OPERATION, MAINTENANCE AND MONITORING WORK PLAN

FOR

FORMER DOWCRAFT SITE
FALCONER, NEW YORK

Prepared by:

C&S ENGINEERS, INC.
141 ELM STREET, SUITE 100
BUFFALO, NEW YORK 14203

MARCH 2018

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ACRONYM LIST

OM&M Plan	Operation, Monitoring and Maintenance Plan
JCC	Jamestown Container Company
TCE	Trichloroethene
IRM	Interim Remedial Measure
ROD	Record of Decision
CRA	Conestoga-Rovers & Associates
COC	Contaminants of Concern
DNAPL	Dense Non-aqueous Phase Liquid
BGS	Below Ground Surface
NYSDOH	New York State Department of Health
SSDS	Sub-slab Depressurization System
HASP	Health and Safety Plan
MS/MSD	Matrix Spike / Matrix Spike Duplicate
U.S. EPA	United States Environmental Protection Agency

1 INTRODUCTION

C&S Engineers, Inc. (C&S) has prepared this Operation, Maintenance and Monitoring (OM&M) Plan on behalf of Jamestown Container Companies (JCC) for the former Dowcraft facility (the Site).

1.1 Background and Site Description

The Dowcraft Site is located at 65 South Dow Street in Falconer, New York and occupies approximately 2.2 acres of land situated immediately east of South Dow Street and approximately 100 feet south of the Chadakoin River. The Jamestown Container manufacturing building is situated between the Site and the Chadakoin River.

The property was first developed in 1890 as a woolen mill until 1939 when it was converted into a factory which manufactured steel partitions used for offices. As part of this manufacturing process, a vapor degreaser was used which included the use of chemicals such as trichloroethene (TCE). This work continued until 1999 when the facility was closed, a portion of the Site was demolished, and the property was sold to JCC.

Figure 1 presents present and historic site features.

The Site was the subject of environmental investigations in the early 1990s, at which time contaminated groundwater was discovered on site. An interim remedial measure (IRM) was subsequently put in place in 1994 which consisted of groundwater extraction and treatment. In 2000, the use of additional groundwater remediation technologies was approved by the NYSDEC which involved in-situ chemical oxidation of TCE through the injection of potassium permanganate into the overburden groundwater. In 2003, a Record of Decision (ROD) was approved that selected the following remedy:

- In-situ groundwater treatment through chemical oxidation, by injection of potassium permanganate dissolved in water, through existing well points into the shallow overburden groundwater table;
- Overburden groundwater monitoring to verify the effectiveness of the treatment;
- Institutional controls to prevent the use of groundwater as a source of potable water; and
- Annual certification to NYSDEC to certify that institutional controls remain in place.

Conestoga-Rovers & Associates (CRA) conducted nine injection treatments between May 2000 and July 2006, totaling 21,500 pounds of potassium permanganate. Previous injection treatments were successful in oxidizing some TCE; however, the concentrations of TCE in the source area remain high.

Injections were conducted on December 1 through 9, 2014. Two methods were implemented in treating the contaminated groundwater. The first method included the injection of a solution of 4,024.12 pounds of potassium permanganate in ten borings. The second method included the placement of potassium permanganate cylinders as a treatment adjacent to PW-3R and installation of cylinders in monitoring wells inside the JCC building.

The fifth round of post-treatment sampling suggests that the potassium permanganate injections and cylinders appear to be effective in treating the groundwater contaminants in many wells.

