

This section presents an assessment of the chemical, biological, and physical hazards that may be encountered during the tasks specified under Section 1.0. Additional information can be found in **Appendix A** - Safety Data Sheets or in **Appendix B** - Activity Hazard Analyses.

5.1 Chemical Hazards

Review of historical information from the site indicates that the groundwater at the site is contaminated with VOCs which are present at elevated levels in groundwater. These compounds may present an occupational exposure hazard during site operations.

The chemicals identified above may have an effect on the central nervous system, respiratory system and may cause chronic liver and kidney damage. Acute exposure symptoms may include headache, dizziness, nausea, diarrhea and skin and eye irritation. Specific information on the chemicals identified at the Site can be found in Table 5-1 as well as on the Safety Data Sheets found in Appendix A.

Table 5-1

Chemical Hazards

COMPOUND	CAS#	OSHA PEL	ROUTES OF EXPOSURE	SYMPTOMS OF EXPOSURE	TARGET ORGANS	PHYSICAL DATA
Acetone	64-64-1	TWA 1,000 mg/m^3	Inhalation Ingestion Skin/Eye	Irritation eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a fragrant, mint-like odor.
Tetracholorethene (PCE)	127-48-4	TWA 100 mg/m^3	Inhalation Ingestion Skin/Eye	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]	Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system	Colorless liquid with a mild, chloroform-like odor.
Trichloroethylene (TCE)	79-01-6	TWA 100 mg/m^3	Inhalation Ingestion Skin/Eye	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system	Colorless liquid (unless dyed blue) with a chloroform-like odor.
Cis-1,2-Dichloroethene	156-59-2	TWA 200 mg/m^3	Inhalation Ingestion Skin/Eye	Irritation eyes, respiratory system; central nervous system depression	Eyes, respiratory system, central nervous system	Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor.

Abbreviations

C = Ceiling limit, not to be exceeded
CNS = Central Nervous System
OSHA = Occupational Safety and Health Administration
ppm = parts per million
PEL=Permissible Exposure Limit
TWA = Time-weighted average (8 hours)

5.2 Biological Hazards

Work will be performed in a developed area of Oceanside, New York. During the course of the project, there is potential for workers to come into contact with biological hazards such as animals, insects and plants. The Activity Hazard Analyses found in **Appendix B** includes specific hazards and control measures for each task, if applicable.

5.2.1 *Animals*

The Site is located in a predominantly developed area. It is possible that dogs, cats, rats and mice may be present. Workers shall use discretion and avoid all contact with animals.

5.2.2 *Insects*

Insects, such as mosquitoes, ticks, bees and wasps may be present during certain times of the year. Workers will be encouraged to wear repellents and PPE, if deemed necessary, when working in areas where insects are expected to be present.

During the months of April through October, particular caution must be exercised to minimize exposure to deer ticks and the potential for contracting Lyme disease. Specific precautionary work practices that are recommended include the following:

- Cover your body as much as possible. Wear long pants and long sleeved shirts. Light color clothing makes spotting of ticks easier.
- Try to eliminate possible paths by which the Deer Tick may reach unprotected skin. For example, tuck bottoms of pants into socks or boots and sleeves into gloves. (Duct tape may be utilized to help seal cuffs and ankles). If heavy concentrations of ticks or insects are anticipated or encountered, Tyvek coveralls may be utilized for added protection when the potential for heat stress is not a concern.
- Conduct periodic and frequent, (e.g., hourly), surveys of your clothing for the presence of ticks. Remove any tick, save it and report to the clinic with the tick.
- Use insect /tick repellents that contain the chemical DEET (n,n-Diethyltoluamide). Apply repellents in accordance with manufacturers' recommendations. These repellents are readily available and include such brands as Deep Woods OFF and Maximum Strength OFF.

5.2.3 *Plants*

Poison ivy, sumac and oak may be present on site. The FTL/SHSO should identify the susceptible individuals. Worker shall avoid all contact with these plants.

5.3 Physical Hazards

Most safety hazards are discussed in the Activity Hazard Analyses (AHA) in **Appendix B** for the different phases of the project. In addition to the AHAs, general work rules and other safety procedures are described in Section 10 of this HASP.

5.3.1 *Temperature Extremes*

Heat Stress

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke.

Cold Stress

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia as well as slippery surfaces, brittle equipment, and poor judgment.

PWGC's Heat/Cold Stress Protocols are specified in **Appendix C**.

5.3.2 *Steam, Heat and Splashing*

Exposure to steam/heat/splashing hazards can occur during steam cleaning activities. Splashing can also occur during well development and sampling activities. Exposure to steam/heat/splashing can result in scalding/burns, eye injury, and puncture wounds.

5.3.3 *Noise*

Noise is a potential hazard associated with the operation of heavy equipment, drill rigs, pumps and engines. Workers will wear hearing protection while in the work zone when these types of machinery are operating.

5.3.4 *Fire and Explosion*

When conducting excavation or drilling activities, the opportunity of encountering fire and explosion hazards may exist from encountering underground utilities, from the use of diesel engine equipment, and other potential ignition sources. During dry periods there is an increased chance of forest and brush fires starting at the job site. If these conditions occur no smoking will be permitted at the site and all operations involving potential ignition sources will be monitored continuously (fire watch).

5.3.5 *Manual Lifting/Material Handling*

Manual lifting of heavy objects may be required. Failure to follow proper lifting technique can result in back injuries and strains. Back injuries are a serious concern as they are the most common work place injury, often resulting in lost or restricted work time, and long treatment and recovery periods.

5.3.6 *Slips, Trips and Falls*

Working in and around the site will pose slip, trip and fall hazards due to slippery surfaces that may be oil covered, or from rough terrain, surfaces that are steep inclines, surfaced debris, or surfaces which are wet from rain or ice. Falls may result in twisted ankles, broken bones, head trauma or back injuries.

5.3.7 *Heavy Equipment Operation*

An excavator/backhoe will be used to excavate where required. Working with or near heavy equipment poses many potential hazards, including electrocution, fire/explosion, being struck by or against, or pinched/caught/crushed by, and can result in serious physical harm.

5.3.8 *Electrocution*

Encountering underground utilities may pose electrical hazards to workers. Additionally, overhead electrical lines can be a concern during drilling operations. Potential adverse effects of electrical hazards include burns and electrocution, which could result in death.

6.0 ACTIVITY HAZARD ANALYSES

The Activity Hazard Analysis (AHA) is a systematic way of identifying the potential health and safety hazards associated with major phases of work on the project and the methods to avoid, control and mitigate those hazards. The AHAs will be used to train work crews in proper safety procedures during phase preparatory meetings.

AHAs have been developed by PWGC for the following phases of work:

1. Site Mobilization/Demobilization;
2. Soil and groundwater sampling; and
3. Monitoring well/vapor point installation

Copies of these AHAs are included in **Appendix B** of this HASP.

7.0 PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment (PPE) specified in **Table 7-1** represents the hazard analysis and PPE selection required by 29 CFR 1910.132. Specific information on known potential hazards can be found under Section 4.0 and **Appendix B** - Activity Hazard Analyses. For the purposes of PPE selection, the HSM and FTL/SHSO are considered competent persons. The signatures on the approval page of the HASP constitute certification of the hazard assessment. For activities not covered by **Table 7-1**, the FTL/SHSO will conduct the hazard assessment, select the PPE, and document changes in the appropriate field logs. PPE selection will be made in consultation with the HSM.

Modifications for initial PPE selection may also be made by the FTL/SHSO in consultation with the HSM and changes documented accordingly. If major modifications occur, the HSM will notify the PM.

7.1 PPE Abbreviations

HEAD PROTECTION
HH = Hard Hat

HEARING PROTECTION
EP = ear plugs
EM = ear muffs

HAND PROTECTION
Cot = cotton
But = Butyl
LWG = Leather Work Gloves
Neo = Neoprene
Nit = Nitrile
Sur = Surgical

EYE/FACE PROTECTION
APR = Full Face Air Purifying Respirator
MFS = Mesh Face shield
PFS =Plastic Face shield
SG = ANSI approved safety glasses with side shields

BODY PROTECTION
WC = work clothes
Cot Cov = Cotton Coveralls
Poly = Polyethylene coated Tyvek® coveralls
Saran = Saranex coated coveralls
Tyvek® = Uncoated Tyvek® coveralls

FOOT PROTECTION
Neo = Neoprene
OB = Overboot
Poly = polyethylene coated boot
Rub = rubber slush boots
STB = Leather work boots with steel toe

RESPIRATORY PROTECTION
APR = Full-face air purifying respirator with organic vapor cartridges
ASR = Full face air supplied respirator with escape bottle
SCBA = Self-contained breathing apparatus

7.2 Hazard Assessment for Selection of Personal Protective Equipment

The initial selection of personal protective equipment for each task was done by performing a hazard assessment taking into consideration the following:

- Potential chemical and physical present;
- Work operations to be performed;
- Potential routes of exposure;
- Concentrations of contaminants present; and
- Characteristics, capabilities and limitations of PPE and any hazard that the PPE presents or magnifies.

A review of the analytical data from previous sampling events indicates that VOCs identified in **Table 5-1** are the primary contaminants of concern.

The exposure routes for these chemicals are inhalation, skin absorption, skin/eye contact and ingestion. Chemical protective gloves will be required for all activities that involve sample handling and the likelihood for skin contact. The proper use of PPE and strict adherence to decontamination and personal hygiene procedures will effectively minimize skin contact and ingestion as potential routes of exposure.

Table 7-1

Personal Protective Equipment Selection

TASK	HEAD	EYE/FACE	FEET	HANDS	BODY	HEARING	RESPIRATOR
Mobilization/ Demobilization	HH	SG	STB	WG	WC	None	None
Monitoring Well / Vapor Point Installation	HH	SG	STB	WG, Nit & Sur as needed	WC, Tyvek® as needed	None	None initially APR if action levels exceeded
Soil and groundwater sampling	HH	SG	STB	WG, Nit & Sur as needed	WC, Tyvek® as needed	None	None initially APR if action levels exceeded
Decontamination	HH	SG	STB	Nit + Sur	WC, Tyvek® as needed	None	None initially APR if action levels exceeded

7.3 Respirator Cartridge Change-Out Schedule

A respirator cartridge change-out schedule has been developed in order to comply with 29 CFR 1910.134. If the use of respirators is necessary, the respirator cartridge change-out schedule for this project will be as follows:

1. Cartridges shall be removed and disposed of at the end of each shift, when cartridges become wet or wearer experiences breakthrough, whichever occurs first; and
2. If the humidity exceeds 85%, then cartridges shall be removed and disposed of after 4 hours of use.

Respirators shall not be stored at the end of the shift with contaminated cartridges left on. Cartridges shall not be worn on the second day, no matter how short of time period they were used the day before.

The schedule was developed based on the following scientific information and assumptions:

- Analytical data that is available regarding site contaminants;
- Using the Rule of Thumb provided by the AIHA;
- All of the chemicals have boiling points greater than 70 degrees C;
- Total airborne concentration of contaminants is anticipated to be less than 200 ppm;
- The humidity is expected to be less than 85%; and
- Desorption of the contaminants (including those with poor warning properties) after partial use of the chemical cartridge can occur after a short period (hours) without use (eg, overnight) and result in a non-use exposure.

The following is a partial list of factors that may affect the usable cartridge service life and/or the degree of respiratory protection attainable under actual workplace conditions. These factors have been considered when developing the cartridge change-out schedule.

Type of contaminant(s);

- Contaminant concentration;
- Relative humidity;
- Breathing rate; Temperature; Changes in contaminant concentration, humidity, breathing rate and temperature;
- Mixtures of contaminants;
- Accuracy in the determination of the conditions;
- The contaminant concentration in the workplace can vary greatly. Consideration must be given to the quality of the estimate of the workplace concentration;
- Storage conditions between multiple uses of the same respirator cartridges. It is recommended that the chemical cartridges be replaced after each work shift. Contaminants adsorbed on a cartridge can migrate through the carbon bed without airflow;

- Age of the cartridge;
- Condition of the cartridge and respirator;
- Respirator and cartridge selection respirator fit;
- Respirator assembly, operation, and maintenance;
- User training, experience and medical fitness;
- Warning properties of the contaminant; and
- The quality of the warning properties should be considered when establishing the chemical cartridge change schedule. Good warning properties may provide a secondary or back-up indication for cartridge change-out.

8.0 AIR MONITORING

Air monitoring will be performed for protection for on-site workers and 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 the site. Air monitoring will be used to help to confirm that the remedial work will not spread contamination off-site through the air. The primary concerns for this site are dust particulates and VOCs. Site monitoring with a photo-ionization detector (PID) will be performed during any invasive activities.

Real-time monitoring for dust and VOCs will be conducted both within the work area, and along the site perimeter, during intrusive activities such as excavation and drilling activities.

Detailed information on the types, frequency and location of real-time monitoring and community air monitoring requirements are provided in the Community Air Monitoring Plan prepared for this project.

9.0 ZONES, PROTECTION AND COMMUNICATION

9.1 Site Control

Site zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas. A three-zone approach will be utilized. It shall include an Exclusion Zone (EZ), Contamination Reduction Zone (CRZ) and a Support Zone (SZ). Specific zones shall be established on the work site when operations begin.

This project is a hazardous waste remediation project, and any person working in an area where the potential for exposure to site contaminants exists, will only be allowed access after providing the FTL/SHSO with proper training and medical documentation.

The zones are based upon current knowledge of proposed site activities. It is possible that the zone configurations may be altered due to work plan revisions. Should this occur, the work zone will be adjusted accordingly, and documented through use of a field-change request form.

The following shall be used for guidance in revising these preliminary zone designations, if necessary.

Support Zone - The SZ is an uncontaminated area that will be the field support area for most operations. The SZ provides for field team communications and staging for emergency response. Appropriate safety equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples.

Contamination Reduction Zone - The CRZ is established between the EZ and the SZ. The CRZ contains the contamination reduction corridor and provides for an area for decontamination of personnel and portable hand-held equipment, tools and heavy equipment. A personnel decontamination area will be prepared at each exclusion zone. The CRZ will be used for EZ entry and egress in addition to access for heavy equipment and emergency support services.

Exclusion Zone - All activities, which may involve exposure to site contaminants, hazardous materials and/or conditions, should be considered an EZ. The FTL/SHSO may establish more than one EZ where different levels of protection may be employed or different hazards exist. The size of the EZ shall be determined by the site HSO allowing adequate space for the activity to be completed, field members and emergency equipment.

9.2 Contamination Control

Decontamination areas will be established for drilling/sampling activities.

9.2.1 *Personnel Decontamination Station*

All personnel and portable equipment used in the EZ shall be subject to a thorough decontamination process, as deemed necessary by the FTL/SHSO. Sampling equipment shall be decontaminated. As necessary, all boots and gloves will be decontaminated using soap and water solution and scrub brushes or simple removal and disposal.

All used respiratory protective equipment will be decontaminated daily and sanitized with appropriate sanitizer solution.

All drums generated as a result of sampling and decontamination activities will be marked and stored at a designated area at the site until the materials can be property disposed of off-site.

All non-expendable sampling equipment will be decontaminated. This usually entails the use of Alconox, solvent and distilled/deionized water rinses to eliminate contaminants.

9.3 Communication

- Each team member will have a cell phone/radio for communication with the PM, HSO and other team members during field activities.
- Hand Signals - Hand signals shall be used by field teams, along with the buddy system. The entire field team shall know them before operations commence and their use covered during site-specific training. Typical hand signals are the following:

SIGNAL	MEANING
Hand gripping throat	Out of air, can't breathe
Grip on a partner's wrist or placement of both hands around a partner's waist.	Leave the area immediately, no debate.
Hands on top of head	Need assistance
Thumbs up	Okay, I'm all right, I understand.
Thumbs down	No, negative.

10.0 MEDICAL SURVEILLANCE PROCEDURES

All contractor and subcontractor personnel performing field work where potential exposure to contaminants exists at the site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120(f).

10.1 Medical Surveillance Requirements

A physician's medical release for work will be confirmed by the HSM before an employee can work in the exclusion zone. The examination will be taken annually at a minimum and upon termination of hazardous waste site work if the last examination was not taken within the previous six months. Additional medical testing may be required by the HSM in consultation with the Corporate Medical Consultant and the FTL/SHSO if an over-exposure or accident occurs, if an employee exhibits symptoms of exposure, or if other site conditions warrant further medical surveillance.

10.2 Medical Data Sheet

A medical data sheet is provided in **Appendix D**. This medical data sheet is voluntary and should be completed by all on-site personnel and will be maintained at the site. Where possible, this medical data sheet will accompany the personnel needing medical assistance. The medical data sheet will be maintained in a secure location, treated as confidential, and used only on a need-to-know basis.

11.0 SAFETY CONSIDERATIONS

11.1 General Health and Safety Work Practices

A list of general health and safety work practices is included as an included in **Appendix E**. The work rules will be posted in a conspicuous location at the site.

11.2 The Buddy System

At a minimum, employees shall work in groups of two in such a manner that they can observe each other and maintain line-of-sight for each employee within the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

11.3 Sample Handling

Personnel responsible for the handling of samples should wear the prescribed level of protection. Samples should be identified as to their hazard and packaged as to prevent spillage or breakage. Sample containers shall be decontaminated in the CRZ or EZ before entering a clean Support Zone area. Any unusual sample conditions, odors, or real-time readings should be noted. Laboratory personnel should be advised of sample hazard level and the potential contaminants present. This can be accomplished by a phone call to the lab coordinator and/or including a written statement with the samples reviewing lab safety procedures in handling, in order to assure that the practices are appropriate for the suspected contaminants in the sample.

11.4 Excavation

Excavations will be conducted in accordance with the requirements contained in 29 CFR 1926, Subpart P-Excavations. It provides for the designation of a "Competent Person" and general requirements for safe excavating practices. The program also incorporates company standards for the monitoring of potentially hazardous atmospheres; protection from water hazards; analyzing and maintaining the stability of adjacent structures; daily competent person inspections; soil classification; sloping and benching; protective systems, including fall protection; and training.

The Competent Person will be the FTL or other designee with appropriate training and experience. The Competent Person will be assisted in his/her duties by other technical personnel such as the HSM, geologists, structural engineers and soils engineers.

No entry into excavations will be allowed for this phase of the project.

12.0 DISPOSAL PROCEDURES

All discarded materials, waste materials or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard or causing litter to be left on site.

All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary, labeled and segregated for disposal. All non-contaminated materials will be collected and bagged for appropriate disposal as non-hazardous solid waste. Additional waste disposal procedures may be developed as applicable.

13.0 EMERGENCY RESPONSE PLAN

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff is essential. Specific elements of emergency support procedures which are addressed in the following subsections include communications, local emergency support units, preparation for medical emergencies, first aid for injuries incurred on site, record keeping, and emergency site evacuation procedures.

13.1 Responsibilities

13.1.1 *Health and Safety Manager (HSM)*

The HSM oversees and approves the Emergency Response/Contingency Plan and performs audits to determine that the plan is in effect and that all pre-emergency requirements are met. The HSM acts as a liaison to applicable regulatory agencies and notifies OSHA of reportable accidents.

13.1.2 *Field Team Leader/Site Health and Safety Officer (FOL/HSO)*

The FTL/SHSO is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The FTL/SHSO is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSM can ensure that OSHA is notified within the required time frame. The HSM will be notified of all OSHA recordable injuries, fires, spills, releases or equipment damage in excess of $500 within 24 hours.

13.1.3 *Emergency Coordinator (EC)*

The Emergency Coordinator (EC) for the project is the FTL/SHSO.

The EC shall make contact with Local Emergency Response personnel prior to beginning work on site. In these contacts the EC will inform interested parties about the nature and duration of work expected on the site and the type of contaminants and possible health or safety effects of emergencies involving these contaminants. The EC will locate emergency phone numbers and identify hospital routes prior to beginning work on site. The EC shall make necessary arrangements to be prepared for any emergencies that could occur.

The EC will implement the Emergency Response/Contingency Plan whenever conditions at the site warrant such action.

13.1.4 *Site Personnel*

Site personnel are responsible for knowing the Emergency Response/Contingency Plan and the procedures contained herein. Personnel are expected to notify the EC of situations that could constitute a site emergency.

13.2 Communication

A variety of communication systems may be utilized during emergency situations. These are discussed in the following sections.

13.2.1 *Hand Signals*

Downrange field teams will employ hand signals where necessary for communication during emergency situations. Hand signals are found in Section 8.3.

13.2.2 *Field Radios and Cell Phones*

PWGC field personnel are provided cellular phones for site communication and emergency use.

13.3 Local Emergency Support Units

A route map from the site to the nearest hospital can be found in **Appendix F**. This map will be placed with the above emergency telephone numbers in all on-site vehicles.

13.4 Pre-Emergency Planning

PWGC will communicate directly with administrative personnel from the emergency room at the hospital to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from exposure to any of the contaminants expected to be found on the site. Instructions for finding the hospital will be posted conspicuously in the site office and in each site vehicle.

Before the field activities begin, the local emergency response personnel will be notified of the schedule for field activities and about the materials that are thought to exist on the site so that they will be able to respond quickly and effectively in the event of a fire, explosion, or other emergency. Before fieldwork on the site commences, each person who will be working there or observing the operations will complete a medical data sheet (**Appendix D**). These data sheets will be filled out during site-specific training and will be kept on the site.

In the event of an incident where a team member becomes exposed or suffers from an acute symptom of exposure to site materials and has to be taken to a hospital, a copy of his/her medical data sheet will be presented to the attending physician.

Table 13-1

Emergency Telephone Numbers

Contact	Firm or Agency	Telephone Number
Police		911
Fire		911
Hospital	South Nassau Community Hospital	(877) 768-8462 or (516) 763-3052
Ambulance		911
Project Manager/Health and Safety Manager	Kris Almskog PWGC	(631) 589-6353
Health & Safety Officer	Jessica Ferngren PWGC	(631) 589-6353
NYSDEC Site Contact	Jahan Reza, Project Manager	(631) 444-0242
Poison Control Center		(800) 962-1253
Chemtrec		(800) 424-9300

13.5 Emergency Medical Treatment

The procedures and rules in this HASP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the FTL/SHSO immediately. First aid equipment will be available on site at the following locations:

- First Aid Kit: Support Zone (or designated by FTL/SHSO upon arrival)
- Emergency Eye Wash: Support Zone (or designated by FTL/SHSO upon arrival)

During site-specific training, project personnel will be informed of the location of the first aid station(s) that has been set up. Unless they are in immediate danger, severely injured persons will not be moved until paramedics can attend to them. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. Any

first aid instructions that can be obtained from doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

There will be at least two people with current First Aid and CPR certification on each active work shift. When personnel are transported to the hospital, the FTL/SHSO will provide a copy of the Medical Data Sheet to the paramedics and treating physician.

Only in non-emergency situations will an injured person be transported to the hospital by means other than an ambulance. **A map and directions to the hospital can be found in Appendix F.**

13.6 Emergency Site Evacuation Routes and Procedures

In order to mobilize the manpower resources and equipment necessary to cope with a fire or other emergency, a clear chain of authority will be established. The EC will take charge of all emergency response activities and dictate the procedures that will be followed for the duration of the emergency. The EC will report immediately to the scene of the emergency, assess the seriousness of the situation, and direct whatever efforts are necessary until the emergency response units arrive. At his/her discretion, the EC also may order the closure of the site for an indefinite period.

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs, including but not limited to fire, explosion or significant release of toxic gas into the atmosphere, an air horn will be sounded on the site. The horn will sound continuously for one blast, signaling that immediate evacuation of all personnel is necessary due to an immediate or impending danger. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the evacuation meeting point, which will be determined upon arrival at the site by the FTL/SHSO, prior to work beginning. This will then be conveyed to all crew members during the site-specific briefing.

The EC will give directions for implementing whatever actions are necessary. Any project team member may be assigned to be in charge of emergency communications during an emergency. He/she will attend the site telephone specified by the EC from the time the alarm sounds until the emergency has ended.

After sounding the alarm and initiating emergency response procedures, the EC will check and verify that access roads are not obstructed. If traffic control is necessary, as in the event of a fire or explosion, a project team member, who has been trained in these procedures and designated at the site safety meeting, will take over these duties until local police and fire fighters arrive.

The EC will remain at the site to provide any assistance requested by emergency-response squads as they arrive to deal with the situation. A map showing evacuation routes, meeting places and the location of emergency equipment will be posted in all trailers and used during site-specific training.

13.7 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site (air horn will sound for a single continuous blast), and notification of local fire and police departments. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

13.7.1 *Fire Prevention*

Adhering to the following precautions will prevent fires:

- Good housekeeping and storage of materials;
- Storage of flammable liquids and gases away from oxidizers;
- No smoking in the exclusion zone or any work area;
- No hot work without a properly executed hot work permit;
- Shutting off engines to refuel;
- Grounding and bonding metal containers during transfer of flammable liquids;
- Use of UL approved flammable storage cans;
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities; and
- Monthly inspections of all fire extinguishers.

13.8 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Safety Data Sheet or recommended by the Corporate Medical Consultant will be followed, when necessary.

SKIN AND EYE CONTACT: Use copious amounts of soap and water. Wash/rinse affected areas thoroughly, and then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination. Skin should also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs.

INHALATION: Move to fresh air. Decontaminate and transport to hospital or local medical provider.

INGESTION: Decontaminate and transport to emergency medical facility.

PUNCTURE WOUND OR LACERATION: Decontaminate and transport to emergency medical facility.

13.9 Decontamination during Medical Emergencies

If emergency life-saving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or postponed. The FTL/SHSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination, when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on-site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then

be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed.

13.10 Accident/Incident Reporting

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone:

- Health and Safety Manager;
- Project Manager; and
- The employer of any injured worker who is not a PWGC employee.

Written confirmation of verbal reports are to be completed by the FTL/SHSO using the Incident Report Form and submitted within 24 hours. The incident report and investigation form is found in **Appendix G**. If the employee involved is not a PWGC employee, his employer will receive a copy of the report.

13.11 Adverse Weather Conditions

In the event of adverse weather conditions, the FTL/SHSO will determine if work can continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries;
- Potential for cold stress and cold-related injuries;
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds);
- Limited visibility (fog);
- Potential for electrical storms;
- Earthquakes; and
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The FTL/SHSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

13.12 Spill Control and Response

All small hazardous spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. Drains or

drainage areas should be blocked. All spill containment materials will be properly disposed. An exclusion zone around the spill area should be established depending on the size of the spill in accordance with the latest USDOT Emergency Response Guide Book. The following seven steps should be taken by the EC:

- Determine the nature, identity and amounts of major spill components;
- Make sure all unnecessary persons are removed from the spill area;
- Notify appropriate response teams and authorities;
- Use proper PPE in consultation with the FTL/SHSO;
- If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosive proof equipment to contain or clean up the spill (diesel only vehicles, air operated pumps, etc.);
- If possible, try to stop the leak with appropriate material; and,
- Remove all surrounding materials that can react or compound with the spill.

13.13 Emergency Equipment and Kits

The following minimum emergency equipment and kits shall be kept and maintained on-site:

- Industrial first aid kit;
- Burn kit and portable eye washes (one per field team);
- Fire extinguishers (one per work area); and
- Absorbent material /spill kit.

14.0 TRAINING

14.1 General Health and Safety Training

In accordance with PWGC corporate policy, and pursuant to 29 CFR 1910.120, hazardous waste site workers shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations unless otherwise noted in the above reference. At a minimum, the training shall have consisted of instruction in the topics outlined in the standard. Personnel who have not met the requirements for initial training shall not be allowed to work in any site activities in which they may be exposed to hazards (chemical or physical).

14.1.1 *Three Day Supervised On the Job Training*

In addition to the required initial hazardous waste operations training, each employee shall have received three days of directly supervised on-the-job training. This training will address the duties the employees are expected to perform.

14.2 Annual Eight-Hour Refresher Training

Annual eight-hour refresher training will be required of all hazardous waste site field personnel in order to maintain their qualifications for fieldwork. The training will cover a review of 1910.120 requirements and related company programs and procedures.

14.3 Site-Specific Training

Prior to commencement of field activities, all field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the site operations. It will include site and facility layout, hazards and emergency services at the site, and will highlight all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

14.4 On-Site Safety Briefings

Project personnel and visitors will be given on-site health and safety briefings daily by the FTL/SHSO to assist site personnel in safely conducting their work activities. A copy of the Daily Briefing Sign-In Sheet is contained in **Appendix H**. The briefings will include information on new operations to be conducted, changes in work practices or changes in the site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. The meetings will also be an opportunity to periodically update the crews on monitoring results. Prior to starting any new activity, a training session using the Activity Hazard Analysis will be held for crew members involved in the activity.

14.5 First Aid and CPR

The HSM will identify those individuals requiring first aid and CPR training to ensure that emergency medical treatment is available during field activities. It is anticipated that a minimum of one field person on-site at any one

time will have first aid and CPR training. The training will be consistent with the requirements of the American Red Cross Association or American Heart Association. If none are available on-site, then the HSM shall be notified.

14.6 Supervisory Training

Supervisors and health and safety personnel shall have completed an additional eight hours of specialized training in accordance with 29 CFR 1910.120.

15.0 LOGS, REPORTS AND RECORDKEEPING

Changes to the HASP will be documented in the Health and Safety log book and as appropriate, the HSM and/or PM will be notified. Daily tailgate meetings will be documented in the H&S log book as well as personnel on-site.

15.1 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training and documentation of three day OJT) and medical clearance for hazardous waste site work and respirator use will be maintained on-site. Records for all subcontractor employees will also be kept on-site.

15.2 Incident Report and Investigation Form

The incident report and investigation form is to be completed for all accidents and incidents, including near misses. The form can be found in **Appendix G**.

15.3 Health and Safety Logbooks

The FTL/SHSO will maintain a logbook during site work. The daily site conditions, personnel, monitoring results and significant events will be recorded. The original logbooks will become part of the exposure records file.

16.0 FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have read, or have been informed of, and understand the provisions of the HASP. It is maintained on site by the FTL/SHSO as a project record. Each field team member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read, or have been informed of, the Health and Safety Plan and understand the information presented. I will comply with the provisions contained therein.

Name (Print and Sign)	***Date***

Appendix A
Safety Data Sheets

SAFETY DATA SHEET

Version 3.17
Revision Date 06/04/2015
Print Date 06/16/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Acetone

Product Number : 650501
Brand : Sigma-Aldrich
Index-No. : 606-001-00-8

CAS-No. : 67-64-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Repeated exposure may cause skin dryness or cracking.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	C_3H_6O
Molecular weight	:	58.08 g/mol
CAS-No.	:	67-64-1
EC-No.	:	200-662-2
Index-No.	:	606-001-00-8
Registration number	:	01-2119471330-49-XXXX

Hazardous components

Component	Classification	Concentration
Acetone		
	Flam. Liq. 2; Eye Irrit. 2A; STOT SE 3; H225, H319, H336	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Acetone	67-64-1	TWA	500.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Hematologic effects Upper Respiratory Tract irritation Eye irritation Adopted values or notations enclosed are those for which changes are proposed in the NIC		

		See Notice of Intended Changes (NIC) Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	500 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Hematologic effects Upper Respiratory Tract irritation Eye irritation Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	750.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Hematologic effects Upper Respiratory Tract irritation Eye irritation Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	750 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Hematologic effects Upper Respiratory Tract irritation Eye irritation Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	1,000.000000 ppm 2,400.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	250.000000 ppm 590.000000 mg/m3	USA. NIOSH Recommended Exposure Limits

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Acetone	67-64-1	Acetone	50.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Skin contact	Long-term systemic effects	186mg/kg BW/d
Consumers	Ingestion	Long-term systemic effects	62mg/kg BW/d
Consumers	Skin contact	Long-term systemic effects	62mg/kg BW/d
Workers	Inhalation	Acute systemic effects	2420 mg/m3
Workers	Inhalation	Long-term systemic effects	1210 mg/m3
Consumers	Inhalation	Long-term systemic effects	200 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Soil	33.3 mg/kg
Marine water	1.06 mg/l
Fresh water	10.6 mg/l
Marine sediment	3.04 mg/kg
Fresh water sediment	30.4 mg/kg
Onsite sewage treatment plant	100 mg/l

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators

and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -94 °C (-137 °F)
f)	Initial boiling point and boiling range	56 °C (133 °F) at 1,013 hPa (760 mmHg)
g)	Flash point	-16.99 °C (1.42 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 13 %(V) Lower explosion limit: 2 %(V)
k)	Vapour pressure	533.3 hPa (400.0 mmHg) at 39.5 °C (103.1 °F) 245.3 hPa (184.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	0.791 g/mL at 25 °C (77 °F)
n)	Water solubility	completely miscible
o)	Partition coefficient: n-octanol/water	log Pow: -0.24
p)	Auto-ignition temperature	465.0 °C (869.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	23.2 mN/m at 20.0 °C (68.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Bases, Oxidizing agents, Reducing agents, Acetone reacts violently with phosphorous oxychloride.

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 5,800 mg/kg
Remarks: Behavioral:Altered sleep time (including change in righting reflex). Behavioral:Tremor. Behavioral:Headache. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

LC50 Inhalation - Rat - 8 h - 50,100 mg/m3
Remarks: Drowsiness Dizziness Unconsciousness

LD50 Dermal - Guinea pig - 7,426 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitisation
- Guinea pig
Result: Does not cause skin sensitisation.

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: AL3150000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Kidney - Irregularities - Based on Human Evidence
Skin - Dermatitis - Based on Human Evidence
Kidney - Irregularities - Based on Human Evidence
Skin - Dermatitis - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 5,540 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 8,800 mg/l - 48 h
Toxicity to algae	Remarks: No data available

12.2 Persistence and degradability

Biodegradability: Result: 91 % - Readily biodegradable
(OECD Test Guideline 301B)

12.3 Bioaccumulative potential

Does not bioaccumulate.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1090 Class: 3 Packing group: II
Proper shipping name: Acetone
Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1090 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: ACETONE

IATA
UN number: 1090 Class: 3 Packing group: II
Proper shipping name: Acetone

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Acetone	67-64-1	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Acetone	67-64-1	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Acetone	67-64-1	2007-03-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.17 Revision Date: 06/04/2015 Print Date: 06/16/2015

SAFETY DATA SHEET

Version 4.3
Revision Date 03/05/2015
Print Date 06/16/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : cis-Dichloroethylene

Product Number : 48597
Brand : Supelco
Index-No. : 602-026-00-3

CAS-No. : 156-59-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Inhalation (Category 4), H332
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H332 Harmful if inhaled.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312	Call a POISON CENTER or doctor/ physician if you feel unwell.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	C2H2Cl2
Molecular weight	:	96.94 g/mol
CAS-No.	:	156-59-2
EC-No.	:	205-859-7
Index-No.	:	602-026-00-3

Hazardous components

Component	Classification	Concentration
cis-Dichloroethylene		
	Flam. Liq. 2; Acute Tox. 4; Aquatic Acute 3; Aquatic Chronic 3; H225, H332, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

Handle and store under inert gas. Air and moisture sensitive. Light sensitive.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
cis-Dichloroethylene	156-59-2	TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Eye irritation		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: light yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	-80.0 °C (-112.0 °F)
f)	Initial boiling point and boiling range	60.0 - 61.0 °C (140.0 - 141.8 °F)
g)	Flash point	6.0 °C (42.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.28 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available

r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LC50 Inhalation - Rat - 13700 ppm
Remarks: Behavioral:Somnolence (general depressed activity). Liver:Fatty liver degeneration.

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KV9420000

narcosis, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene

Poison Inhalation Hazard: No

IMDG
UN number: 1150 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: 1,2-DICHLOROETHYLENE

IATA
UN number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H332	Harmful if inhaled.
H402	Harmful to aquatic life.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	1

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.3 Revision Date: 03/05/2015 Print Date: 06/16/2015

SAFETY DATA SHEET

Version 4.5
Revision Date 06/10/2015
Print Date 06/16/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Tetrachloroethylene

Product Number : 371696
Brand : Sigma-Aldrich
Index-No. : 602-028-00-4

CAS-No. : 127-18-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Skin sensitisation (Category 1), H317
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.
H351 Suspected of causing cancer.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Perchloroethylene PCE
Formula	:	C_2Cl_4
Molecular weight	:	165.83 g/mol
CAS-No.	:	127-18-4
EC-No.	:	204-825-9
Index-No.	:	602-028-00-4

Hazardous components

Component	Classification	Concentration
Tetrachloroethylene		
	Skin Irrit. 2; Eye Irrit. 2A; Skin Sens. 1; Carc. 2; STOT SE 3; Aquatic Acute 2; Aquatic Chronic 2; H315, H317, H319, H336, H351, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Move out of dangerous area.Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Tetrachloroethylene	127-18-4	TWA	25.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		
		STEL	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		
		Potential Occupational Carcinogen Minimize workplace exposure concentrations. See Appendix A		
		See Table Z-2		
		TWA	100.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		CEIL	200.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Peak	300.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Tetrachloroethylene	127-18-4	Tetrachloroethylene	3ppm	In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)
	Remarks	Prior to shift (16 hours after exposure ceases)			
		Tetrachloroethylene	0.5000 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
		Prior to shift (16 hours after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 49 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -22 °C (-8 °F) - lit.
f)	Initial boiling point and boiling range	121 °C (250 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	25.3 hPa (19.0 mmHg) at 25.0 °C (77.0 °F) 17.3 hPa (13.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.623 g/cm3 at 25 °C (77 °F)
n)	Water solubility	0.15 g/l at 25 °C (77 °F)
o)	Partition coefficient: n-octanol/water	log Pow: 2.53 at 23 °C (73 °F)
p)	Auto-ignition temperature	No data available
q)	Decomposition	No data available

	temperature	
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	32.1 mN/m at 20 °C (68 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Strong bases

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - female - 3,005 mg/kg
(OECD Test Guideline 401)

LC50 Inhalation - Rat - male and female - 6 h - 28 mg/l

LD50 Dermal - Rabbit - 5,000 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation
- Mouse
Result: May cause sensitisation by skin contact.
(OECD Test Guideline 429)

Germ cell mutagenicity
Hamster
ovary
Result: negative

OECD Test Guideline 474
Mouse - male
Result: negative

Carcinogenicity

Limited evidence of carcinogenicity in animal studies

IARC:	2A - Group 2A: Probably carcinogenic to humans (Tetrachloroethylene)
NTP:	Reasonably anticipated to be a human carcinogen (Tetrachloroethylene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information

Repeated dose toxicity - Mouse - female - Oral - Lowest observed adverse effect level - 390 mg/kg
RTECS: KX3850000

narcosis, Liver injury may occur., Kidney injury may occur.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 5 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 7.50 mg/l - 48 h
Toxicity to algae	static test EC50 - Skeletonema costatum - > 16 mg/l - 7 h

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 11 % - Not readily biodegradable. (OECD Test Guideline 301C)

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 21 d - 0.00343 mg/l Bioconcentration factor (BCF): 49

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1897 Class: 6.1 Packing group: III
Proper shipping name: Tetrachloroethylene
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1897 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TETRACHLOROETHYLENE
Marine pollutant: yes

IATA
UN number: 1897 Class: 6.1 Packing group: III
Proper shipping name: Tetrachloroethylene

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Tetrachloroethylene	127-18-4	2007-07-01

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Tetrachloroethylene	127-18-4	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Tetrachloroethylene	127-18-4	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Tetrachloroethylene	127-18-4	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Tetrachloroethylene	127-18-4	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity

Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.5 Revision Date: 06/10/2015 Print Date: 06/16/2015

SAFETY DATA SHEET

Version 4.6
Revision Date 03/02/2015
Print Date 06/16/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Trichloroethylene

Product Number : 251402
Brand : Sigma-Aldrich
Index-No. : 602-027-00-9

CAS-No. : 79-01-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.
H341 Suspected of causing genetic defects.
H350 May cause cancer.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear eye protection/ face protection.
P280	Wear protective gloves.
P281	Use personal protective equipment as required.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	TCE Trichloroethene
Formula	:	C_2HCl_3
Molecular weight	:	131.39 g/mol
CAS-No.	:	79-01-6
EC-No.	:	201-167-4
Index-No.	:	602-027-00-9

Hazardous components

Component	Classification	Concentration
Trichloroethylene Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Skin Irrit. 2; Eye Irrit. 2A; Muta. 2; Carc. 1B; STOT SE 3; Aquatic Acute 3; Aquatic Chronic 3; H315, H319, H336, H341, H350, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Light sensitive. Handle and store under inert gas.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Trichloroethylene	79-01-6	TWA	10.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment cognitive decrement Renal toxicity Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Suspected human carcinogen		
		STEL	25.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment cognitive decrement Renal toxicity Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Suspected human carcinogen		
		Potential Occupational Carcinogen See Appendix C See Appendix A		
		See Table Z-2		
		TWA	100.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967		
		CEIL	200.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967		
		Peak	300.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Trichloroethylene	79-01-6	Trichloroacetic acid	15.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			
		Trichloroethanol	0.5000 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			
		Trichloroethylene		In blood	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			
		Trichloroethylene		In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -84.8 °C (-120.6 °F) - lit.
f)	Initial boiling point and boiling range	86.7 °C (188.1 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower	Upper explosion limit: 10.5 %(V)

	flammability or explosive limits	Lower explosion limit: 8 %(V)
k)	Vapour pressure	81.3 hPa (61.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.463 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 2.29log Pow: 5
p)	Auto-ignition temperature	410.0 °C (770.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Oxidizing agents, Strong bases, Magnesium

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 4,920 mg/kg

LC50 Inhalation - Mouse - 4 h - 8450 ppm

LD50 Dermal - Rabbit - > 20,000 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Severe skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.
In vitro tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	1 - Group 1: Carcinogenic to humans (Trichloroethylene)
NTP:	Reasonably anticipated to be a human carcinogen (Trichloroethylene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KX4550000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Exposure to and/or consumption of alcohol may increase toxic effects., Gastrointestinal disturbance, Kidney injury may occur., narcosis
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 41 mg/l - 96.0 h
	LOEC - other fish - 11 mg/l - 10.0 d
	NOEC - Oryzias latipes - 40 mg/l - 10.0 d
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 18.00 mg/l - 48 h
Toxicity to algae	IC50 - Pseudokirchneriella subcapitata (green algae) - 175.00 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Does not bioaccumulate.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

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

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1710 Class: 6.1 Packing group: III
Proper shipping name: Trichloroethylene
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1710 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TRICHLOROETHYLENE

IATA
UN number: 1710 Class: 6.1 Packing group: III
Proper shipping name: Trichloroethylene

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Trichloroethylene	CAS-No. 79-01-6	Revision Date 2011-09-01
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.	CAS-No. 79-01-6	Revision Date 2011-09-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H402	Harmful to aquatic life.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6 Revision Date: 03/02/2015 Print Date: 06/16/2015

Appendix B
Activity Hazard Analyses

Project Identification Jay's Lucky Cleaners	**Location** 3220-3224 Long Beach Road, Oceanside, New York	**Estimated Dates** TBD
Phase of Work Mobilization/ Demobilization	**Page 1 of 1**	**Analysis Approved by** Kris Almskog, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1. Mobilization and demobilization of equipment site tools, personnel	Slips/trips/falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and • Mark and repair if possible tripping hazards.
	Manual lifting and material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting devices.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and • Stay in visual and verbal contact with your buddy.
	Vehicular traffic	• Spotters will be used when backing up trucks and heavy equipment and when moving equipment.
	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1; • Ground personnel will stay clear of suspended loads; • Equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects; and • Overhead hazards will be identified prior to commencing work operations.
	Noise	• Ear plugs or ear muffs shall be worn for operations that exceed 85 decibels.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.
	Biological hazards	• Be alert to the presence of biological hazards; • Wear insect repellent; • Follow procedures in Section 4.2.2 for tick bites; • FTL/SHSO should be aware of on-site personnel with allergic reactions in insect bites and stings.

Project Identification	**Location**	**Estimated Dates**
Jay's Lucky Cleaners	3220-3224 Long Beach Road, Oceanside, New York	TBD
Phase of Work	**Page 1 of 2**	**Analysis Approved by**
Drilling		Kris Almskog, PM/HSM

TASKS	HAZARDS	CONTROL MEASURES
1. Drill to required depths and collect soil samples/install wells.	Chemical hazards	• Wear appropriate PPE per Table 6-1; • Perform air monitoring per Community Air Monitoring Plan; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Hand and power tool usage	• Equip electrical equipment with GFCI's; • Inspect electrical equipment and tools prior to use; • Daily inspections will be performed; • Remove broken or damaged tools from service; • Use the tool for its intended purpose; • Use in accordance with manufacturer instructions; and Tag and remove defective equipment.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and, • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting devices.
	Fire/Explosion	• ABC type fire extinguishers shall be readily available; • No smoking in work area.
	Biological hazards	• Be alert to the presence of biological hazards; • Wear insect repellent; • Follow procedures in Section 4.2.2 for tick bites; • FTL/SHSO should be aware of on-site personnel with allergic reactions in insect bites and stings.
	Heavy equipment	• Ground personnel will stay clear of suspended loads; • Ground personnel will stay out of the swing radius; • Eye contact with operators will be made before approaching equipment; • Equipment will not be approached on blind sides; • Equipment will be equipped with backup alarms or spotters shall be used.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and mark and repair if possible tripping hazards are present.