2 SUMMARY OF ENVIRONMENTAL CONDITIONS

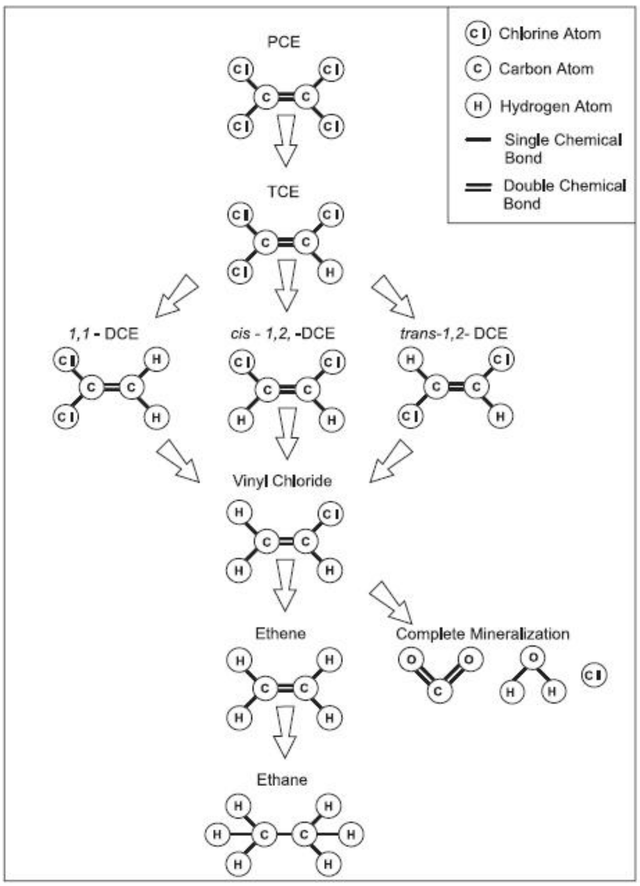
1.2 Contaminants of Concern

Chlorinated solvents, primarily, trichloroethene and its daughter compounds, were identified as the contaminants of concern (COC) for this Site. TCE is a man-made volatile organic compound used for degreasing metal and electronic parts. Remedial considerations for TCE include its low solubility value and heavy molecular weight. TCE is in a class of chemicals called dense non-aqueous phase liquids (DNAPL) that sink through the water column until they encounter an impermeable barrier.

Groundwater contaminant plumes with TCE can undergo a process of reductive dechlorination, during which chlorine atoms are stripped from TCE and daughter compounds are produced. The rate of dechlorination can vary based on:

- Amount of TCE in the subsurface;
- Amount of organic material; and
- Type and concentration of electron acceptors available in the system.

The process of TCE reductive dechlorination is shown below:



1.3 Geology and Hydrogeology

Site geology consists of fill material overlying two sand/gravel layers separated by a silt/clay lens. Fill material consists of a mixed matrix of sand, cinders, silt, gavel, brick, concrete, coal, slag and metal. The fill unit ranges in thickness from 2 to over 14 feet with an average thickness of 8 feet.

The upper sand/gravel layer ranges from 10 to 20 feet in thickness. Underlying the upper sand/gravel layer is a silt/clay lens that ranges from 4 to 8 feet in thickness. The lower sand/gravel layer is 10 to 18 feet thick. Underlying the lower sand layer is a second silt/clay layer that starts approximately 43 feet below ground surface (BGS). This unit is estimated to be 60 feet in thickness according to regional geology.

The average depth to groundwater is 10 feet BGS within the upper sand/gravel layer. Groundwater flow within the upper sand/gravel layer is to the north-northeast at approximately 2.7 feet per year. Figure 2 shows the inferred groundwater flow direction in the upper sand/gravel layer. The silt/clay layer overlying the lower sand/gravel layer is acting as an aquitard for deeper groundwater and is creating a semi-confined aquifer.

1.4 Extent of Contamination

According to previous environmental reports, the area of former degreaser pit (area of groundwater monitoring wells PW-3 and PW-3R) is a likely source area for the COC plume. The plume originates from the degreaser area and has affected groundwater in the upper and lower sand/gravel layers. The plume extends from the degreaser area to the north, under the JCC building and up to the area of the Chadakoin River. This is an area of approximately one acre. The rate of movement is approximately 2 to 3 feet per year to the north.

3 OBJECTIVES, SCOPE AND RATIONALE

The objectives of the scope of work described in this Work Plan are to monitor the natual attenuation of the groundwater contamination and periodically inspect the operation of two soil vapor mitigation systems over five years.

3.1 Groundwater Contamination

As stated in the 2003 ROD, the remedial goals selected for this Site are:

- Treat the source area of groundwater contamination by oxidative de-chlorination of the contaminants in place;
- Prevent exposure of human receptors to contaminated groundwater in the sand and gravel unit under Site;
- Prevent or mitigate, to the maximum extent practicable, COC migration via groundwater so that releases from the underlying sand and gravel unit to the Chadakoin River do not exceed applicable standards, criteria and guidance;
- Prevent or mitigate, to the maximum extent practicable, the migration of contaminated groundwater to off-site areas;
- Restore on-Site groundwater in the sand and gravel unit to the maximum extent practicable which will not result in exceedances of applicable standards, criteria and guidance; and

- Monitor the groundwater in a manner to verify the effectiveness of the remedial actions.

Two IRMs have been conducted at the Site. The first IRM involved the operation of a groundwater pump & treat system between 1994 and 1999. The second IRM consisted of CRA conducting nine injection treatments between May 2000 and July 2006, totaling 21,500 pounds of potassium permanganate and one injection of soy lactate have been completed and have dramatically reduced the concentrations of COCs in groundwater in the area of the former TCE degreaser pit. C&S conducted one injection in December 2014, totaling 4,024.12 pounds of potassium permanganate, and installed a potassium permanganate treatment fence. These efforts have further reduced COC concentrations.

C&S has reviewed the criteria outlined by the EPA on evaluating the potential for natural attenuation on sites contaminated with chlorinated solvents. Based on groundwater quality results from past groundwater monitoring events, C&S believes that natural attenuation via anaerobic biodegradation could effectively degrade the remaining COCs in the on-site groundwater.

C&S proposes the next remedial action for the Site consist of monitored natural attenuation for five years in addition to existing institutional controls to prohibit the use of impacted Site groundwater. The sections below outline the sampling plan, maintenance/monitoring protocols and reporting for the natural attenuation monitoring.

3.2 Soil Vapor Contamination

On November 2, 2015, Centek Laboratories performed the SVI sampling with the assistance of JCC maintenance staff. A total of nine sub-slab samples and nine indoor air samples installed within two buildings. Sub-slab air samples indicate that TCE contaminated soil vapor has impacted the subsurface underneath both of the buildings. After review of the SVI study, the New York State Department of Health (NYSDOH) required the installation of a mitigation system address soil vapor concerns.

Two separate sub-slab depressurization systems (SSDS) were designed and recently installed to mitigate the migration or potential migration of subsurface vapors into the building interiors. As stated in the Sub-Slab Depressurization System Work Plan (provided in **Appendix A**) C&S proposes to monitor the SSDS for five years.

April 2017, Jamestown Container Companies – 65 South DOW St., Falconer, NY 14733 Construction Completion Report for SSD System – Building 9, prepared by Mitigation Tech Vapor Intrusion Specialists.

The building was assessed by confirmatory sub-slab air communication testing at the job start to refine data obtained from the preliminary building assessment. The system, comprised of two fans, suction cavities, and other SSD system components, was constructed on March 21 through 27, 2017. Vacuum and air flow measurements were performed continuously during construction to ensure design integrity.

As-built sketches of the system are provided in Appendix C.

October 2017, Jamestown Container Companies – 65 South DOW St., Falconer, NY 14733 Construction Completion Report for SSD System – Building 5 & 6, prepared by Mitigation Tech Vapor Intrusion Specialists.

This document presented a construction report, performance evaluation, O&M recommendations, and certification of effectiveness for the SSDS and Crawlspace Ventilation System (CVS) installed by Mitigation Tech. Following a Design/Build SSD construction plan that was modified based on continuing assessment performed during construction, five single suction point SSD systems were installed using principles and equipment typically used for soil vapor intrusion mitigation in buildings in compliance with the NYSDOH document, "Guidance for Evaluation Soil Vapor Intrusion in the State of New York, October 2006."

The building was assessed by extensive sub-slab air communication testing at job start to refine data obtained from the preliminary building assessment. Due to a system of sub-slab structural arches and crisscrossing grade beams, sub-slab spaces were either inaccessible or difficult to access. In the case of Building 5, extensive backfilling has occurred such that the soil is present immediately below the floor in the central and northernmost portions of the foundation. The southernmost portion is an open crawlspace with a dirt floor. Mitigation Tech determined that active ventilation of the southernmost sub-slab compartment bounded by buildings 4 and 6A would constitute a zone of defense to intercept soil vapor migrating from the south which would also create some limited depressurization north of the first grade beam. In the case of Building 6, the sub-space is in essence a crawlspace so ventilation was determined the most appropriate strategy to divert vapors from the building interior.