	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.

Project Identification	Location	Estimated Dates
Jay's Lucky Cleaners	3220-3224 Long Beach Road, Oceanside, New York	TBD
Phase of Work	**Page 1 of 1**	**Analysis Approved by**
Drilling		Kris Almskog, PM/HSM

TASKS	HAZARDS	CONTROL MEASURES
	Noise	• Hearing protection mandatory at or above 85 dBA. • Instruct personnel how to properly wear heating protective devices. •Disposable ear plugs or other hearing protection required when working near noisy equipment..
	Steam/Heat/Splashing	• Use face shield and safety glasses or goggles; • Stay out of the splash/steam radius; • Do not direct steam at anyone; • Do not hold objects with your foot and steam area near it; • Direct spray to minimize spread of constituents of concern; and • Use shielding as necessary.
	Excavation hazards	• Follow 29 CFR 1926 Subpart P.
	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1; • Ground personnel will stay clear of suspended loads; • Equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects; and • Overhead hazards will be identified prior to commencing work operations.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.

Project Identification	**Location**	**Estimated Dates**
Jay's Lucky Cleaners	3220-3224 Long Beach Road, Oceanside, New York	TBD
Phase of Work	**Page 1 of 1**	**Analysis Approved by**
Soil/Groundwater Sampling		Kris Almskog, PM/HSM

TASKS	HAZARDS	CONTROL MEASURES
1. Collect soil samples.	Chemical hazards	• Wear appropriate PPE per Table 6-1; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Site personnel will be instructed on proper lifting techniques; mechanical devices should be used to reduce manual handling of materials; team lifting should be utilized if mechanical devices are not available.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and • Mark and repair if possible tripping hazards.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.

Project Identification Jay's Lucky Cleaners	**Location** 3220-3224 Long Beach Road, Oceanside, New York	**Estimated Dates** TBD
Phase of Work Decontamination	**Page 1 of 1**	**Analysis Approved by** Kris Almskog, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1.Decontaminate equipment	Chemical hazards	• Wear appropriate PPE per Table 6-1; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Site personnel will be instructed on proper lifting techniques; mechanical devices should be used to reduce manual handling of materials; team lifting should be utilized if mechanical devices are not available.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and • Mark and repair if possible tripping hazards.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.

Appendix C
Heat/Cold Stress Protocols

HEAT STRESS

Heat Stress (Hyperthermia)

Heat stress is the body's inability to regulate the core temperature. A worker's susceptibility to heat stress can vary according to his/her physical fitness, degree of acclimation to heat, humidity, age and diet.

1. Prior to site activity, the field team leader may make arrangements for heat stress monitoring (i.e., monitoring heart rate, body temperature, and body water loss) during actual site work if conditions warrant. In addition, the FTL is to ensure that each team member has been acclimatized to the prevailing environmental conditions, that personnel are aware of the signs and symptoms of heat sickness, that they have been adequately trained in first aid procedures, and that there are enough personnel on-site to rotate work assignments and schedule work during hours of reduced temperatures. Personnel should not consume alcoholic or caffeinated beverages but rather drink moderate levels of an electrolyte solution and eat well prior to commencing site work.

2. Although there is no specific test given during a baseline physical that would identify a person's intolerance to heat, some indicators are tobacco or medication use, dietary habits, body weight, and chronic conditions such as high blood pressure or diabetes.

3. *Heat cramps*, caused by profuse perspiration with inadequate fluid intake and salt replacement, most often afflict people in good physical condition who work in high temperature and humidity. Heat cramps usually come on suddenly during vigorous activity. Untreated, heat cramps may progress rapidly to heat exhaustion or heat stroke. First aid treatment: remove victim to a cool place and replace lost fluids with water.

4. Thirst is not an adequate indicator of heat exposure. Drinking fluid by itself does not indicate sufficient water replacement during heat exposure. A general rule, the amount of water administered should replace the amount of water lost, and it should be administered at regular intervals throughout the day. For every half pound of water lost, 8 ounces of water should be ingested. Water should be replaced by drinking 2 – 4 ounce servings during every rest period. A recommended alternative to water is an electrolyte drink split 50/50 with water.

5. *Heat exhaustion* results from salt and water loss along with peripheral pooling of blood. Like heat cramps, heat exhaustion tends to occur in persons in good physical health who are working in high temperatures and humidity. Heat exhaustion may come on suddenly as dizziness and collapse. Untreated, heat exhaustion may progress to heat stroke.

6. *Treatment for heat exhaustion*: Move the victim to a cool environment (e.g. air-conditioned room/car), lay victim down and fan him/her. If the air-conditioning is not available, remove the victim to a shaded area, remove shirt, and fan. If symptoms do not subside within an hour, notify 911 to transport to hospital.

7. *Heat stroke* results from the body's inability to dissipate excess heat. A true medical emergency that requires immediate care, it usually occurs when one ignores the signs of heat exhaustion and continues strenuous activities. Working when the relative humidity exceeds 60% is a particular problem. Workers in the early phase of heat stress may not be coherent of they will be confused, delirious or comatose. Changes in behavior, irritability and combativeness are useful early signs of heat stroke.

8. *Treatment of heat stroke*: Move the victim to a cool, air-conditioned environment. Place victim in a semi-reclined position with head elevated and strip to underclothing. Cool victim as rapidly as possible, applying ice packs to the arms and legs and massaging the neck and torso. Spray victim with tepid water and constantly fan to promote evaporation. Notify 911 to transport to hospital as soon as possible.

TABLE 1

SYMPTOMS OF HEAT STRESS

Heat cramps are caused by heavy sweating with inadequate fluid intake. Symptoms include;

- Muscle cramps
- Cramps in the hands, legs, feet and abdomen

Heat exhaustion occurs when body organs attempt to keep the body cool. Symptoms include;

- Pale, cool moist skin
- Core temperature elevated 1-2^{o}
- Thirst
- Anxiety
- Rapid heart rate
- Heavy sweating
- Dizziness
- Nausea

Heat stroke is the most serious form of heat stress. Immediate action must be taken to cool the body before serious injury and death occur. Symptoms are;

- Red, hot, dry skin
- Lack of perspiration
- Seizures
- Dizziness and confusion
- Strong, rapid pulse
- Core temperature of 104^{o} or above
- Coma

TABLE 2

HEAT STRESS INDICATORS

Heat stress indicator	When to measure	If Exceeds…	Action
Heart rate (pulse)	Beginning of rest period	110 beats per minute	Shorten next work period by 33%
Oral temperature	Beginning of rest period	99°F (after thermometer is under tongue for 3 minutes) 100.6°F	Shorten next work period by 33% Prohibit work in impermeable clothing
Body weight	1. Before workday begins (a.m.) 2. After workday ends (p.m.)		Increase fluid intake

COLD STRESS

Cold stress (Hypothermia)

In hypothermia the core body temperature drops below 95°F. Hypothermia can be attributed to a decrease in heat production, increased heat loss or both.

Prevention

Institute the following steps to prevent overexposure of workers to cold:

1. Maintain body core temperature at 98.6°F or above by encouraging workers to drink warm liquids during breaks (preferably not coffee) and wear several layers of clothing that can keep the body warm even when the clothing is wet.
2. Avoid frostbite by adequately covering hands, feet and other extremities. Clothing such as insulated gloves or mittens, earmuffs and hat liners should be worn. To prevent contact frostbite (from touching metal and cold surfaces below 20°F), workers should wear gloves. Tool handles should be covered with insulating material.
3. Adjust work schedules to provide adequate rest periods. When feasible, rotate personnel and perform work during the warmer hours of the day.
4. Provide heated shelter. Workers should remove their outer layer(s) of clothing while in the shelter to allow sweat to evaporate.
5. In the event that wind barriers are constructed around an intrusive operation (such as drilling), the enclosure must be properly vented to prevent the buildup of toxic or explosive gases or vapors. Care must be taken to keep a heat source away from flammable substances.
6. Using a wind chill chart such as the one in Table 3, obtain the equivalent chill temperature (ECT) based on actual wind speed and temperature. Refer to the ECT when setting up work warm-up schedules, planning appropriate clothing, etc. Workers should use warming shelters at regular intervals at or below an ECT of 20°F. For exposed skin, continuous exposure should not be permitted at or below an ECT of -25°F.

Frostbite

Personnel should be aware of symptoms of frostbite/hypothermia. If the following symptoms are noticed in any worker, he/she should immediately go to a warm shelter.

Condition	Skin Surface	Tissue Under Skin	Skin Color
Frostnip	Soft	Soft	Initially red, then white
Frostbite	Hard	Soft	White and waxy
Freezing	Hard	Hard	Blotchy, white to yellow-gray to gray

1. *Frostnip* is the incipient stage of frostbite, brought about by direct contact with a cold object or exposure of a body part to cool/cold air. Wind chill or cold water also can be major factors. This condition is not serious. Tissue damage is minor and the response to care is good. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostnip.

2. *Treatment of frostnip*: Care for frostnip by warming affected areas. Usually the worker can apply warmth from his/her bare hands, blow warm air on the site, or, if the fingers are involved, hold them in the armpits. During recovery, the worker may complain of tingling or burning sensation, which is normal. If the condition does not respond to this simple care, begin treatment for frostbite.

3. *Frostbite*: The skin and subcutaneous layers become involved. If frostnip goes untreated, it becomes superficial frostbite. This condition is serious. Tissue damage may be serious. The worker must be transported to a medical facility for evaluation. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostbite. The affected area will feel frozen, but only on the surface. The tissue below the surface must still be soft and have normal response to touch. *DO NOT* squeeze or poke the tissue. The condition of the deeper tissues can be determined by gently palpating the affected area. The skin will turn mottled or blotchy. It may also be white and then turn grayish-yellow.

4. *Treatment of frostbite*: When practical, transport victim as soon as possible. Get the worker inside and keep him/her warm. Do not allow any smoking or alcohol consumption. Thaw frozen parts by immersion, re-warming in a 100^{o}F to 106^{o}F water bath. Water temperature will

drop rapidly, requiring additional warm water throughout the process. Cover the thawed part with a dry sterile dressing. Do not puncture or drain any blisters.

NOTE: Never listen to myths and folk tales about the care of frostbite. *Never* rub a frostbitten or frozen area. *Never* rub snow on a frostbitten or frozen area. Rubbing the area may cause serious damage to already injured tissues. Do not attempt to thaw a frozen area if there is any chance it will be re-frozen.

5. *General cooling/Hypothermia*: General cooling of the body is known as systemic hypothermia. This condition is not a common problem unless workers are exposed to cold for prolonged periods of time without any shelter.

Body Temperature	°C	Symptoms
99-96	37-35.5	Intense, uncontrollable shivering
95-91	35.5-32.7	Violent shivering persists. If victim is conscious, he has difficulty speaking.
90-86	32-30	Shivering decreases and is replaced by strong muscular rigidity. Muscle coordination is affected. Erratic or jerkey movements are produced. Thinking is less clear. General comprehension is dulled. There may be total amnesia. The worker is generally still able to maintain the appearance of psychological contact with his surroundings.
85-81	29.4-27.2	Victim becomes irrational, loses contact with his environment, and drifts into a stuporous state. Muscular rigidity continues. Pulse and respirations are slow and the worker may develop cardiac arrhythmias.
80-78	26.6-18.5	Victim becomes unconscious. He does not respond to the spoken word. Most reflexes cease to function. Heartbeat becomes erratic
Below 78	25.5	Cardiac and respiratory centers of the brain fail. Ventricular fibrillation occurs; probably edema and hemorrhage in the lungs; death.

6. *Treatment of hypothermia*: Keep worker dry. Remove any wet clothing and replace with dry clothes, or wrap person in dry blankets. Keep person at rest. Do not allow him/her to move around. Transport the victim to a medical facility as soon as possible.

PWGC
Strategic Environmental Engineering Solutions

TABLE 3[(1)]
COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS AN EQUIVALENT TEMPERATURE (UNDER CALM CONDITIONS)

Estimated wind Speed (in mph)	Actual Temperature Reading (^{o}F)P											
	50	40	30	20	10	0	10	20	30	40	50	60
	Equivalent Chill Temperature (^{o}F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	15	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-146
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER in < hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute			GREAT DANGER Flesh may freeze within 30 seconds.				
	Trench foot and imersion foot may occur at any point on this chart											

Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

(1) Reproduced from American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1985-1986, p.01.

Appendix D
Medical Data Sheet

MEDICAL DATA SHEET

The brief medical data sheet shall be completed by on-site personnel and will be kept in the Support Zone by the HSO as a project record during the conduct of site operations. It accompanies any personnel when medical assistance is needed or if transport to a hospital is required.

Project:
Name: Home Telephone: _____
Address: _____
Age: _____ Height: _____ Weight: _____ Blood Type: _____

Name and Telephone Number of Emergency Contact: _____

Drug or Other Allergies: _____

Particular Sensitivities: _____

Do You Wear Contacts? _____

Provide A Check List Of Previous Illnesses: _____

What Medications Are You Presently Using?_____

Do You Have Any Medical Restrictions? _____

Name, Address, And Phone Number Of Personal Physician:

Appendix E
General Health and Safety Work Practices

GENERAL HEALTH AND SAFETY WORK PRACTICES

1. Site personnel must attend each day's Daily Briefing and sign the attendance sheet.

2. Any individual taking prescribed drugs shall inform the FTL/HSO of the type of medication. The FTL/HSO will review the matter with the HSM and the Corporate Medical Consultant (CMC), who will decide if the employee can safely work on-site while taking the medication.

3. The personal protective equipment specified by the FTL/HSO and/or associated procedures shall be worn by site personnel. This includes hard hats and safety glasses which must be worn in active work areas.

4. Facial hair (beards, long sideburns or mustaches) which may interfere with a satisfactory fit of a respirator mask is not allowed on any person who may be required to wear a respirator.

5. Personnel must follow proper decontamination procedures and shower as soon as possible upon completion of work shift.

6. Eating, drinking, chewing tobacco or gum, smoking and any other practice that may increase the possibility of hand-to-mouth contact is prohibited in the exclusion zone or the contamination reduction zone. (Exceptions may be permitted by the HSM to allow fluid intake during heat stress conditions).

7. Lighters, matches, cigarettes and other forms of tobacco are prohibited in the Exclusion Zone.

8. Signs and demarcations shall be followed. Such signs and demarcation shall not be removed, except as authorized by the FTL/HSO.

9. No one shall enter a permit-required confined space without a permit and appropriate training. Confined space entry permits shall be implemented as issued.

10. Personnel must follow Hot Work Permits as issued.

11. Personnel must use the Buddy System in the Exclusion Zone.

12. Personnel must follow the work-rest regimens and other practices required by the heat stress program.

13. Personnel must follow lockout/tagout procedures when working on equipment involving moving parts or hazardous energy sources.

14. No person shall operate equipment unless trained and authorized.

15. No one may enter an excavation greater than four feet deep unless authorized by the Competent Person. Excavations must be sloped or shored properly. Safe means of access and egress from excavations must be maintained.

16. Ladders and scaffolds shall be solidly constructed, in good working condition, and inspected prior to use. No one may use defective ladders or scaffolds.

17. Fall protection or fall arrest systems must be in place when working at elevations greater than six feet for temporary working surfaces and four feet for fixed platforms.

18. Safety belts, harnesses and lanyards must be selected by the Supervisor. The user must inspect the equipment prior to use. No defective personal fall protection equipment shall be used. Personal fall protection that has been shock loaded must be discarded.

19. Hand and portable power tools must be inspected prior to use. Defective tools and equipment shall not be used.

20. Ground fault interrupters shall be used for cord and plug equipment used outdoors or in damp locations. Electrical cords shall be kept out walkways and puddles unless protected and rated for the service.

21. Improper use, mishandling, or tampering with health and safety equipment and samples is prohibited.

22. Horseplay of any kind is prohibited.

23. Possession or use of alcoholic beverages, controlled substances, or firearms on any site is forbidden.

24. Incidents, no matter how minor, must be reported immediately to the Supervisor.

25. Personnel shall be familiar with the Site Emergency Action Plan, which is contained in Section 12 of the HASP/EAP.

The above Health and Safety Rules are not all inclusive and it is your responsibility to comply with regulations set forth by OSHA, the client, PWGC Supervisors, and the FTL/HSO.

Appendix F
Hospital Route Map and Directions

mapquest

Notes

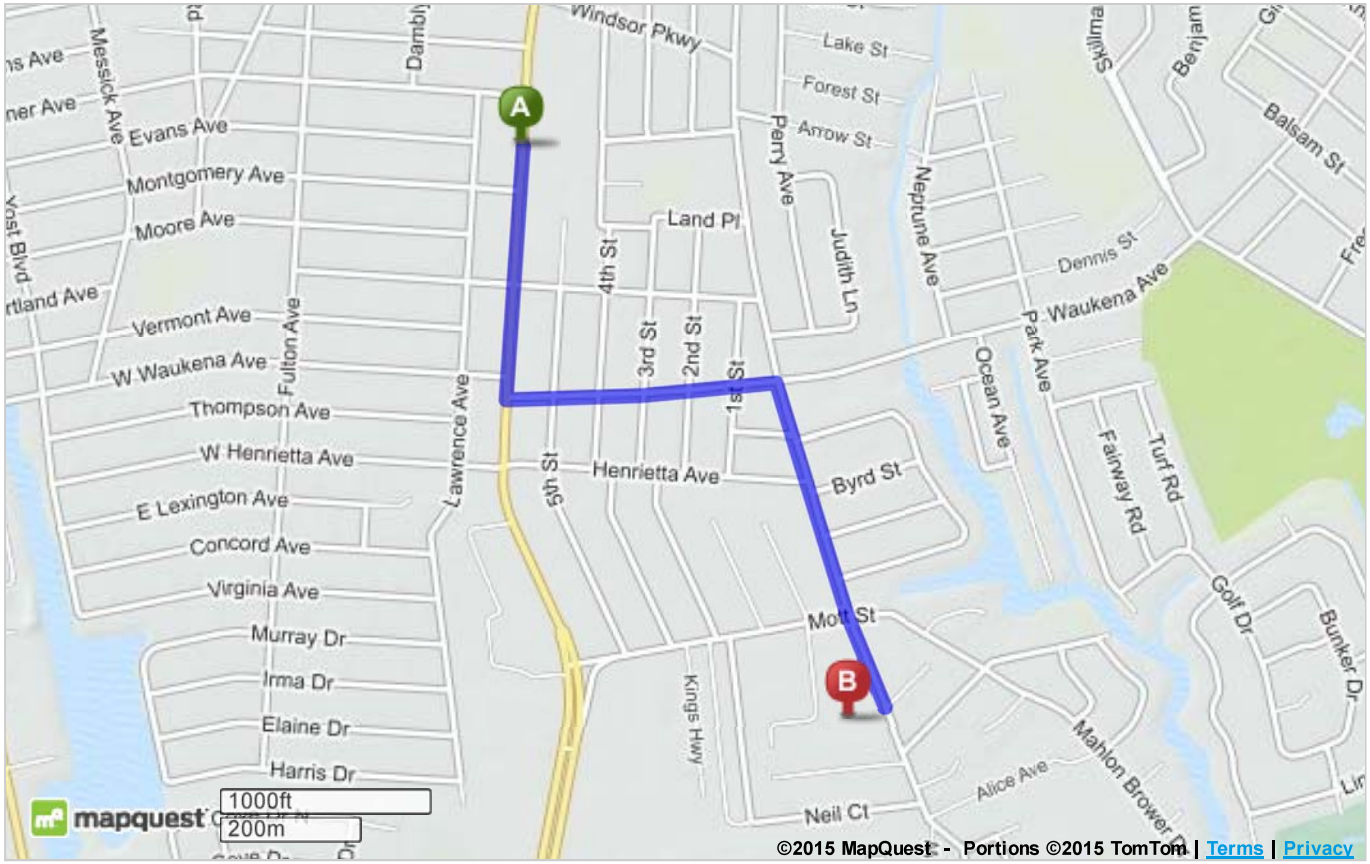
Trip to:

South Nassau Communities Hospital
3560 Oceanside Rd

Oceanside, NY 11572
(516) 763-3052
0.92 miles / 2 minutes

A	**3206 Long Beach Rd**, Oceanside, NY 11572-4110	**Download Free App**
	1. Start out going **south** on **Long Beach Rd** toward **Montgomery Ave**. Map	**0.3 Mi** *0.3 Mi Total*
	2. Take the 2nd **left** onto **Waukena Ave**. Map *Waukena Ave is just past W Waukena Ave* *Evergreen North Insurance is on the right* *If you reach Henrietta Ave you've gone a little too far*	**0.3 Mi** *0.6 Mi Total*
	3. Turn **right** onto **Oceanside Rd**. Map *Oceanside Rd is just past 1st St* *If you reach Neptune Ave you've gone about 0.1 miles too far*	**0.4 Mi** *0.9 Mi Total*
	4. **3560 OCEANSIDE RD** is on the **right**. Map *Your destination is 0.1 miles past Mott St* *If you reach Wrights Ln you've gone a little too far*	
B	**South Nassau Communities Hospital** 3560 Oceanside Rd, Oceanside, NY 11572 (516) 763-3052	

Total Travel Estimate: **0.92 miles - about 2 minutes**



Appendix G
Incident Report Form / Investigation Form

INCIDENT / NEAR MISS REPORT AND INVESTIGATION - PAGE 1 OF 2			
TYPE OF INCIDENT - CHECK ALL THAT APPLY			
☐ INJURY/ILLNESS	☐ VEHICLE DAMAGE	☐ PROPERTY DAMAGE	☐ FIRE
☐ SPILL/RELEASE	☐ PERMIT EXCEEDENCE	☐ NEAR MISS	☐ OTHER
GENERAL INFORMATION			
PROJECT NAME:	DATE OF REPORT:	REPORT NO.:	
DATE OF INCIDENT:	TIME:	DAY OF WEEK:	
LOCATION OF INCIDENT:			
WEATHER CONDITIONS:	ADEQUATE LIGHTING AT SCENE? ☐ YES ☐ NO ☐ N/A		
DESCRIBE WHAT HAPPENED (STEP BY STEP - USE ADDITIONAL PAGES IF NECESSARY)			
AFFECTED EMPLOYEE INFORMATION			
NAME:	EMPLOYEE: ☐ YES ☐ NO		
HOME ADDRESS:			
SOCIAL SECURITY NO.:	HOME PHONE NO.:		
JOB CLASSIFICATION:	YEARS IN JOB CLASSIFICATION:		
HOURS WORKED ON SHIFT PRIOR TO INCIDENT:	AGE:		
DID INCIDENT RELATE TO ROUTINE TASK FOR JOB CLASSIFICATION? ☐ YES ☐ NO			
INJURY/ILLNESS INFORMATION			
NATURE OF INJURY OR ILLNESS:			
OBJECT/EQUIPMENT/SUBSTANCE CAUSING HARM:			
FIRST AID PROVIDED? ☐ YES ☐ NO			
IF YES, WHERE WAS IT GIVEN: ☐ ON-SITE ☐ OFF-SITE			
IF YES, WHO PROVIDED FIRST AID:			
WILL THE INJURY/ILLNESS RESULT IN: ☐ RESTRICTED DUTY ☐ LOST TIME ☐ UNKNOWN			

INCIDENT / NEAR MISS REPORT AND INVESTIGATION - PAGE 2 OF 2 REPORT NO.
MEDICAL TREATMENT INFORMATION
WAS MEDICAL TREATMENT PROVIDED? ☐ YES ☐ NO
IF YES, WAS MEDICAL TREATMENT PROVIDED: ☐ ON-SITE ☐ DR.'S OFFICE ☐ HOSPITAL
NAME OF PERSON(S) PROVIDING TREATMENT:
ADDRESS WHERE TREATMENT WAS PROVIDED:
TYPE OF TREATMENT:
VEHICLE AND PROPERTY DAMAGE INFORMATION
VEHICLE/PROPERTY DAMAGED:
DESCRIPTION OF DAMAGE:
SPILL AND AIR EMISSIONS INFORMATION:
SUBSTANCE SPILLED OR RELEASED: FROM WHERE: TO WHERE:
ESTIMATED QUANTITY/DURATION:
CERCLA HAZARDOUS SUBSTANCE? ☐ YES ☐ NO
REPORTABLE TO AGENCY? ☐ YES ☐ NO SPECIFY:
WRITTEN REPORT: ☐ YES ☐ NO TIME FRAME:
RESPONSE ACTION TAKEN:
PERMIT EXCEEDENCE
TYPE OF PERMIT: PERMIT #:
DATE OF EXCEEDENCE: DATE FIRST KNOWLEDGE OF EXCEEDENCE:
PERMITTED LEVEL OR CRITERIA:
EXCEEDENCE LEVEL OR CRITERIA:
REPORTABLE TO AGENCY? ☐ YES ☐ NO SPECIFY:
WRITTEN REPORT: ☐ YES ☐ NO TIME FRAME:
RESPONSE ACTION TAKEN:
NOTIFICATIONS
NAMES OF PERSONNEL NOTIFIED: DATE/TIME:
CLIENT NOTIFIED: DATE/TIME:
AGENCY NOTIFIED: DATE/TIME:
CONTACT NAME:
PERSONS PREPARING REPORT
EMPLOYEE'S NAME:(PRINT) SIGN:
SUPERVISOR'S NAME:(PRINT) SIGN:

INVESTIGATIVE REPORT			
DATE OF INCIDENT:	DATE OF REPORT:	REPORT NUMBER:	
INCIDENT COST: ESTIMATED: $_____	ACTUAL: $_____		
OSHA RECORDABLE(S): □ YES □ NO # RESTRICTED DAYS ____ # DAYS AWAY FROM WORK ____			
CAUSE ANALYSIS			
IMMEDIATE CAUSES - WHAT ACTIONS AND CONDITIONS CONTRIBUTED TO THIS EVENT?			
BASIC CAUSES - WHAT SPECIFIC PERSONAL OR JOB FACTORS CONTRIBUTED TO THIS EVENT?			
ACTION PLAN			
REMEDIAL ACTIONS - WHAT HAS AND OR SHOULD BE DONE TO CONTROL EACH OF THE CAUSES LISTED?			
ACTION	PERSON RESPONSIBLE	TARGET DATE	COMPLETION DATE
PERSONS PERFORMING INVESTIGATION			
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:	
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:	
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:	
MANAGEMENT REVIEW			
PROJECT MANAGER: (PRINT)	SIGN:	DATE:	
COMMENTS:			
H&S MANAGER: (PRINT)	SIGN:	DATE:	
COMMENTS:			

EXAMPLES OF IMMEDIATE CAUSES

Substandard Actions

1. Operating equipment without authority
2. Failure to warn
3. Failure to secure
4. Operating at improper speed
5. Making safety devices inoperable
6. Removing safety devices
7. Using defective equipment
8. Failure to use PPE properly
9. Improper loading
10. Improper placement
11. Improper lifting
12. Improper position for task
13. Servicing equipment in operation
14. Under influence of alcohol/drugs
15. Horseplay

Substandard Conditions

1. Guards or barriers
2. Protective equipment
3. Tools, equipment, or materials
4. Congestion
5. Warning system
6. Fire and explosion hazards
7. Poor housekeeping
8. Noise exposure
9. Exposure to hazardous materials
10. Extreme temperature exposure
11. Illumination
12. Ventilation
13. Visibility

EXAMPLES OF BASIC CAUSES

Personal Factors

1. Capability
2. Knowledge
3. Skill
4. Stress
5. Motivation
6. Work Standards
7. Wear and tear
8. Abuse or misuse

Job Factors

1. Supervision
2. Engineering
3. Purchasing
4. Maintenance
5. Tools/equipment

MANAGEMENT PROGRAMS FOR CONTROL OF INCIDENTS

1. Leadership and administration
2. Management training
3. Planned inspections
4. Task analysis and procedures
5. Task observation
6. Emergency preparedness
7. Organizational rules
8. Accident/incident analysis
9. Personal protective equipment
10. Health control
11. Program audits
12. Engineering controls
13. Personal communications
14. Group meetings
15. General promotion
16. Hiring and placement
17. Purchasing controls

Appendix H
Daily Briefing Sign-In Sheet

DAILY BRIEFING SIGN-IN SHEET

Date: _____ Project Name/Location: _____

Person Conducting Briefing: _____

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

_____

_____

_____

2. OTHER ISSUES (HASP/EAP changes, attendee comments, etc.)

_____

_____

_____

3. ATTENDEES (Print Name):

1.	21.
2.	22.
3.	23.
4.	24.
5.	25.
6.	26.
7.	27.
8.	28.
9.	29.
10.	30.
11.	31.
12.	32.
13.	33.
14.	34.
15.	35.
16.	36.
17.	37.
18.	38.
19.	39.
20.	40.

APPENDIX C
COMMUNITY AIR MONITORING PLAN

JAY'S LUCKY CLEANERS
3220-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK

COMMUNITY AIR MONITORING PLAN

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7016

PREPARED FOR:

United Properties Corp.
1975 Hempstead Turnpike, Suite 309
East Meadow, New York 11554

PREPARED BY:

P.W. Grosser Consulting Engineer & Hydrogeologist, PC
630 Johnson Avenue, Suite 7
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PWGC Project Number: UPC1502

MARCH 2016

COMMUNITY AIR MONITORING PLAN
JAY'S LUCKY CLEANERS
3220-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK

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Appendix 1A NYSDOH Generic CAMP
Appendix 1B Fugitive Dust and Particulate Monitoring from DER-10 Technical Guidance for Site Investigations and Remediation

1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) provides measures for protection for on-site workers, the adjacent school and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial investigation) from potential airborne contaminant releases resulting from Remedial Investigation (RI) at 3220-3224 Long Beach Road, Oceanside, New York.

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.

Based on previous investigations at the site, the primary concerns for this site are volatile organic compounds (VOCs) and dust particulates.

1.1 Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- 29 CFR 1910.120(h): This regulation specifies that air shall be monitored to identify and quantify levels of airborne hazardous substances and health hazards, and to determine the appropriate level of protection for workers.
- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan (Appendix 1A): 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's (NYSDEC's) Fugitive Dust and Particulate Monitoring from DER-10 Technical Guidance for Site Investigation and Remediation (Appendix 1B) - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites: 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

The following sections contain information describing the types, frequency and location of real-time monitoring.

2.1 Real-Time Monitoring

This section addresses the real-time monitoring that will be conducted within the work area, and along the site's downwind perimeter, during all ground intrusive activities, such as drilling and test pit excavation.

2.1.1 *Work Area*

The following instruments will be used for work area monitoring:

- PhotoionizationDetector (PID)
- Dust Monitor

Table 1-1 presents a breakdown of each main activity and provides the instrumentation, frequency and location of the real-time monitoring for the site. Table 1-2 lists the Real-Time Air Monitoring Action Levels to be used in all work areas.

2.1.2 *Community Air Monitoring Requirements*

To establish ambient air background concentrations, air will be monitored at several locations around the site perimeter before investigation activities begin. These points will be monitored periodically in series during the site work. In addition, background levels in the adjacent school must be taken prior to commencement of the planned work.

Fugitive respirable dust will be monitored using a MiniRam Model PDM-3 aerosol monitor or equivalent, which is capable of measuring particulate matter less than 10 micrometers in size (PM-10). Air will be monitored for VOCs with a portable Photovac MicroTip PID or equivalent. Table 1-1 presents a breakdown of each main activity and provides the instrumentation, frequency and location of the real-time monitoring for the site. Table 1-2 lists the Real-Time Air Monitoring Action Levels to be used in all work areas. All air monitoring data is documented in a site log book by the designated site safety officer. PWGC's 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.

Table 1-1

Frequency and Location of Air Monitoring

ACTIVITY	AIR MONITORING INSTRUMENT	FREQUENCY AND LOCATION
Drilling, Sampling	PID	Continuous in Breathing Zone (BZ) and downwind perimeter of the work area during all ground intrusive activities or if odors become apparent during non-intrusive activities. Every 30 minutes in the BZ and at the downwind perimeter of the work area during non-intrusive activities.
Drilling, Sampling	Particulate (Dust, Mist or Aerosol) Meter	Continuous at the downwind perimeter of the work area during all ground intrusive activities. Every 30 minutes at the downwind perimeter of the work area during non-intrusive activities.

Table 1-2

Real-Time Air Monitoring Action Levels

AIR MONITORING INSTRUMENT	MONITORING LOCATION	ACTION LEVEL	SITE ACTION	REASON
PID	Breathing Zone	0-25 ppm, non-transient	None	Exposure below established exposure limits
PID	Breathing Zone	25-100 ppm, non-transient	Don APR	Based on potential exposure to VOCs
PID	Breathing Zone	>100 ppm, non-transient	Don ASR or SCBA, Institute vapor/odor suppression measures, Notify HSM.	Increased exposure to site contaminants, potential for vapor release to public areas.
PID	Work Area Perimeter*	< 1 ppm	None	Exposure below established exposure limits.
PID	Work Area Perimeter*	> 1 ppm	Stop work and implement vapor release response plan until readings return to acceptable levels, Notify HSM.	Increased exposure to site contaminants, potential for vapor release to public areas
Particulate (Dust, Mist or Aerosol) Meter	Work Area Perimeter*	< 150 µg/m^3	None	Exposure below established exposure limits.

AIR MONITORING INSTRUMENT	MONITORING LOCATION	ACTION LEVEL	SITE ACTION	REASON
Particulate (Dust, Mist or Aerosol) Meter	Work Area Perimeter*	>150 µg/m^3	Stop work and immediately confirm the upwind background level. Implement dust suppression measures if the downwind PM-10 particulate level is 100 µg/m^3 greater than the upwind background level for a 15-minute period or if airborne dust is observed leaving the work area. Work may continue with dust suppression techniques provided that the downwind PM-10 particulate levels do not exceed 150 µg/m^3 above the upwind background 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 µg/m^3 above the upwind background level, stop work and reevaluate activities. Work may resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 µg/m^3 of the upwind background level and visible dust migration is prevented.	Increased exposure to site contaminants

*Monitoring location to be opposite the walls of occupied structures or next to intake vents

3.0 VAPOR EMISSION RESPONSE PLAN

This section is excerpted from the NYSDOH guidance for Community Air Monitoring Plan - Ground Intrusive Activities.

If the ambient air concentration of organic vapors exceeds 1 ppm above background at the perimeter of the work area or opposite the schools wall, activities will be halted and monitoring continued. Vapor suppression measures can also be taken at this time. If the organic vapor level decreases below 1 ppm above background, work activities can resume.

If the organic vapor level is above 1 ppm at the perimeter of the work area or opposite the schools wall, activities must be shut down. When work shutdown occurs, downwind air monitoring as directed by the Site Health & Safety Officer (SHSO) will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission Response Plan Section.

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures: When work areas are within 20 feet of potentially exposed populations or occupied structures, 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.

If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s) (with appropriate pre-determined response levels and actions.) Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of work.
If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m3 or less at the monitoring point.

Depending upon the nature of contamination and remedial activities, other parameters (e.g., exclusivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work with Co-located Residences or Facilities: Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under "Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g., weekends or evenings) when building occupancy is at a minimum.

4.0 MAJOR VAPOR EMISSION RESPONSE PLAN

If any organic levels greater than 1 ppm over background are identified opposite the walls of the occupied school or next to the intake vents or 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following the cessation of the work activities or as the result of an emergency, organic level persists above 1 ppm, then the air quality must be monitored within the school.

If efforts to abate the emission source (see Section 5.0) are unsuccessful and if organic vapor levels are approaching 1 ppm above background for more than 15 minutes, then the Major Vapor Emission Response Plan shall automatically be placed into effect.

However, the Major Vapor Emission Response Plan shall be immediately placed in effect if organic vapor levels are greater than 10 ppm above background.

Upon activation, the following activities will be undertaken:

1. All emergency Response Contacts as listed in the Health & Safety Plan will go into effect.
2. The local police authorities will immediately be contacted by the Health & Safety Officer and advised of the situation.
3. Frequent air monitoring will be conducted at 15-minute intervals. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Health and Safety Officer.

5.0 VAPOR SUPPRESSION TECHNIQUES

Vapor suppression techniques must be employed when action levels warrant the use of these techniques.

The techniques to be implemented for control of VOCs from stockpiled soil or from the open excavation will include one or more of the following:

- cover with plastic
- cover with "clean soil"
- application of hydro-mulch material or encapsulating foam
- limit working hours to favorable wind and temperature conditions

6.0 DUST SUPPRESSION TECHNIQUES

Reasonable dust-suppression techniques must be employed during all work that may generate dust, such as drilling, excavation, grading, and placement of clean fill. The following techniques were shown to be effective for controlling the generation and migration of dust during remedial activities:

- Wetting equipment and excavation faces;
- Spraying water on buckets during excavation and dumping;
- Hauling materials in properly covered containers; and,
- Restricting vehicle speeds to 10 mph.

It is imperative that utilizing water for suppressing dust will not create surface runoff.

7.0 DATA QUALITY ASSURANCE

7.1 Calibration

Instrument calibration shall be documented in the designated field logbook. All instruments shall be calibrated in accordance with manufacturer's instructions and specifications before each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

7.2 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 FOL/HSO for reference.

7.3 Data Review

The Field Team Leader FOL/SHSO will interpret all monitoring data based on Table 1-2 and his/her professional judgment. The FOL/HSO shall review the data with the HSM to evaluate the potential for worker and community 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 HSM.

8.0 RECORDS AND REPORTING

All readings must be recorded and available for review by personnel from NYSDEC and NYSDOH. Should any of the action levels be exceeded, the NYSDEC Division of Air Resources and NYSDOH must be notified immediately (within one business day).

The notification shall include a description of the control measures implemented to prevent further exceedances.

APPENDIX 1A
NYSDOH GENERIC CAMP

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

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

1. 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.

2. 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.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

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

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/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 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

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

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

APPENDIX 1B
FUGITIVE DUST AND PARTICULATE MONITORING FROM DER-10 TECHNICAL GUIDANCE FOR SITE INVESTIGATIONS AND REMEDATION

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

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

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX D
QUALITY ASSURANCE PROJECT PLAN

5.0 QUALITY ASSURANCE PROJECT PLAN

This quality assurance project plan (QAPP) presents the objectives, functional activities, methods, and quality assurance / quality control (QA/QC) requirements associated with sample collection and laboratory analysis for characterization activities. The QAPP follows requirements detailed in DER-10, Section 2.

5.1 Project Organization

The investigative efforts defined in this RIWP will be coordinated by PWGC on United Properties Corp. The following identifies the responsibilities of various organizations supporting the RI:

- The NYSDEC Project Manager (Jahan Reza) will be responsible for reviewing and approving this work plan, coordinating approval of requested modifications, and providing guidance on regulatory requirements.
- The PWGC Program Manager (Kris Almskog and Paul Boyce) will provide technical expertise for review of the project plans, reports and ongoing field activities. The Program Manager will act as the project's Quality Assurance Manager.
- PWGC Project Manager (Thomas Melia) will be responsible for the day-to-day project management, task leadership, and project engineering support and for the planning and implementation of RI activities. The Project Manager is responsible for ensuring that the requirements of this RI work plan are implemented. The project manager will also act as the Site Health and Safety Manager (HSM).
- PWGC Field Team Leader (Ryan Morley) will be responsible for sample collection, oversight of subcontractor personnel, and coordination of daily field activities. The Field Team Leader will act as the Site Health and Safety Officer ensuring implementation of the Site Health and Safety Plan.
- A NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory (to be determined) will be contracted to perform required analyses and reporting, including Analytical Services Protocol (ASP) Category B Deliverables, which will allow for data validation.
- Subcontractors will perform surveying, drilling, and/or sampling at the direction of the Field Team Leader in accordance with this work plan.

Qualifications of the principal personnel participating in the investigation are included in **Appendix B**.

5.2 Laboratory Analysis

Requirements for sample analysis are described below. All samples will be submitted to a NYSDOH ELAP certified laboratory (to be determined) for analysis. Analytical methods, preservation, container requirements, and holding times are summarized below:

ANALYTICAL METHODS

(SOIL)

Sample Matrix	Sample Type	Parameters	EPA Method	Sample Preservation	Holding Time	Sample Container
Soil	Grab	VOCs	8260C/5035 (High Level)	5ml MeOH Cool to 4°C	14 days	40 ml vials
Soil	Grab	VOCs	8260C/5035 (Low Level)	5ml Water Cool to 4°C	48 Hrs freeze 14 Days analysis	(2) 40 ml vials
Soil	Grab	SVOCs	8270	Cool to 4°C	14 days	4 oz. wide mouth glass
Soil	Grab	TAL Metals	6010/7471	Cool to 4°C	6 months (28 days for Mercury)	4 oz. wide mouth glass
Soil	Grab	PCBs	8082	Cool to 4°C	14 Days (Extraction)	4 oz. wide mouth glass
Soil	Grab	Pesticides	8081	Cool to 4°C	14 Days (Extraction)	4 oz. wide mouth glass

ANALYTICAL METHODS

(GROUNDWATER)

Sample Matrix	Sample Type	Parameters	EPA Method	Sample Preservation	Holding Time	Sample Container
Groundwater	Grab	VOCs	8260	HCL to pH <2.4 Cool to 4°C	14 days	(3) 40-mil vials
Groundwater	Grab	SVOCs	8270	Cool to 4°C	7 days	(2) 1 L amber glass jars.
Groundwater	Grab	TAL Metals	6010/7470	HNO_3 to pH<2 Cool to 4°C	6 months (28 days for Mercury)	0.5 L Plastic.
Groundwater	Grab	Pesticides/PCBs	8081/8082	Cool to 4°C	7 days	1 L amber glass jars.

ANALYTICAL METHODS

(VAPOR/AIR)

Sample Matrix	Sample Type	Parameters	EPA Method	Sample Preservation	Holding Time	Sample Container
Vapor	Grab	VOCs	TO-15	None	15 days	6-liter SUMMA canister
Air	Grab	VOCs	TO-15	None	15 days	6-liter SUMMA canister

5.2.1 Soil Samples

Soil samples will be collected as described in Section 4.3. Analysis will conform to NYSDEC Analytical Services Protocol (ASP) Category B data deliverables in accordance with NYSDEC DER-10, Appendix 2B, 1.0 (b), including calibration standards, surrogate recoveries, and chromatograms.

5.3 Field/Laboratory Data Control Requirements

Quality Control (QC) procedures will be followed in the field and at the laboratory to facilitate that reliable data are obtained. When performing field sampling, care shall be taken to prevent the cross-contamination of sampling equipment, sample bottles, and other equipment that could compromise sample integrity. QC samples will include blind duplicates, equipment blanks, trip blanks, method blanks, matrix spike and matrix spike duplicates. For soil and groundwater, QA/QC samples will be collected for each 20 samples collected per matrix. Analysis will conform to NYSDEC ASP Category B data deliverables in accordance with NYSDEC DER-10, Appendix 2B, 1.0 (b), including calibration standards, surrogate recoveries, and chromatograms.

5.4 Sample Identification

Each sample will be identified with a set of information relating individual sample characteristics. Required information consists of Sample Designation, Depth, Date, Time, and Matrix. Examples of sample IDs are shown below.

- SB001(0-2) (soil sample, boring 001 from 0 to 2 feet)
- GW001(6-8) (groundwater sample, soil boring 001 from 6 to 8 feet)
- MW004 (groundwater sample, permanent monitoring well 004)
- SV001 (permanent soil vapor point 001
- SS001 (temporary sub-slab vapor point 001)
- IA001 (indoor air sample 001)
- AA001 (ambient air quality sample 001)

Sample frequency, locations, depths, and nomenclature may change subject to field decisions and professional judgment.

5.5 Chain-of-Custody, Sample Packaging and Shipment

Each day that samples are collected, a chain-of-custody/request for analysis form will be completed and submitted to the laboratory with samples to be analyzed. A copy of the chain-of-custody will be retained by the Project Manager. The chain-of-custody will include the project name, sampler's signature, sample IDs, date and time of sample collection, and analysis requested.

Samples will be packaged and shipped in a manner that maintains sample preservation requirements during transport (i.e., ice to keep samples cool until receipt at the laboratory), ensures that sample holding times can be achieved by the laboratory, and prevents samples from being tampered with.

If a commercial carrier ships samples, a bill of lading (waybill) will be used as documentation of sample custody. Receipts for bills of lading and other documentation of shipment shall be maintained as part of the permanent custody documentation. Commercial carriers are not required to sign the chain-of-custody as long as it is enclosed in the shipping container and evidence tape (custody seal) remains in place on the shipping container.

5.6 Data Usability and Validation

The main purpose of the data is for use in defining the extent of contamination at the site, to aid in evaluation of potential human health and ecological exposure assessments, and to support remedial action decisions. Based upon this, data usability and validation will be performed as described below. Complete data packages will be archived in the project files, and if deemed necessary additional validation can be performed using procedures in the following sections.