The system, comprised of five independent fan systems, suction cavities, and other SSD system components, was constructed on August 4 through 7, 2017. Vacuum and air flow measurements were performed continuously during construction to ensure design integrity.

As-built sketches of the system are provided in Appendix C.

4 REMEDIAL ACTION MONITORING AND REPORTING

The Remedial Action Monitoring Program will consist of monitoring of Site groundwater on annual basis and the performance of the SSDS on a weekly/annual. The data collected will be used to evaluate the performance of the remedial action and to meet the monitoring requirements.

The following subsections present the details of the monitoring program including specific sample collection, sample analyses, and reporting tasks.

4.1 Groundwater Monitoring Program

A groundwater monitoring program has been designed to provide the data necessary to demonstrate the effectiveness of natural attenuation

4.1.1 Monitoring Well Network

The Site contains a total of 23 monitoring wells installed in November 1990, November 1991, and April 1992. The monitoring wells below have been shown to be directly within the contaminant plume.

ESI - 1	ESI - 11
ESI - 2	ESI - 12
ESI - 3	ESI - 13R
ESI - 6	PW - 1
ESI - 7	PW - 3R

ESI - 10

It should be noted that PW-2 has been previously sampled by other consultants; however, during groundwater monitoring conducted by C&S on July 2, 2013, PW-2 could not be developed and sampled because piping was located in the well that could not be removed. Monitoring well ESI - 6 is located within six feet of PW-2 and was developed and sampled as a substitute for PW-2.

4.1.2 Groundwater Monitoring

To characterize groundwater conditions at the Site, 11 existing monitoring wells will be sampled annually. The groundwater samples will be analyzed for Target Compound List (TCL) VOCs. The locations of the monitoring wells to be sampled are shown in **Figure 2**.

Groundwater sampling will be conducted using low-flow purging and sampling techniques. Before purging the well, water levels will be measured using an electric water level sounder capable of measuring to the 0.01-foot accuracy. Peristaltic or bladder pumps using manufacturer-specified tubing will be used for purging and sampling groundwater. Calibration, purging and sampling procedures will be performed as specified by the USEPA[1] for low-flow sampling. Decontamination will be conducted after each well is sampled to reduce the likelihood of cross contamination. Calibration times, purging volumes, water levels and field measurements will be recorded in a field log.

Purge fluids will be treated with activated carbon prior to being allowed to infiltrate the ground surface of the Site.

4.1.3 Well Inspection and Maintenance

All on-site wells will be inspected annually in conjunction with a groundwater monitoring event. Wells will be inspected for structural damage to the well cap seal, protective pad, and visible portion of the well casing. The presence and condition of J-plugs and locks also will be noted. In addition, the open depth of the well will be sounded. Deficiencies in or damages to the wells will be corrected or repaired as necessary.

The well inspection and maintenance program will continue until the remedial action (including monitoring) is complete. Once the project has been completed, all wells will be decommissioned following CP-43: Groundwater Monitoring Well Decommissioning Policy.

4.2 Sub-slab Depressurization System Components

4.2.1 Building 9 System

- Two sidewall mounted fans connected by manifold piping to vapor extraction points.
- Suction Points: The suction points consists of a 5" core boring into the slab through which 1- 2 cubic feet of sub-slab material has been removed. Mechanically suspended 3" SCH 40 PVC pipe has been inserted into the boring and sealed with urethane sealant.

[1] U.S. EPA Region 1 Low Stress (low-flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, January 19, 2010.

- Riser Piping: The riser piping consists of 3" SCH 40 PVC pipe that follows a route from the extraction point to a 4" trunk line, then to the exterior mounted vacuum fan. Weatherproof flashing or sealant has been applied to all penetrations.

- Exhaust Fans: Exhaust fans has been field selected for specific performance properties. Models: 1) Festa Radon Technologies "Force" producing 4.5 wci at 55 CFM, at 300 watts; 2) RADONAWAY RP-265, producing 2.0 wci at 50 CFM, at 120 watts. Fans have an exterior disconnect switch. Fans are mounted with rubber Fernco couplings, for simplified replacement. No air intakes are present within 10' of the exhaust points.