5.6.1 Data Usability and Validation Requirements

Data usability and validation are performed on analytical data sets, primarily to confirm that sampling and chain-of-custody documentation are complete, sample IDs can be tied to specific sampling locations, samples were analyzed within the required holding times, and analyses are reported in conformance with NYSDEC ASP, Category B data deliverable requirements as applicable to the method utilized.

5.6.2 Data Usability and Validation Methods

A designee of the PWGC Project Manager will complete a data usability evaluation for the data collected during the SRI and a data usability summary report (DUSR) will be prepared. The DUSR will be prepared in accordance with NYSDEC DER-10, Appendix 2B.

Independent third party data validation will be performed on 5% of the sample data, or on one sample from each sample delivery group (SDG), whichever is greater. Data validation will be performed by a qualified subcontractor independent of the project.

5.7 Field Equipment Calibration

Equipment will be inspected and approved by the Field Team Leader before being used. Equipment will be calibrated to factory specifications, if required. Monitoring equipment will be calibrated following manufacturers recommended schedules. Daily field response checks and calibrations will be performed as necessary (i.e. PID calibrations) following manufacturers standard operating procedures. Equipment calibrations will be documented in a designated field logbook.

5.8 Equipment Decontamination

In order to minimize the potential for cross-contamination, non-dedicated drilling and sampling equipment shall be properly decontaminated prior to and between sampling/drilling locations.

5.8.1 General Procedures

Drilling equipment will be decontaminated in a designated area. Sampling equipment and probes will be decontaminated in an area covered with plastic sheeting near the sampling location. Waste material generated during decontamination activities will be containerized, stored and disposed of in accordance with the procedures detailed in Section 5.9. Decontamination of sampling equipment shall be kept to a minimum, and wherever possible, dedicated sampling equipment shall be used. Personnel directly involved in equipment decontamination shall wear appropriate personal protective equipment (PPE).

5.8.2 Drilling Equipment

Drilling equipment shall be decontaminated prior to performance of the first boring/excavation and between all subsequent borings/excavations. This shall include hand tools, casing, augers, drill rods, temporary well material and other related tools and equipment. Water used during drilling and/or steam cleaning operations shall be from a potable source.

5.8.3 Sampling Equipment

Sampling equipment (i.e., trowels, knives, split-spoons, bowls, hand augers, etc...) will be decontaminated prior to each use as follows:

- Laboratory-grade glassware detergent and tap water scrub to remove visual contamination

- Generous tap water rinse
- Distilled water rinse

5.8.4 Meters and Probes

All meters and probes that are used in the field (other than those used solely for air monitoring purposes, e.g., PID meters) will be decontaminated between uses as follows:

- Laboratory-grade detergent and tap water solution wash
- Tap water rinse
- Distilled water rinse (triple rinse)

5.9 Management of Investigation Derived Waste

Waste materials generated from the field operations may consist of soil cuttings, purge water, and miscellaneous solid materials such as personal protective equipment (PPE) and supplies. Investigative derived waste (IDW) generated during field operations will be disposed of in accordance with applicable regulations.

Soil cuttings generated from soil boring and well installation activities will be stored in 55-gallon drums. Drums will be labeled to indicate the source of the soil and will be stored in a designated area onsite. Soil cores and soil cuttings will be field screened using a PID, while performing drilling operations. Drummed soils will be disposed of at an off-site disposal facility. Following receipt of the analytical results, recommendations for disposition of the drummed soil will be provided to the NYSDEC.

Development and purge water generated during the field activities will be stored in a portable holding tank and/or 55-gallon drums. Drums will be labeled to indicate the source of the fluid and will be stored in a designated area onsite. Drummed groundwater will be sampled to determine if discharge to the surface of the site is appropriate or off-site disposal is required. Following receipt of the groundwater sampling results, recommendations for disposition of the water will be provided to NYSDEC.

5.10 Field Documentation

Documentation will take place on either appropriate forms or in a dedicated site logbook. Permanent black or blue ink will be used to record information in the logbook. Errors in field documentation will be lined through, initialed, dated, and corrected. Forms will be kept by the PWGC Field Team Leader during the field activities.

Field activities will be documented in the field logbook. The logbook will contain waterproof pages that are consecutively numbered, and be permanently bound with a hard cover. Upon completion of daily activities, unused portions of pages will be lined-through and initialed.

The primary purpose of the field logbook is to document the daily field activities and to provide descriptions of each activity. All entries in the field logbook will be recorded and dated by person making the entry.

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APPENDIX E
SUB-SLAB DEPRESSURIZATION SYSTEM OPERATION, MAINTENANCE & MONITORING PLAN

3224 LONG BEACH ROAD
OCEANSIDE, NY 11572
NYSDEC BCP # C130219

SUB SLAB DEPRESSURIZATION SYSTEM (SSDS)
OPERATION, MAINTENANCE AND MONITORING PLAN

ON BEHALF OF:

United Properties Corp.
1975 Hempstead Turnpike, Suite 309
East Meadow, New York 11554

PREPARED BY:

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PWGC Project Number: UPC1603

JUNE 2017

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SSDS OM&M Plan Certification

I hereby certify that the operation, maintenance, and monitoring plan requirements (OM&M Plan) for this project has been prepared in accordance with New York State Department of Health's "Guidance for Evaluating Soil Vapor Intrusion". Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil, and/or administrative proceedings.

Paul K. Boyce, P.E. **Date**
Senior Vice President

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Sub Slab Depressurization System (SSDS) Start-up Plan

Initial start-up and testing of the SSDS shall be conducted to ensure the system operates effectively for mitigation. Blower speed and system vacuum will be balanced for efficient removal of vapors and vacuum below the building slab. Review of system components post start-up will be conducted including but not limited to;

- Inspection of all piping, fittings, & equipment to ensure there are no leaks, and
- Measuring of vacuum below the building's slab at designated vacuum sample points, and
- Collection of sub-slab vapor before and after the installed carbon filtration, and
- Review of equipment to ensure it is operating according to manufacturer's specifications, and
- System alarms are functional

If for any reason the system is not operating according to design, the system will be troubleshot and deficient items will be corrected.

Depressurization System Operation, Maintenance & Testing Requirements (OM&T)

Routine maintenance should commence within 18 months after the system becomes operational, and should occur every 12 to 18 months thereafter. The inspection should include review of all system components including piping, fittings, concrete slab integrity, and equipment to ensure all components are functioning effectively. If leaks are observed they should be immediately repaired. Additionally, the location of the exhaust vent should be observed to ensure no air intakes have been located within a 10' radius.

The system's performance should be monitored to ensure a proper minimum vacuum is observed at monitoring points. Adjustments to the system components should be completed as necessary to achieve performance of system parameters. If a minimum vacuum is not able to be achieved post adjustments of the system, indoor air monitoring shall be conducted per NYSDOH Soil Vapor Intrusion Guidance to confirm mitigation is effective.

Building owner and tenants shall be informed of the Sub-Slab Depressurization System (SSDS) and provided with this Operation, Maintenance, & Monitoring Plan (OM&M Plan).

Operating & Maintenance Requirements:

EN 757 Rotron Blower

- System maintenance
    - Verify connections are tight and leak-free
    - Insure the EN 757 series fan and all ducting is secure and vibration-free
    - Document system parameters as cataloged in "Operation, Maintenance & Monitoring Logs" located in Appendix A.
        - Vacuum should be within normal operating range and less than maximum recommended operating vacuum (75 IWG).

System Components

- Carbon Filtration
    - When carbon drum filtration media sample results are received, calculations will be done to determine when depletion of carbon will occur. Replacement of media to be based on sample results and calculations.
- Exhaust inspection
    - Verify no air intakes have been located within 10' of SSDS exhaust
- Pressure Gauge
    - Pressure gauge to be inspected annually. Inspection to consist of removing and comparing to calibrated field manometer. If gauge accuracy is off greater than 10%, gauge should be replaced.
- Sample Port
    - Sample port to be inspected annually. To be visually inspected for degradation and replaced if necessary.
- Piping
    - All piping should be inspected to ensure integrity.
        - If leaks are observed, they should be repaired immediately.
- Building Slab
    - The building's slab should be inspected for cracking, gaps, holes, penetrations, etc. which could cause short circuiting of SSDS.
        - If it appears that an area in the building slab could be causing short circuiting, it should be sealed with a self-leveling polyurethane sealant.
- Low Vacuum Alarm
    - If the alarm is observed to be triggered, the NYSPE and/or environmental professional should be contacted to trouble-shoot the system.

Testing Requirements

Checkpoint IIa Low Vacuum Alarm:

- Follow all installation instructions
- Plug in low vacuum alarm
- Disconnect pressure tubing
    - Both the red indicator light & audible alarm should be on
- Connect pressure tubing to alarm and Depressurization system
    - Red light and audible alarm should go off
    - Green light should come on
- Disconnect tubing from alarm
    - Red light and audible alarm should come on
    - Green light should go out
- Reconnect tubing, test complete

Vacuum Monitoring Schedule

The sub-slab pressure monitoring to be conducted once a month for the first 6 months, and annually thereafter. During monitoring, each vacuum monitoring point shall be tested for a minimum vacuum of 0.02" of water column (W.C.). The results should be recorded in the Operation, Maintenance & Monitoring Logs (OM&M Logs). If vacuum does not meet the minimum requirement of 0.02" W.C., the system should be adjusted to meet the condition.

Annual Certification and Notification

The SSDS is an engineering control to prevent exposure pathways of potential contamination in the sub-surface. Certification that the system is operating effectively to ensure proper vapor mitigation. An annual certification must be conducted by a professional engineer or environmental professional and submitted to New York State, until the State provides in writing that the certification is not needed.

Termination of Mitigation System Operations

The SSDS should remain operational until the State approves a determination that demonstrates that the system is no longer needed to prevent potential exposures related to soil vapor intrusion. After concurrence that the system is no longer necessary to mitigate soil vapor concerns, consideration should be given to allow the system to remain in place to prevent potential future exposures.

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Appendix A – OM&M Logs

Monthly System Performance Log

3224 Long Beach Road, Oceanside, New York 11572

NYSDEC BCP #C130219

Inspector's Name: _____ Inspection Time: _____

Inspection Date: _____ Weather Conditions: _____

YES	NO	
☐	☐	Were any system alarms on upon arrival?
☐	☐	Was the system operating upon arrival?
☐	☐	Was the SSDS Blower Intake Filter clear upon arrival?
☐	☐	Was the SSDS Blower Dilution Filter clear upon arrival?
☐	☐	Is the moisture separator high level alarm float free of dirt and debris? Drain liquids within the moisture separator.
☐	☐	Are any switches in Hand Mode? Operating in hand mode is for testing purposes only.
☐	☐	Are the vacuum monitoring wells properly secured?

System Parameters

Gauge	Reading	Units
VI-701		" W.C.
FI-701		CFM
VI-703		" W.C.
PI-701		" W.C.
TI-701		ºF
PI-702		" W.C.
Hours		Hours

Monthly System Performance Log

3224 Long Beach Road, Oceanside, New York 11572

NYSDEC BCP #C130219

Vacuum Monitoring Points

Well	VMP-01	VMP-02	VMP-03
Vacuum (" WC)			

Vapor Sample Information

Location	PID (ppm)	Start Time	Start Vacuum	End Time	End Vacuum	Sample ID	Notes
Pre-Moisture Separator						Influent	
Post-Treatment						Effluent	

Which SVE Legs are operating (valves are open to create vacuum when SVE / SSDS is operating)? See diagram on following page.

_____

Comments: _____

_____

_____

Items to be Addressed / Fixed: _____

_____

_____

Monthly System Performance Log

3224 Long Beach Road, Oceanside, New York 11572

NYSDEC BCP #C130219

APPENDIX A – DESIGN DRAWINGS

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SCOPE:

INSTALLATION OF ACTIVE SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS) AT 3206-3224 LONG BEACH ROAD IN OCEANSIDE, NEW YORK AS SHOWN ON THESE PLANS. THE WORK INCLUDES:

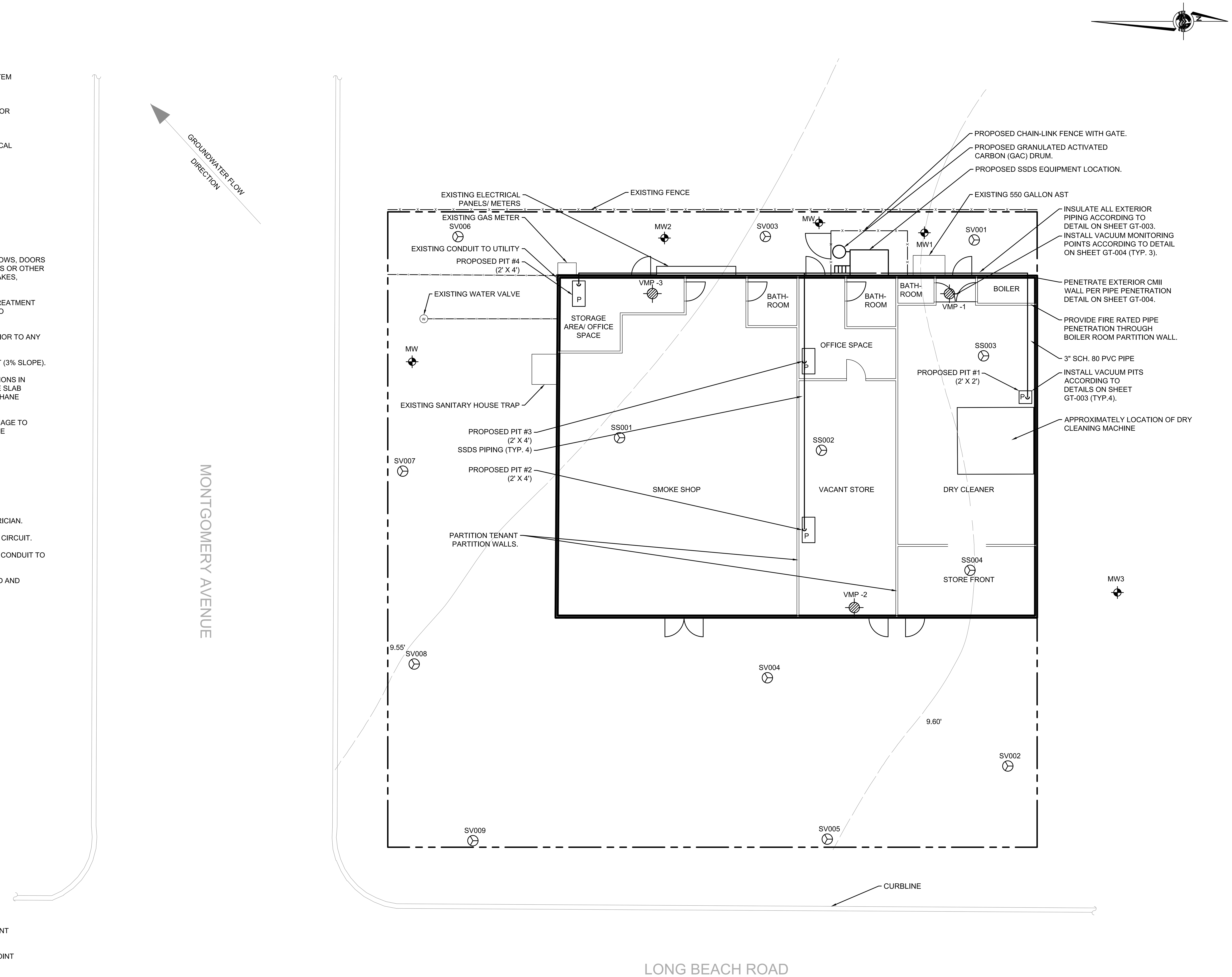
1. DEMOLITION AND RESTORATION OF CONCRETE SLAB FOR PITS AND VACUUM MONITORING POINTS
2. INSTALLATION OF SUB-SLAB PITS
3. INSTALLATION OF RISER PIPING
4. INSTALLATION OF FAN UNIT AND ASSOCIATED ELECTRICAL EQUIPMENT
5. INSTALLATION OF CARBON FILTRATION UNIT
6. DISPOSAL OF ANY EXCESS SOIL MATERIAL
7. INSTALLATION OF VACUUM MONITORING LOCATIONS

NOTES:

1. TOP OF EFFLUENT STACK AT LEAST 10' FROM ANY WINDOWS, DOORS OR OTHER BUILDING OPENINGS, OR FROM ANY WINDOWS OR OTHER OPENINGS IN ADJACENT BUILDINGS, INCLUDING AIR INTAKES, LOUVERS, VENTS, ETC.
2. MOUNT LOW VACUUM ALARM / MONITOR MOUNTED IN TREATMENT SYSTEM W/ WATERTIGHT SEALS. INSTALL ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
3. FIELD CONDITIONS TO BE VERIFIED BY CONTRACTOR PRIOR TO ANY WORK.
4. SOLID PIPING SLOPED TOWARDS PITS AT 3/10" PER FOOT (3% SLOPE).
5. CONTRACTOR TO SEAL ALL CRACKS IN SLAB, PENETRATIONS IN SLAB, EDGES OF SLAB, AND EXISTING PITS IN CONCRETE SLAB SEALED WITH HYDRAULIC CEMENT AND/OR A POLYURETHANE SEALANT.
6. PITS SHOULD BE EXCAVATED CAREFULLY TO AVOID DAMAGE TO EXISTING PLUMBING/ UTILITIES. PIT EXCAVATION MUST BE INSPECTED BY THE ENGINEER.

ELECTRICAL NOTES:

1. ALL ELECTRICAL TO BE INSTALLED BY LICENSED ELECTRICIAN.
2. POWER SUPPLY FOR ALARM / MONITOR HAS DEDICATED CIRCUIT.
3. INTERIOR CONDUIT TO BE SCHEDULE 40 PVC. EXTERIOR CONDUIT TO BE EMT.
4. ALL EXTERIOR PENETRATIONS FOR ELECTRICAL BOOTED AND WATER TIGHT.



SSDS SITE PLAN

SCALE: 1"=10'

LEGEND

- MONITORING WELL
- BUILDING FOOTPRINT
- PROPERTY LINE
- PROPOSED VACUUM MONITORING POINT
- EXISTING SOIL VAPOR MONITORING POINT
- P — PIT LOCATION
- W — WATER VALVE
- 9.55' — GROUNDWATER ELEVATION
- ACTUAL
- INFERRED

PWGC

Strategic Environmental and Engineering Solutions

P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.

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CONSULTANTS

Number	Revision Description	Revision Date
7		
6		
5		
4		
3		
2		
1	INTERN REMEDIAL MEASURE	06/02/17

Designed By: DWH	Date Submitted: 06/02/17
Drawn By: GMG	Date Created: 5/18/17
Approved By: DWH	Scale: 1"=10'

Client:
UNITED PROPERTIES CORP.
1975 HEMPSTEAD TURNPIKE, SUITE 309
EAST MEADOW, NEW YORK 11554

Project:
SUB SLAB DEPRESSURIZATION SYSTEM

Project Address:
3206-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK

County Tax Map Number: | Contract Number:

Regulatory Reference Number:

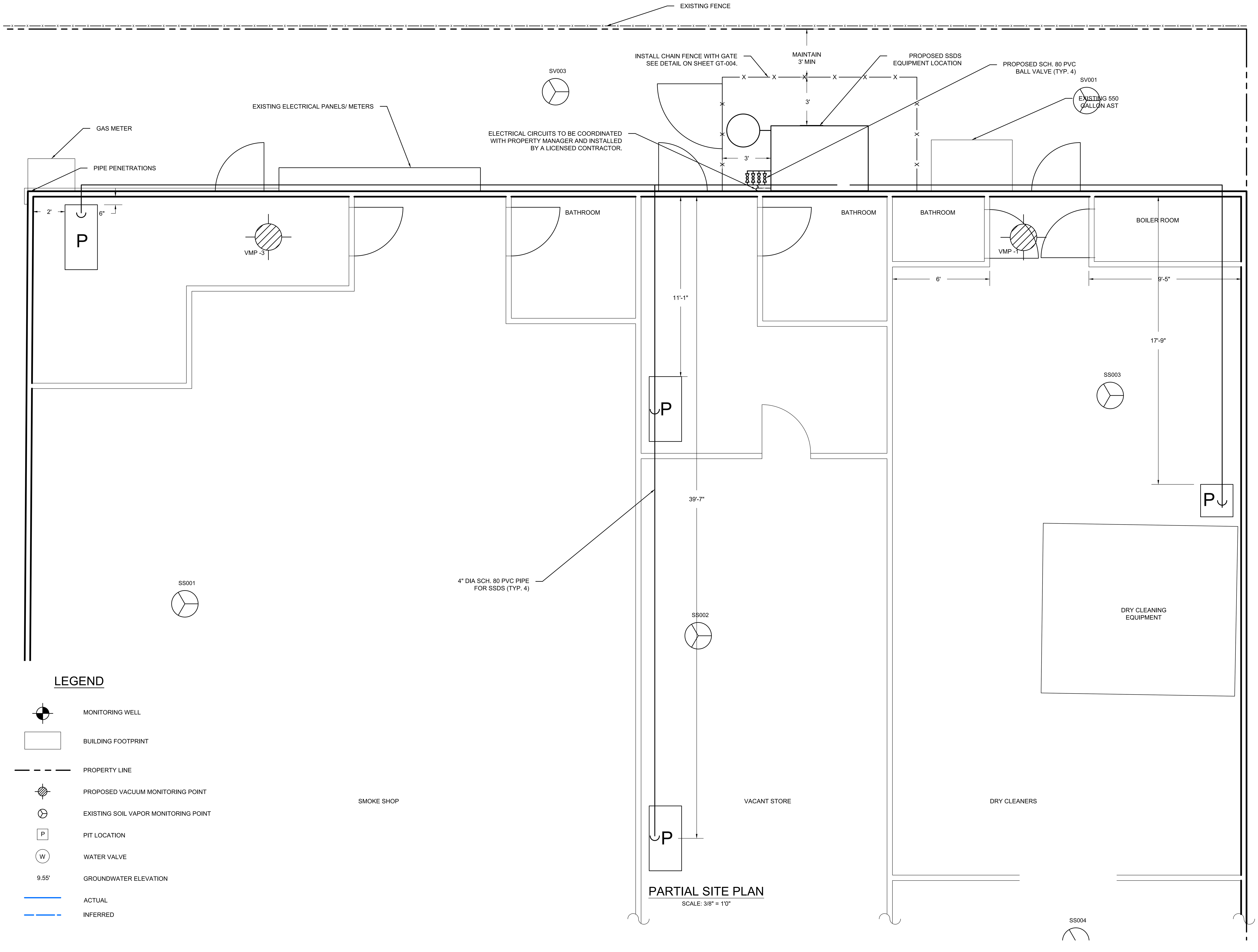
Title of Drawing:

SSDS SITE PLAN

Drawing Number: **G-001**

Sheet 1 of 5

PWGC Project Number: **UPC1701**



LEGEND

(symbol)	MONITORING WELL
(symbol)	BUILDING FOOTPRINT
(symbol)	PROPERTY LINE
(symbol)	PROPOSED VACUUM MONITORING POINT
(symbol)	EXISTING SOIL VAPOR MONITORING POINT
P	PIT LOCATION
W	WATER VALVE
9.55'	GROUNDWATER ELEVATION
(symbol)	ACTUAL
(symbol)	INFERRED

PARTIAL SITE PLAN

SCALE: 3/8" = 1'0"

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Designed By	DWH	Date Submitted	06/02/17
Drawn By	GMG	Date Created	05/18/17
Approved By	DWH	Scale	3/8"=1'0"

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1975 HEMPSTEAD TURNPIKE, SUITE 309
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Project:

SUB SLAB DEPRESSURIZATION SYSTEM

Project Address:

3206-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK

County Tax Map Number:

Contract Number:

Regulatory Reference Number:

Title of Drawing:

SSDS PARTIAL SITE PLAN

Drawing Number:

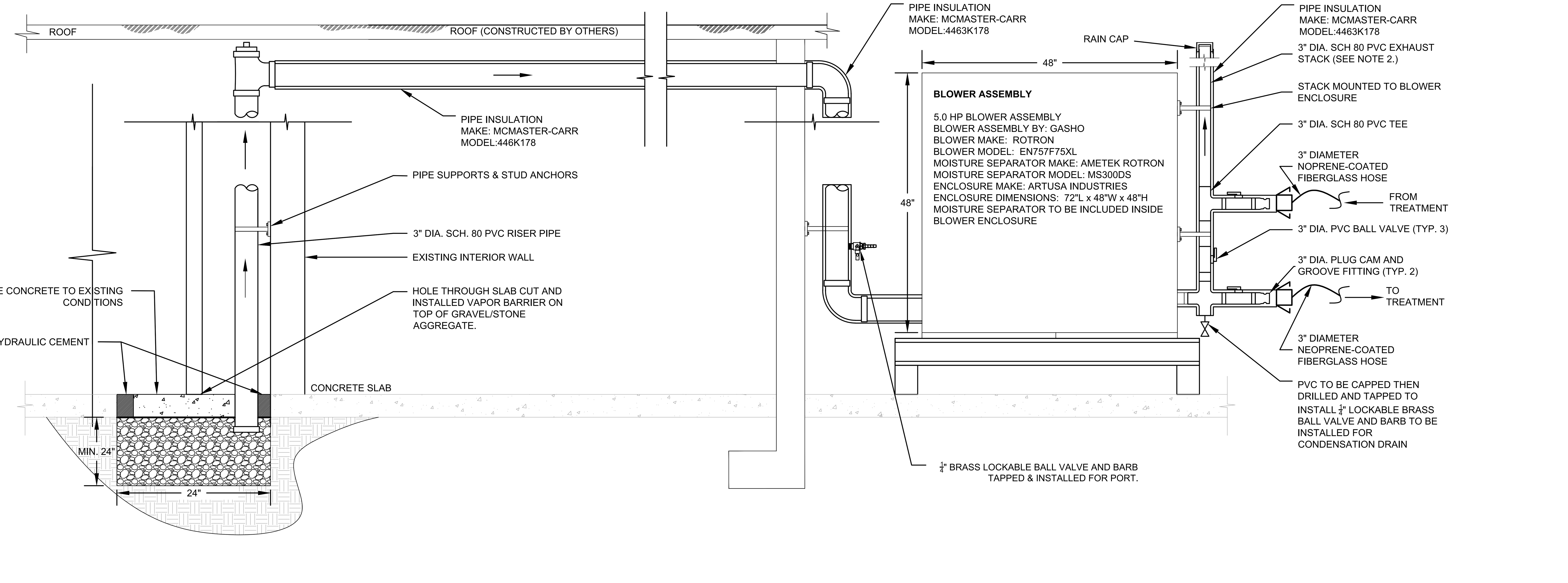
G-002

Sheet 2 of 5

PWGC Project Number:

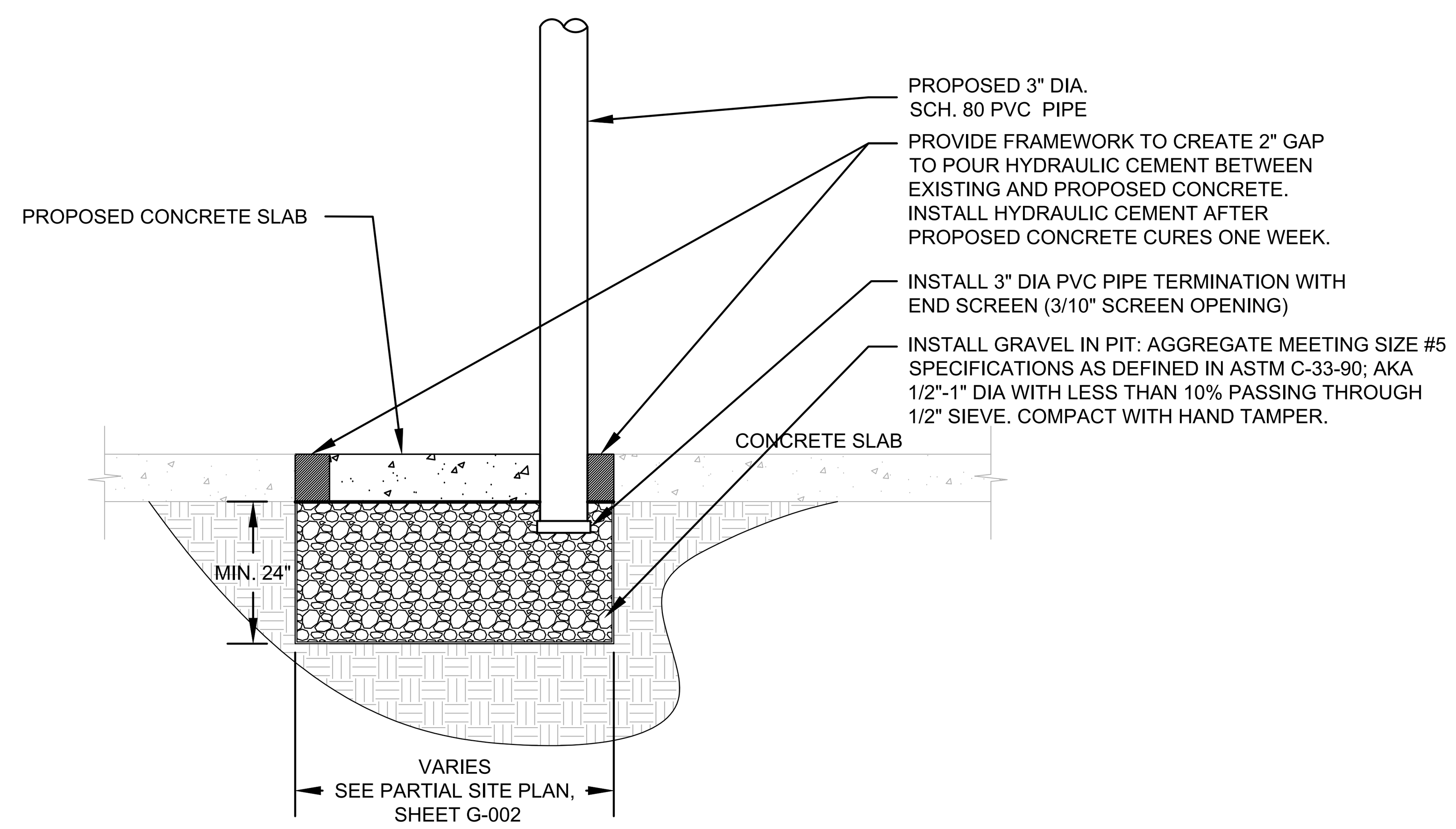
UPC1701

PWGC FILE NAME: J:\Projects S-Z\UPC\1603 - Jay's Lucky Cleaners RI\SSDS\CAD\2017-05-31 - UPC1701 IRM SSDS.dwg (G-002 Partial Site Plan)
PLOT DATE/TIME: May 31, 2017-4:42pm By: ggobillot



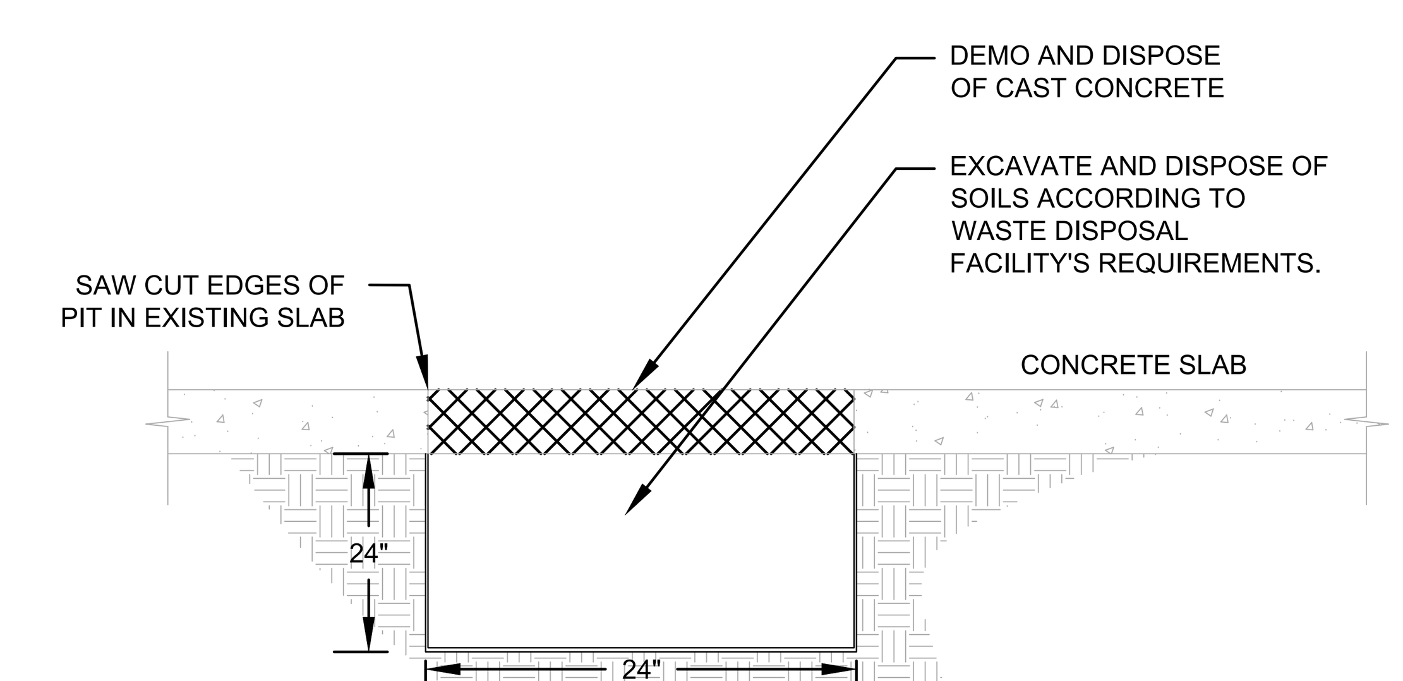
DETAIL A: CONNECTOR PIPING AND ROOFTOP EQUIPMENT

SCALE: NOT TO SCALE



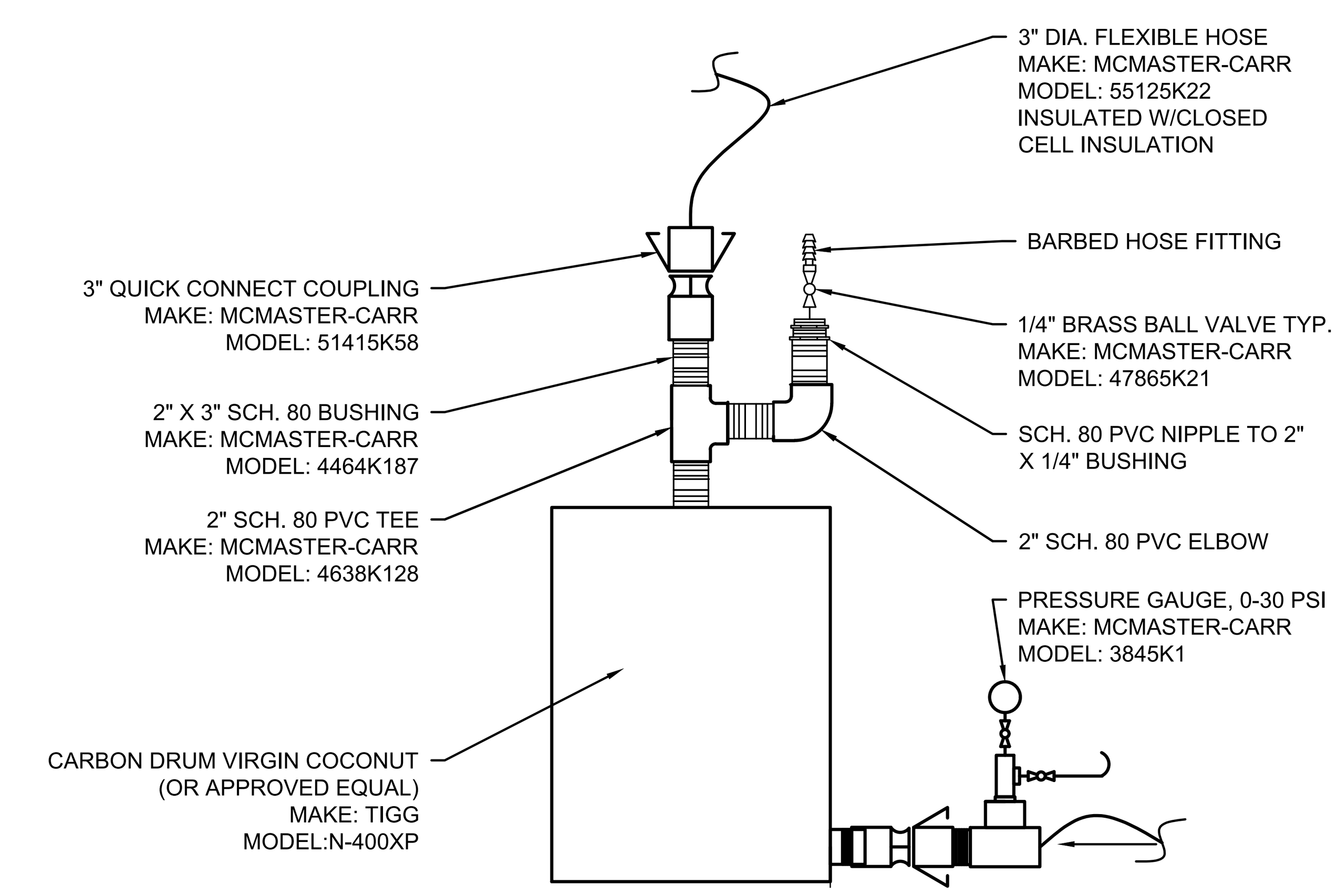
DETAIL B: PIT RESTORATION DETAIL

SCALE: NOT TO SCALE



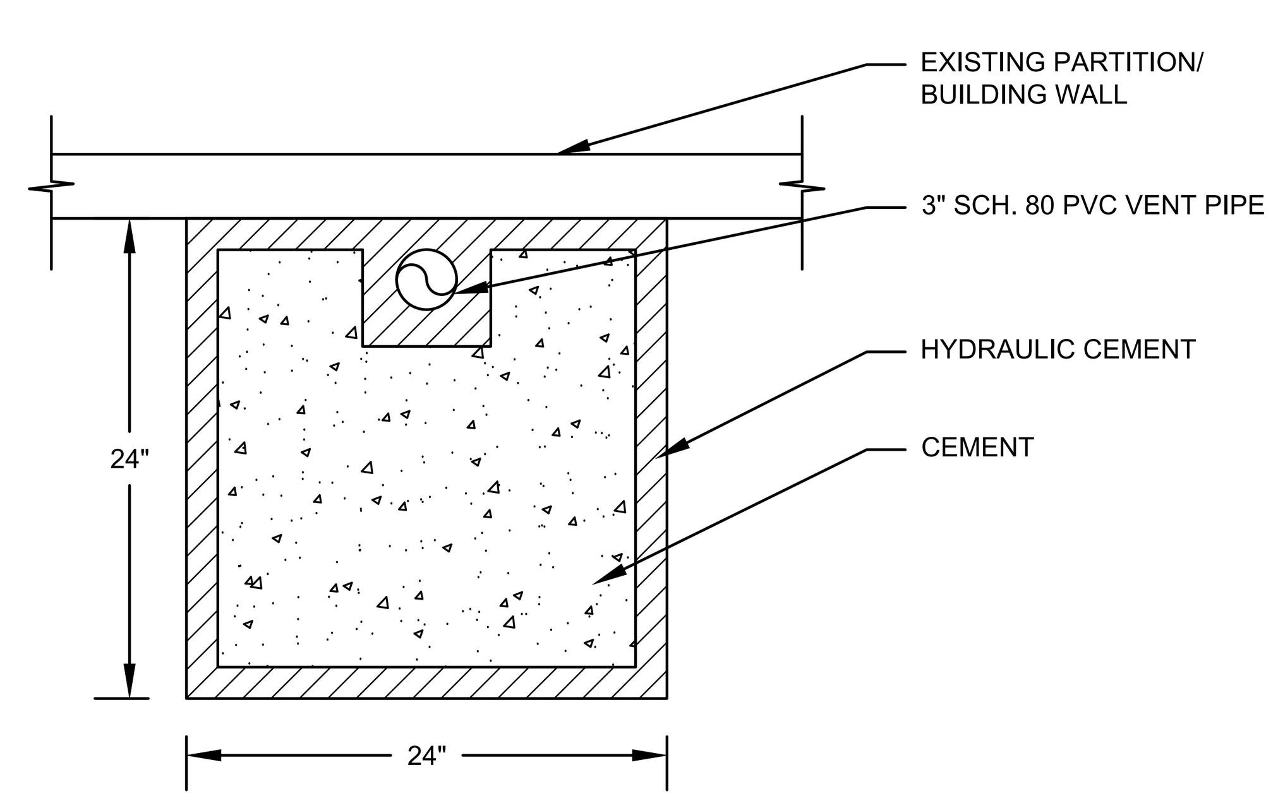
DETAIL C: CONCRETE DEMOLITION FOR PIT DETAIL

SCALE: NOT TO SCALE



DETAIL D: CARBON VESSEL

SCALE: NOT TO SCALE



DETAIL E: PLAN VIEW FOR PIT DETAIL

SCALE: NOT TO SCALE

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SUB SLAB DEPRESSURIZATION SYSTEM

Project Address:
3206-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK

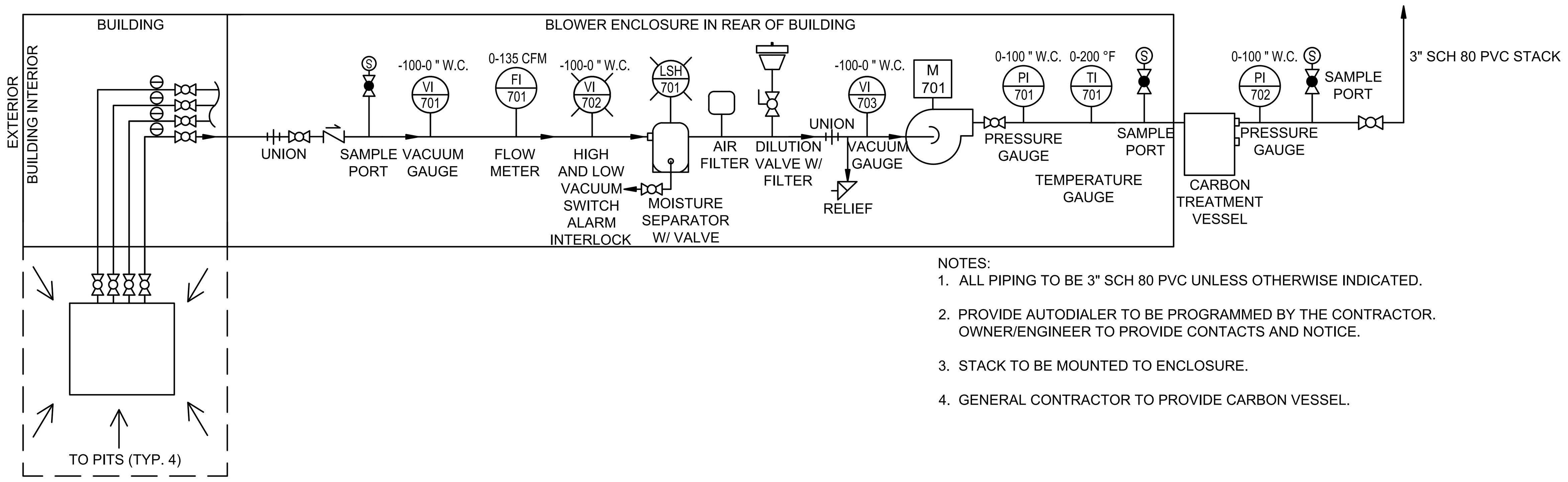
County Tax Map Number:
Contract Number:
Regulatory Reference Number:
Title of Drawing:

SSDS SECTIONS

Drawing Number:
G-003

Sheet 3 of 5

PWGC Project Number:
UPC1701



NOTES:
1. ALL PIPING TO BE 3" SCH 80 PVC UNLESS OTHERWISE INDICATED.
2. PROVIDE AUTODIALER TO BE PROGRAMMED BY THE CONTRACTOR. OWNER/ENGINEER TO PROVIDE CONTACTS AND NOTICE.
3. STACK TO BE MOUNTED TO ENCLOSURE.
4. GENERAL CONTRACTOR TO PROVIDE CARBON VESSEL.

PROCESS AND INSTRUMENTATION DIAGRAM

SCALE: NOT TO SCALE

LEGEND

VALVES AND PIPING	NO	NC
BALL VALVE		
SAMPLE PORT		
PRESSURE RELIEF VALVE		
VACUUM RELIEF VALVE		
CAMLOCK CONNECTION		
UNION		
PARTICULATE FILTER	DRAIN	
CARBON VESSEL		
MOISTURE SEPARATOR		

INSTRUMENT IDENTIFICATION
- INDICATING INSTRUMENT (LOCAL)
- ALARM

EXAMPLE: INSTRUMENT TYPE; SETPOINT OF INSTRUMENT; INSTRUMENT DESIGNATION (PRESSURE SWITCH); SYSTEM POSITION NUMBER

EQUIPMENT
- CENTRIFUGAL, REGENERATIVE BLOWER

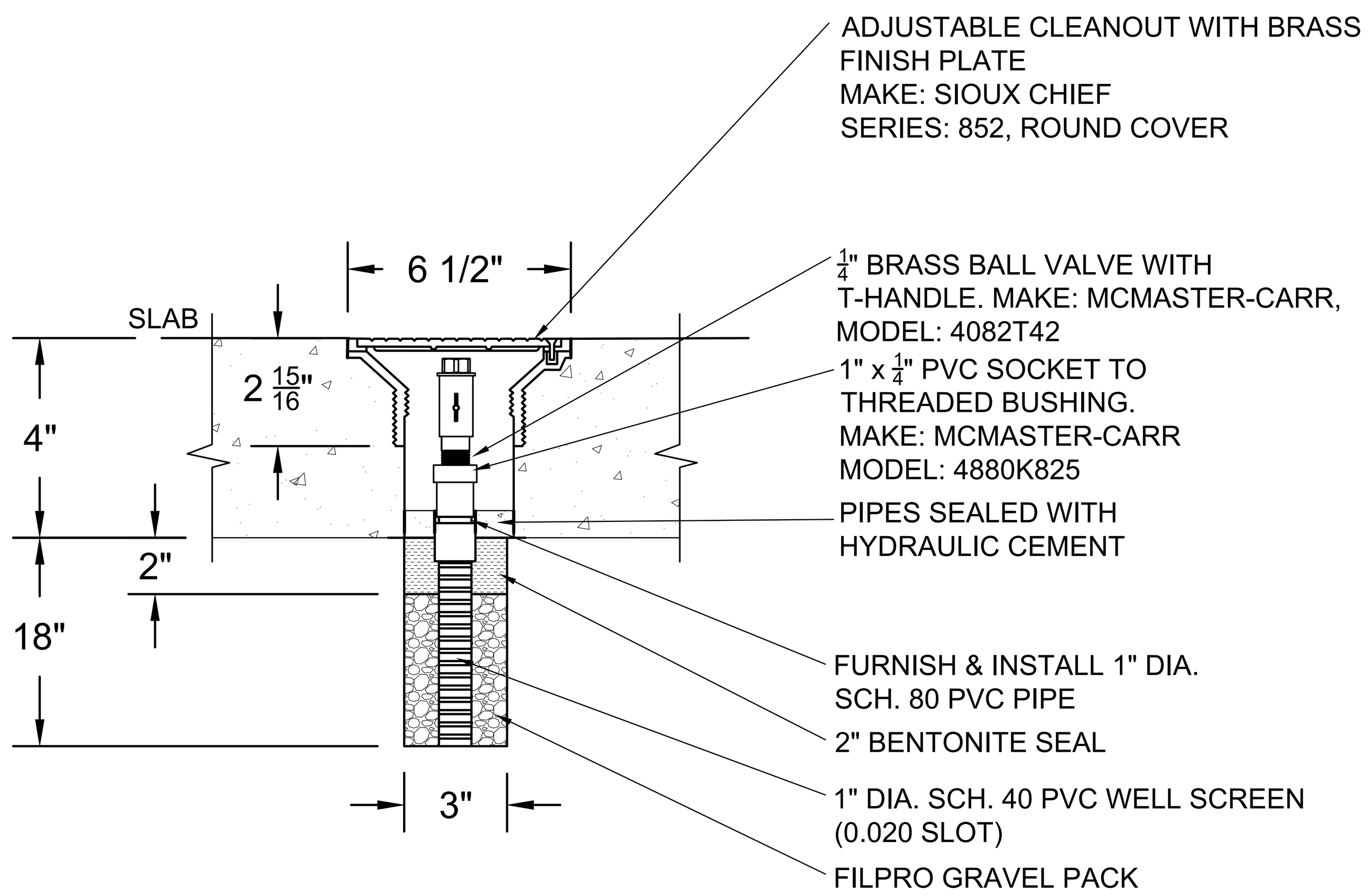
EQUIPMENT ABBREVIATIONS
- FI - FLOW INDICATOR
- M - MOTOR
- PI - PRESSURE INDICATOR
- TI - TEMPERATURE INDICATOR
- VA - VACUUM ALARM

SYSTEM POSITION DESIGNATION
- 700 - SOIL VAPOR EXTRACTION

PROPOSED

ALARM INTERLOCK TABLE

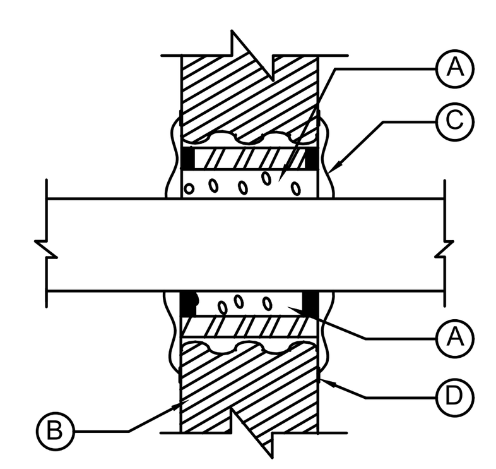
ALARM INTERLOCK	P & ID DESCRIPTION	ALARM DESCRIPTION	SYSTEM RESPONSE	NOTES
1	LSH-701	MOISTURE SEPARATOR HIGH	CRITICAL ALARM SYSTEM SHUT DOWN	
2	VI-702	VACUUM LOW	CRITICAL ALARM SYSTEM SHUT DOWN	
3	VI-702	VACUUM HIGH	CRITICAL ALARM SYSTEM SHUT DOWN	



NOTE: SEE SHEET G-001 FOR VAPOR MONITORING POINT LOCATIONS.

DETAIL F: VACUUM MONITORING POINT

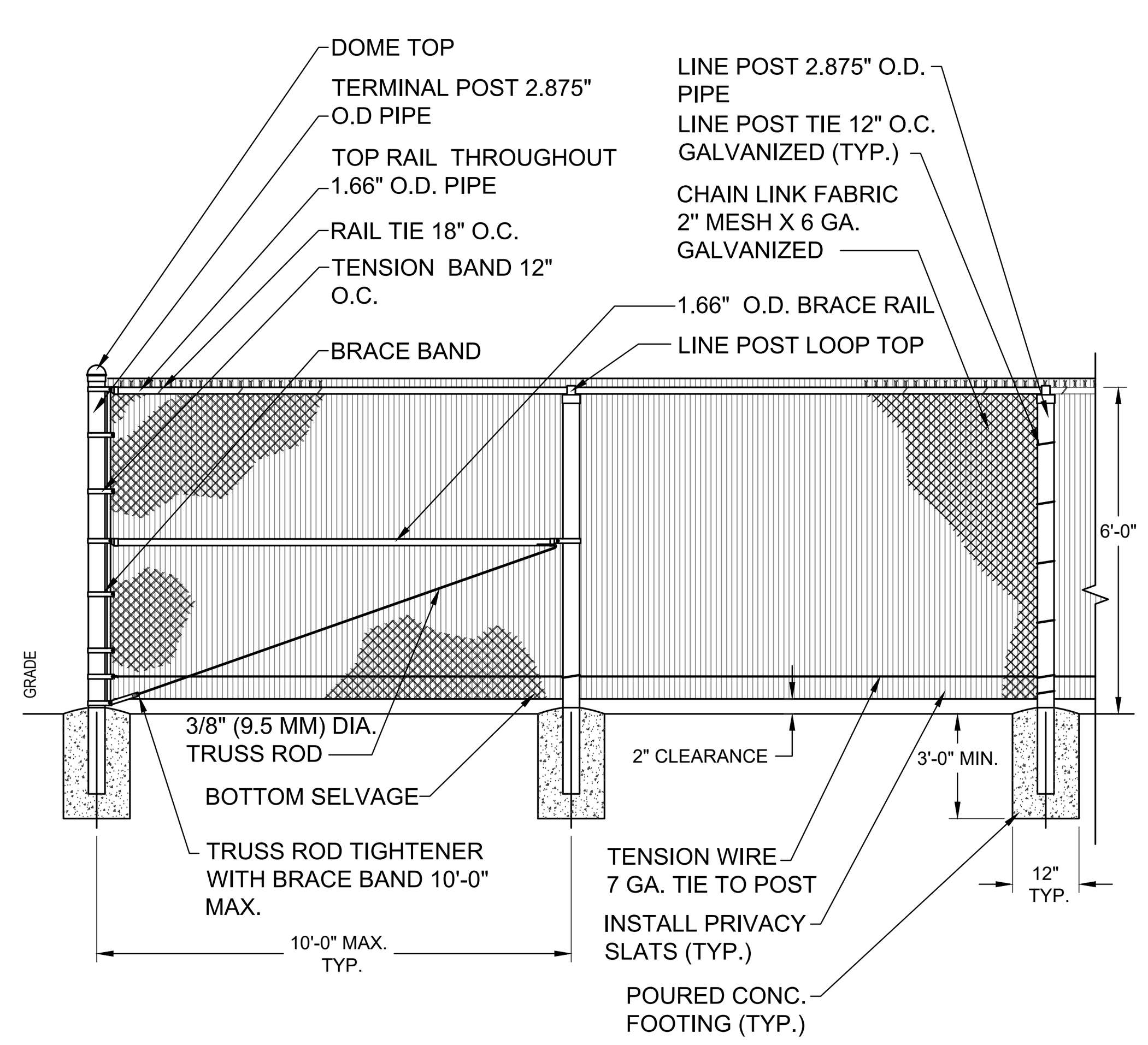
SCALE: NOT TO SCALE



- (A) ALL SPACES PACKED FULL DEPTH WITH MINERAL WOOL OR OTHER EQUALLY APPROVED FIRE RESISTIVE MATERIAL (ASBESTOS OR FIBERGLASS SHALL NOT BE USED).
- (B) EXTERIOR CMU BLOCK WALL.
- (C) ESCUTCHEON RING
- (D) WATER TIGHT SEAL

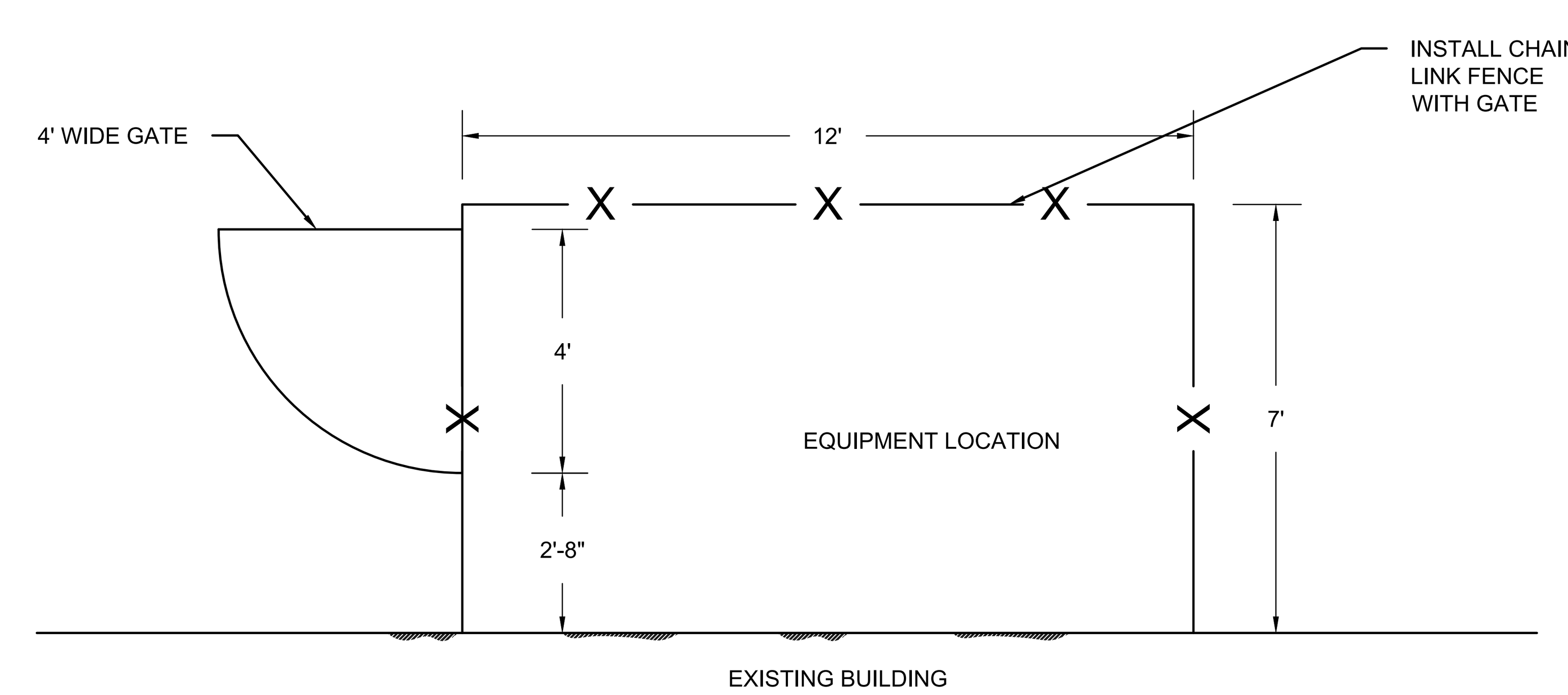
DETAIL G: PIPE PENETRATION DETAIL

SCALE: NOT TO SCALE



DETAIL H: NEW CHAINLINK FENCE DETAIL

SCALE: NOT TO SCALE



DETAIL J: PLAN VIEW FOR CHAINLINK FENCE

SCALE: NOT TO SCALE

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CONSULTANTS

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7		
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1	INTERN REMEDIAL MEASURE	06/02/17

Designed By	DWH	Date Submitted	06/02/17
Drawn By	GMG	Date Created	5/18/17
Approved By	DWH	Scale	NTS

Client:
UNITED PROPERTIES CORP.
1975 HEMPSTEAD TURNPIKE, SUITE 309
EAST MEADOW, NEW YORK 11554

Project:
SUB SLAB DEPRESSURIZATION SYSTEM

Project Address:
3206-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK

County Tax Map Number:
Contract Number:
Regulatory Reference Number:

Title of Drawing:
SSDS DETAILS & DIAGRAMS

Drawing Number: G-004

Sheet 4 of 5

PWGC Project Number: UPC1701

GENERAL NOTES:

1. SITE PLAN IS BASED UPON DRAWINGS PROVIDED BY OWNER. INFORMATION ON THIS PLAN IS APPROXIMATE AND IS TO BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION, ALONG WITH UTILITY LOCATIONS, AS PER THESE GENERAL NOTES.
2. BEFORE START OF WORK THE CONTRACTOR SHALL FURNISH CERTIFICATES OF INSURANCE TO COMPLY WITH THE OWNER'S REQUIREMENTS. CERTIFICATES WILL INDICATE THE AMOUNTS DESIGNATED ON THE APPLICATION AND WORKERS' COMPENSATION NUMBER.
3. NO WORK TO START UNTIL CLEARANCE IS RECEIVED FROM THE OWNER AND ENGINEER.
4. CONTRACTOR SHALL NOTIFY THE ENGINEER'S OFFICE 48 HOURS PRIOR TO THE START OF WORK.
5. THE CONTRACTOR MUST CHECK JOB SITE AND VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO SUBMITTING HIS PROPOSAL AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES FOUND. THE CONTRACTOR SHALL ESTABLISH THE EXACT LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE ANY EXCAVATION WITH THE LOCATION OF EXISTING UTILITIES.
6. ALL WORK SHALL COMPLY WITH THE 2008 N.Y.C. FIRE CODE, N.Y.C. BUILDING CODE, NYSDEC, E.P.A., N.Y.C. ELECTRIC CODE, N.Y.S. FIRE PREVENTION CODE, NATIONAL ELECTRIC CODE, NATIONAL FIRE PROTECTION ASSOCIATION, U.L., AND ALL GOVERNING AGENCIES HAVING JURISDICTION.
7. THE EXISTENCE AND LOCATION OF AERIAL, SURFACE, OR SUBSURFACE UTILITIES IS NOT SHOWN ON THESE PLANS. PRIOR TO ANY DEMOLITION, EXCAVATION, OR SOIL BORINGS, CONTACT THE NYS ONE CALL NUMBER (800) 272-4480 SO THAT UTILITIES CAN BE MARKED OUT.
8. ALL ELECTRIC WORK IS TO BE PERFORMED BY A LICENSED ELECTRICIAN.
9. THE CONTRACTOR SHALL REPAIR ANY DAMAGED SURFACES OR MATERIALS IN THE PERFORMANCE OF THIS CONTRACT.
10. CONTRACTOR TO FURNISH TO OWNER REPRODUCIBLE AS-BUILT DRAWINGS OF ALL COMPLETED WORK.
11. ALL MATERIALS TO BE REMOVED ARE TO BE LEGALLY DISPOSED OF, OFF SITE, EACH DAY EXCEPT WHERE OTHERWISE NOTED. EXTREME CARE IS TO BE TAKEN TO AVOID SPILLAGE OF DEBRIS.
12. THIS WORK IS TO BE PERFORMED TO PROTECT ADJOINING AREAS, EQUIPMENT, AND OCCUPANTS FROM DAMAGE AND HARM, AND TO PRODUCE MINIMUM DISTURBANCE TO SITE OPERATIONS. PROVIDE ALL PROTECTIVE METHODS AND SCHEDULE WORK WITH OWNER.
13. ANY CONSTRUCTION TO BE LEFT IN PLACE THAT IS WEAKENED OR DAMAGED SHALL BE RESTORED TO THE CONDITION WHICH EXISTED PRIOR TO SUCH DAMAGE.
14. CONSTRUCTION THAT IS TO BE REPLACED AFTER REMOVAL WORK SHALL BE REPLACED WITH CONSTRUCTION OF EQUAL OR BETTER STRENGTH AND DESIGN.
15. CONTRACTOR SHALL EMPLOY A PRIVATE UNDERGROUND UTILITY LOCATING COMPANY TO PERFORM UNDERGROUND UTILITY MARKOUTS. UTILITIES SHALL BE MARKED OUT WITH PAINT ON GROUND SURFACE, THEN SKETCHED AND DIMENSIONED TO SCALE. COPIES OF UTILITY SKETCHES SHALL BE PROVIDED TO THE ENGINEER OF RECORD.
16. SUBGRADE PIPING, CONCRETE, AND MASONRY ARE SUBJECT TO CONTROLLED INSPECTIONS.
17. IT SHALL BE ASSUMED THAT THE EXISTING UTILITIES IN AND ADJACENT TO THE CONSTRUCTION WORK ARE IN WORKING ORDER. IN THE EVENT OF UTILITY BREAKDOWNS IN THE AREA, THE CONTRACTOR SHALL MAKE IMMEDIATE REPAIRS WITHOUT COST TO THE OWNER.
18. ALL FIELD WORK SHOULD PROCEED ONLY AFTER EACH UTILITY THAT IS SHOWN ON THE CONTRACT DRAWINGS IS CLEARLY MARKED IN THE FIELD. THEN WORK IS TO PROCEED WITH CONTROLLED EXCAVATION (WITH HAND DIGGING TO EXPOSE KNOWN UTILITIES) UNTIL THE AREA HAS BEEN OPENED SUFFICIENTLY TO UTILIZE MASS OR MECHANICAL EXCAVATION.

EXCAVATION NOTES:

1. AREA OF DISTURBANCE SHALL BE MINIMIZED. CONTRACTOR TO COORDINATE ACCESS AND STAGING AREA WITH OWNER.
2. EXISTING UTILITIES SHALL NOT BE UNDERMINED. CONTRACTOR SHALL MAINTAIN EXISTING UTILITIES DURING THE WORK.
3. CONTRACTOR SHALL LEGALLY DISPOSE OF ALL CONTAMINATED SOILS AS PER APPLICABLE FEDERAL, STATE, AND LOCAL LAWS.

SSDS PIT BACKFILL NOTES:

1. PROVIDE 1/2" - 3/4" CRUSHED STONE TO REPLACE SOIL MATERIALS REMOVED FROM PIT CONSTRUCTION, UNLESS OTHERWISE INDICATED. CONTRACTOR TO PROVIDE CERTIFICATIONS FROM SOURCE OF STONE FILL.
2. CONTRACTOR SHALL PROVIDE ENGINEER AND OWNER ALL, BILLS OF LADING AND DISPOSAL MANIFEST FOR ALL MATERIAL TAKEN OFF SITE.
3. THE CONTRACTOR SHALL PROPERLY DISPOSE OF ALL DEMOLITION AND CONSTRUCTION MATERIAL OFF-SITE. CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR THE DISPOSAL OF THE MATERIAL AND BEAR ALL COSTS OR RETAIN ANY PROFIT INCIDENTAL TO SUCH DISPOSAL.

UNDERGROUND UTILITIES:

1. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES ARE NOT KNOWN BASED UPON AVAILABLE DRAWINGS. THE CONTRACTOR ASSUMES ALL LIABILITY AND RESPONSIBILITY FOR LOCATION AND PROTECTION OF THE UTILITY PIPES, CONDUITS, OR STRUCTURES SHOWN OR NOT SHOWN ON THESE DRAWINGS.

ELECTRICAL INSTALLATIONS:

1. ELECTRICAL INSTALLATION SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH NFPA 70 - NATIONAL ELECTRIC CODE.
2. CONTRACTOR TO COORDINATE WITH OWNER FOR POWER SOURCE FOR TREATMENT SYSTEM.
3. CONTRACTOR TO COORDINATE WITH OWNER FOR PLACEMENT OF CONDUIT FOR MONITORING EQUIPMENT / POWER.
4. ALL ELECTRICAL WORK SHALL BE PERFORMED BY A LICENSED ELECTRICAL CONTRACTOR. CONTRACTOR TO PROVIDE UNDERWRITER'S CERTIFICATE FOR ALL ELECTRIC WORK.

SYSTEM NOTES:

1. SYSTEM CONTROL PANEL SHALL INCLUDE:
   A. VARIABLE SPEED CONTROLLER FOR BLOWER.
   B. H-O-A SWITCHES FOR BLOWER.
   C. RUN AND FAULT INDICATORS FOR ALL MOTORS AND INTERLOCKS.
   D. HI/LOW VACUUM ALARM INDICATOR W/REMOTE INDICATOR MOUNTED ON ENCLOSURE.
2. SYSTEM CONTROLS SHALL BE EQUIPPED WITH AN EMERGENCY STOP BUTTON LOCATED WITHIN 5 FEET OF THE BLOWER.
3. ALL ELECTRICAL WORK SHALL COMPLY WITH NEC DESIGN STANDARDS AND LOCAL REQUIREMENTS.
4. ALL EQUIPMENT SHALL BE INDIVIDUALLY GROUNDED, AS PER NEC REQUIREMENTS.
5. ALL PRESSURE SENSOR ALARMS SHALL BE FIELD ADJUSTABLE IN ON CONTROLLER AND HAVE A RANGEOF 0-100" W.C..

TESTING:

1. ALL NEW OR MODIFIED PIPING MUST BE PRESSURE TESTED FOR 1 HOUR @ 30 PSI. TESTING MUST BE WITNESSED BY ENGINEER.
2. ALL NEW EQUIPMENT WILL BE TESTED TO ENSURE PROPER OPERATION.
3. TESTING MUST BE WITNESSED BY ENGINEER.

PIPING NOTES:

1. RISER PIPE TO BE 3" DIA. SCH 80 PVC. JOINTS SHALL BE CEMENTED.
2. TOTAL LENGTH OF PIPE WILL VARY DEPENDING ON FINAL LOCATION OF BLOWER ASSEMBLIES UPON ROOF.
3. INSTALL DI-ELECTRIC COUPLINGS / BUSHINGS / TRANSITION FITTINGS AS REQUIRED.
4. ALL EXTERIOR PIPING TO BE INSULATED WITH 1/2" CLOSED CELL INSULATION.

SYSTEM DETAILS

SVE BLOWER AND INSTRUMENTATION PACKAGE TO BE PROVIDED BY GASHO CORPORATION OF CHESTER PA. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THE DETAILS AND REQUIREMENTS OF THESE PLANS REFLECT THE EQUIPMENT VENDORS PROPOSAL. CARBON VESSELS ARE TO BE PROVIDED BY THE CONTRACTOR.

1. NEMA 4 CONTROL PANEL, 208 VOLT, 3 PHASE, WITH;
   1.1. ELECTRICAL DISCONNECT SWITCH
   1.2. VARIABLE SPEED CONTROLLER
   1.3. MOTOR RUN LIGHT
   1.4. HOA SELECTOR SWITCH
   1.5. CONTROL INTERLOCK (SEE P&ID)
   1.6. MANUAL RESET BUTTON
   1.7. AUTOMATIC TELEPHONE DIALER
   1.8. HI/LOW ALARM INDICATION LIGHTS W/REMOTE INDICATOR
2. ELECTRICAL DISTRIBUTION PANEL FOR LIGHTING ENCLOSURE, FANS , HEATER ENCLOSURE, RECEPTACLE.
3.
4. AMETEK MOISTURE SEPARATOR, MODEL MS300DS W/LIQUID LEVEL SWITCH FOR INTERLOCK.
5. 2" DILUTION VALVE W/INLET FILTER/ SILENCER
6. 2" INLINE FILTER W/ POLYESTER ELEMENT
7. AMETEK ROTRON ENVIRONMENTAL BLOWER MODEL: EN757F72XL, P/N 081174 5 HP, XP, 230/460/3/60
8. 400 LB CARBON VESSEL, MAKE: TIGG CORPORATION, MODEL: N-400 XP, VIRGIN COCONUT. PROVIDED BY GENERAL CONTRACTOR
9. 3" CAM LOCK TYPE SYSTEM EFFLUENT CONNECTION AND 3" DIAMETER SCH. 80 PVC EFFLUENT PIPING TO STACK.
10. TEFC VENTILATION FAN WITH THERMOSTAT

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Designed By: DWH	Date Submitted: 06/02/17
Drawn By: GMG	Date Created: 5/18/17
Approved By: DWH	Scale: NTS

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Project:
SUB SLAB DEPRESSURIZATION SYSTEM

Project Address:
**3206-3224 LONG BEACH ROAD
OCEANSIDE, NEW YORK**

County Tax Map Number:

Contract Number:

Regulatory Reference Number:

Title of Drawing:

SSDS NOTES

Drawing Number: **G-005**

Sheet 5 of 5

PWGC Project Number: **UPC1701**

PWGC FILE NAME: J:\Projects S-Z\UPC\1603 - Jay's Lucky Cleaners RI\SSDS\CAD\2017-05-31 - UPC1701 IRM SSDS.dwg (G-005 Notes)
PLOT DATE/TIME: May 31, 2017-4:42pm By: ggobillot

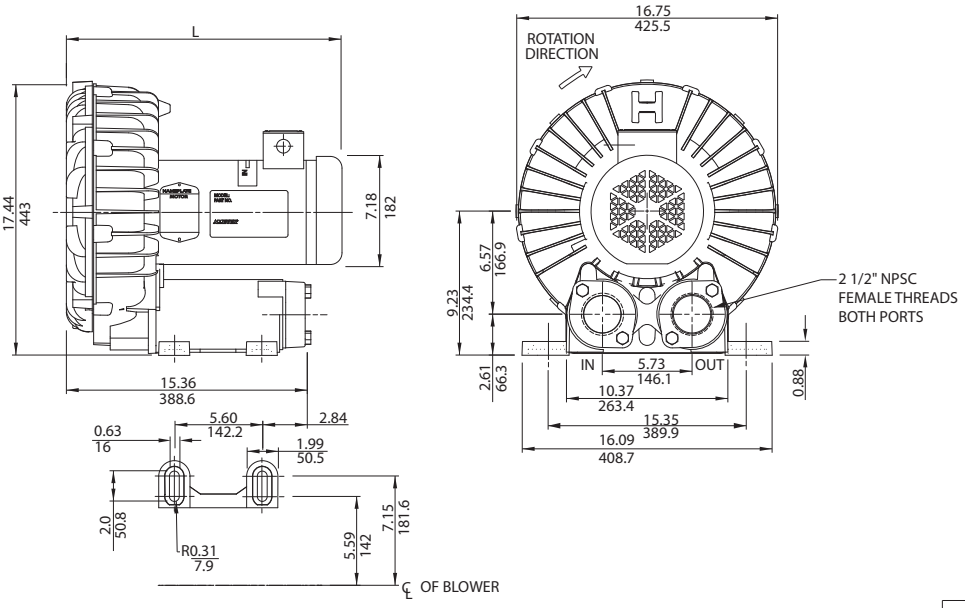
Appendix B – Manufacturer's Specifications

Environmental / Chemical Processing Blowers

ROTRON®

EN 757 & CP 757

3.0 / 5.0 HP Sealed Regenerative w/Explosion-Proof Motor



IN
MM

NOTES
1. TERMINAL BOX CONNECTOR HOLE .75 NPT.
2. DRAWING NOT TO SCALE, CONTACT FACTORY FOR SCALE CAD DRAWING.
3. CONTACT FACTORY FOR BLOWER MODEL LENGTHS NOT SHOWN.

MODEL	L (IN/MM)
EN757M72XL	19.72/500.9
EN757F72XL	21.00/533.4

		Part/Model Number				
		EN757M72XL	EN757M86XL	EN757F72XL	CP757FW72XLR	CP757FU72XLR
Specification	Units	081176	081177	081174	081180	081181
Motor Enclosure - Shaft Mtl.	-	XP-CS	XP-CS	XP-CS	Chem XP-SS	Chem XP-SS
Horsepower	-	3.0	3.0	5.0	XP-CS	3
Voltage	AC	208-230/460	575	208-230/460	208-230/460	208-230/460
Phase - Frequency	-	Three-60 Hz	Three-60 Hz	Three - 60 Hz	Three-60 Hz	Three - 60 Hz
Insulation Class	-	B	B	B	B	B
NEMA Rated Motor Amps	Amps (A)	7.2/3.6	3.0	14/7	14/7	7.2/3.6
Service Factor	-	1.0	1.0	1.0	1.0	1.0
Maximum Blower Amps	Amps (A)	10/5	4.0	15/7.5	15/7.5	10/5
Locked Rotor Amps	Amps (A)	54/47	22	152/76	152/76	54/27
NEMA Starter Size	-	0/0	0	1/1	1/1	0/0
Shipping Weight	Lbs	158	158	158	158	158
	Kg	71.7	71.7	71.7	71.7	71.7

Voltage - 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.

Operating Temperatures - 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.

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.

XP Motor Class - Group - See Explosive Atmosphere Classification Chart in Section I

AMETEK TECHNICAL & INDUSTRIAL PRODUCTS
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Customer Service Fax: +1 215.256.1338
www.ametektip.com

AMETEK®
TECHNICAL & INDUSTRIAL PRODUCTS

Environmental / Chemical Processing Blowers

EN 757 & CP 757

ROTRON®

3.0 / 5.0 HP Sealed Regenerative w/Explosion-Proof Motor

FEATURES

- Manufactured in the USA - ISO 9001 and NAFTA compliant
- Maximum flow: 310 SCFM
- Maximum pressure: 80 IWG
- Maximum vacuum: 75 IWG
- Standard motor: 5.0 HP, explosion-proof
- Cast aluminum blower housing, impeller , cover & 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

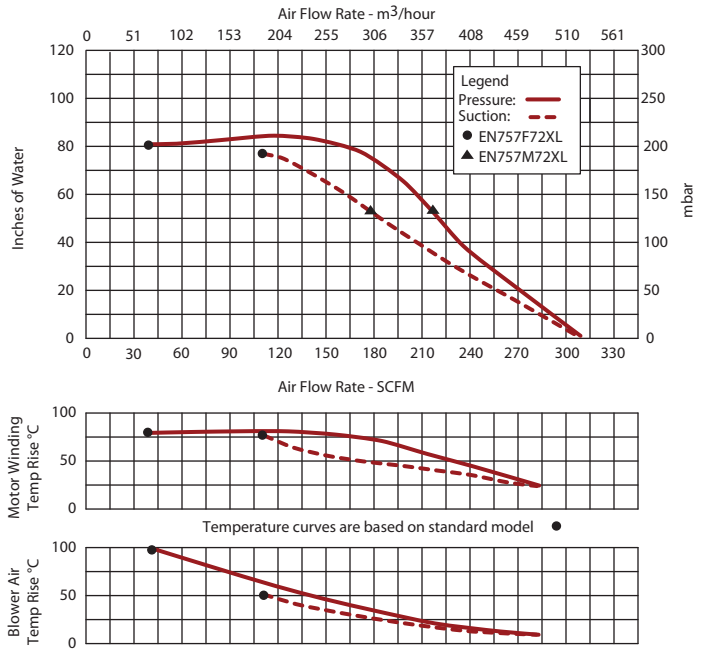
- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

ACCESSORIES

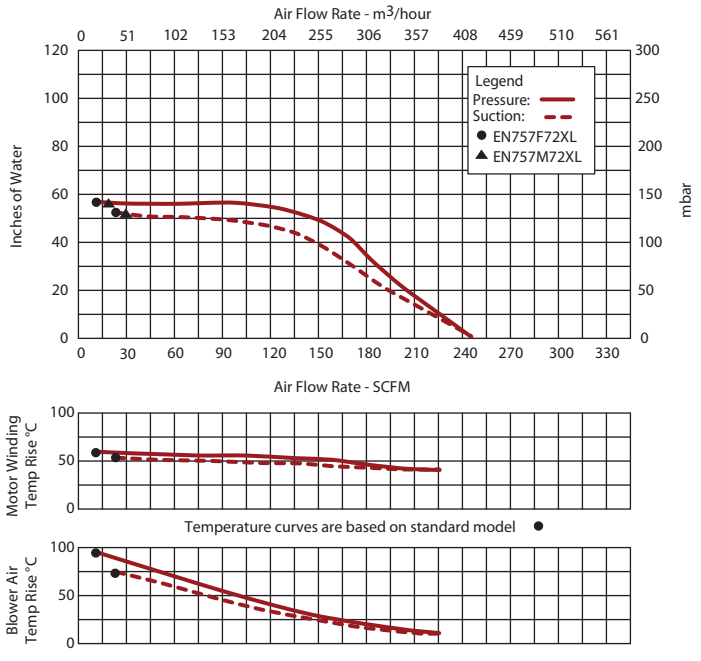
- Flowmeters reading in SCFM
- Filters & moisture separators
- Pressure gauges, vacuum gauges, & relief valves
- Switches - air flow, pressure, vacuum, or temperature
- External mufflers for additional silencing
- Air knives (used on blow-off applications)
- Variable frequency drive package

Blower Performance at Standard Conditions

60 Hz



50 Hz



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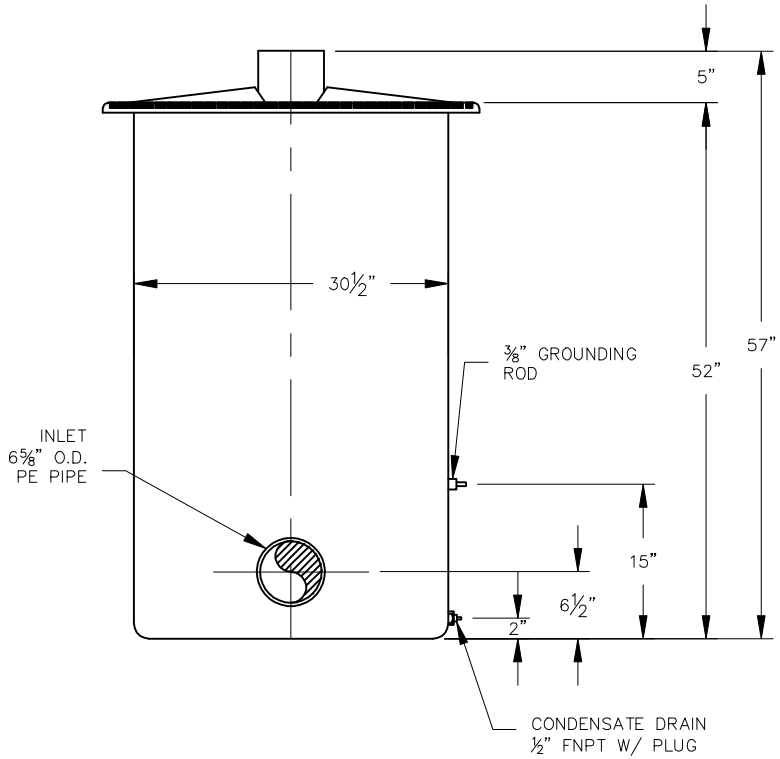
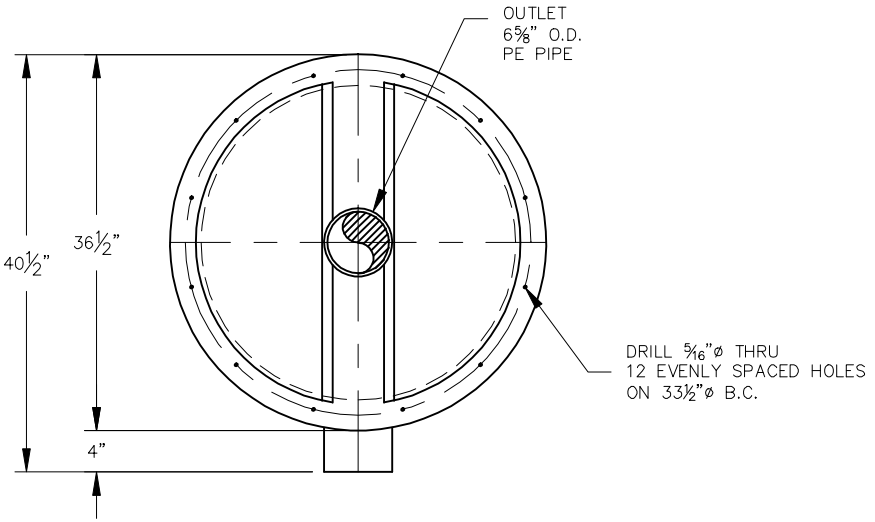


ELEVATION



PLAN

VESSEL STANDARDS

VESSEL MATERIALS : LINEAR DENSITY POLYETHYLENE	VOLUME OF MEDIA BED : 14.7 FT^3
LINING : N/A	STANDARD CARBON FILL : 400 LBS
EXTERIOR PAINT : N/A	SHIP WT. : 440 LBS
INTERNALS : POLYETHYLENE	MAXIMUM OPERATING PRESSURE : ATMOSPHERE
ADSORBENT OUTLET ASSEMBLY : N/A	MAXIMUM OPERATING TEMPERATURE : 130°F
CONDENSATE DRAIN ASSEMBLY : 1/2" FNPT W/ PLUG	

NO.	REVISION	BY	DATE
4	REMOVE INLET / OUTLET FLANGE	JB	3/9/10
3	SHORTEN INLET PROJECTION	JB	6/23/05
2	REVISE GROUNDING ROD HEIGHT	JB	12/15/03
1	REVISE TITLEBLOCK	JB	6/24/03

PROJECT

N-400-XP

PROJ. NO. SALES

P.O. NO.

DRAWN BY	ZS
DESIGN BY	BL
CHKD. BY	BL
DATE	6/24/03
SCALE	NTS

TIGG corporation

PLAN & ELEVATION

DWG. NO. N-400-XP-1001 REV. 4

Westates® coconut shell based granular activated carbon - VOCarb® 48C

(Formerly CC-601)

For Gas Phase Adsorption Applications

Description

VOCarb® 48C is a high activity, granular activated carbon that is manufactured from selected grades of coconut shell. The granular shape of this carbon maximizes its geometric surface area, significantly increasing surface and pore diffusion rates and thereby increasing it's effectiveness for the adsorption of VOCs with a short contact time. The very high surface area and predominately microporous pore size distribution further enhance the effectiveness of this coconut shell based carbon. In addition, VOCarb® carbons also have a high retentivity to hold onto and prevent desorption of previously adsorbed organic compounds. The granular shape of VOCarb® 48C results in excellent gas contacting but still allows the carbon bed to operate at a relatively low pressure drop. The high density and superior hardness of VOCarb® 48C activated carbon provides excellent resistance to dust and fines formation.

Applications

Cost effective VOCarb® activated carbons developed by Siemens have been demonstrated to provide superior performance in an extensive array of gas phase treatment applications. VOCarb® activated carbons are available for:

- Chemical process applications
- VOC control from air strippers, soil vapor extraction and air sparge systems
- Control of tank vent emissions
- HVAC
- Odor control
- Solvent recovery of low boiling point solvents
- Use as a catalyst/catalyst support

Quality Control

All VOCarb® activated carbons are extensively quality checked at our State of California certified environmental and carbon testing laboratory located in Los Angeles, CA. Siemens' laboratory is fully equipped to provide complete quality control analyses using ASTM standard test methods in order to assure the consistent quality of all Westates® carbons.

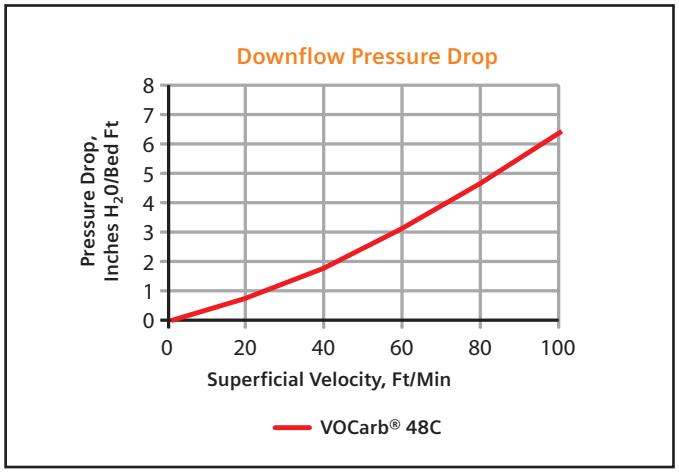
Our technical staff offers hands-on guidance in selecting the most appropriate system, operating conditions and carbon to meet your needs. For more information, contact your nearest Siemens representative.

Features and Benefits

- Exceptionally high VOC adsorption capacity
- Excellent VOC retentivity characteristics, works well for the adsorption of small molecules
- Superior hardness minimizes attrition losses during handling, use and service
- Cost effective
- Easily reactivated for recycle and reuse
- Low pressure drop characteristics
- Backed by technical support and a strong QA/QC program

Typical Properties	
Parameter	**VOCarb® 48C**
Carbon Type	Coconut Shell
Mesh Size, U.S. Sieve	4 x 8
Butane Activity (1)	23.5
Hardness No., Wt. %	95
Moisture Content, Wt. %	2
Apparent Density, g/cc	0.45 - 0.52
CTC Activity (1)	60

1)Butane activity (D5742) has been adopted by ASTM as a replacement for CTC activity (D3467) as a test method for estimating the micropore volume of an activated carbon.



Warning

The adsorption of organic compounds onto activated carbon generates heat. In rare instances, adsorbed compounds may also react on the carbon surface to generate additional heat. If these heat sources are not properly dissipated, the carbon bed temperature may rise to the point where the carbon can ignite, leading to a fire or other hazardous condition. A description of industry-accepted engineering practices to assure the dissipation of heat and safe operation of the carbon bed can be provided upon request. In certain applications where the risk of ignition is significant, activated carbon may not be a recommended treatment technology. Please contact your Technical Sales Representative for more details.

Wet activated carbon readily adsorbs atmospheric oxygen. Dangerously low oxygen levels may exist in closed vessels or poorly ventilated storage areas. Workers should follow all applicable state and federal safety guidelines for entering oxygen depleted areas.

All information presented herein is believed reliable and in accordance with accepted engineering practices. Siemens makes no warranties as to the completeness of this information. Users are responsible for evaluating individual product suitability for specific applications. Siemens assumes no liability whatsoever for any special, indirect or consequential damages arising from the sale, resale or misuse of its products.

Siemens
Water Technologies
866.613.5620 phone

The Leader in Blower & Vacuum Solutions
460 West Gay Street
West Chester, PA 19380

GX100-DL Moisture Separator, 400 ICFM Specification

100 gallon vessel with approx. 40 gallons of storage
Flow Rate- 400 ICFM, Vacuum rating 29.5 in. Hg
Integral SS demister / filter media, 99.5% entrained water removal
Pressure drop through clean media = .25 IWC
Welded steel construction, reinforced for high vacuum
External Site Gauge, 1" ports for 2" clear tube sight gauge
Level Switch Ports- (3) 1" NPT ports, 6" 150 Lb. Flange Cleanout port with clear cover
4" NPT inlet, and outlet
Standard External finish is alkyd paint, inside is left uncoated
Optional coatings available