- Instrumentation and Control: There is no centralized instrumentation or control for the SSDS. The fans can be switched either from the adjacent positioned disconnect or at the marked breakers #36 and #42 on the panel box centrally located on the east wall. The exhaust fan systems are equipped with a vacuum indicator mounted in a visible location on a riser pipe per the attached schematic. The indicator consists of an oil filled U-tube style manometer. The indicator can be inspected by observing the level of colored fluid. The indicator is designed primarily to give a simple visual check that vacuum is present in the riser pipe, specifically by observation that the fluid levels on each side of the indicator are not even. Indicator is marked at level observed on March 27, 2017.

- Sealing measures: Polyurethane sealants have been applied to control joints, floor cracks and slab penetrations to enhance the barrier between sub-slab and ambient air and improve the efficiency of the SSD System. Smoke testing has been employed to guide sealing operations. Materials used include Sika Sikaflex 1c-SL self leveling sealant.

4.2.2 Building 5 and 6 System

- Five sidewall mounted fans connected to vapor extraction points.

- Suction Points: The suction points consists of a 10" core boring into the slab directly to crawlspace voids. Mechanically suspended 8" SCH 40 PVC pipe has been inserted into the boring and sealed with urethane sealant.

- Riser Piping: The riser piping consists of 8" SCH 40 PVC pipe that follows a route from the extraction point to the exterior mounted vacuum fan.

- Exhaust Fans: Exhaust fans were field selected for specific performance properties. Model: RADONAWAY RP-380 producing 5.0 wci at 350 CFM, at 140 watts. Fans have an exterior disconnect switch. Fans are mounted with rubber Fernco couplings, for simplified replacement.

- Instrumentation and Control: There is no centralized instrumentation or control for the SSDS. The fans can be switched either from the adjacent positioned disconnect or at the marked breakers on the panel box centrally located. The exhaust fan systems are equipped with a vacuum indicator mounted in a visible location near the riser pipe per the attached schematic. The indicator consists of a dial style manometer, Dwyer Model 5001 or oil filled U-tube. The indicator can be inspected by observing the position of the dial needle or oil level. The indicator is designed primarily to give a simple visual check that vacuum is present in the riser pipe. Indicator is marked at level observed on August 4, 2017.

- Sealing measures: Polyurethane sealants have been applied to control joints, floor cracks and slab. Smoke testing has been employed to guide sealing operations. Materials used include Sika Sikaflex 1c-SL self leveling sealant.

4.3 Sub-slab Depressurization System Operation

By design, other than the fans and electrical system, the SSDS has relatively few components that could fail and affect operation. The system fans are designed by the manufacturer for a long operational lifespan. At the end of this lifespan, the fan should be replaced, as necessary, with an equivalent or better performance unit. In the event of failure of the SSDS electrical components (breakers, switches, etc.), the component should be repaired or replaced by a licensed electrical contractor. Where necessary, the subcontractor that installed the system (Mitigation Tech) could be contacted to discuss the problem. In the event the subcontractor is not able to assist in fixing the problem, a licensed subcontractor should be contacted to correct the problem and return the SSDS to normal operation. Other SSDS contacts are provided in Section 4.5. A summary of the operation requirements provided in Mitigation Tech's Construction Completion Report is provided below.

- The fans should be kept in continuous operation.
- Reset: Fans restart automatically in event of power loss.
- In the event of unusual fan noise, failure to start, physical damage, or repeated circuit breaker trip, turn fan off and call for service.
- Regularly inspect system oil filled U-tube type manometers to verify that value, indicated by a mark on the gauge, has not changed significantly from the position of the mark. Gauge is inspected by observing the level of colored fluid.
- Normal system operation requires unchanged structural conditions. Report any changes in structure, HVAC systems, slab conditions, etc., so that the change can be evaluated for impact on the SSD System.
- Ensure that a periodic inspection is performed

4.4 Soil Vapor Monitoring Program

4.4.1 Weekly Monitoring

Weekly monitoring will be conducted as follows:

- Inspect fan vacuum indicator to verify that value, indicated by a mark on the gauge, has not changed significantly from the position of the mark. Gauge is inspected by observing the level of colored fluid.
- Record the observed measurement for each fan vacuum indicator on form labeled "SSD System Vacuum Gauge Record". Store all forms in the facility maintenance office.
- Inspect visible components of SSD system for degraded condition.

4.4.2 Annual Inspection

Annual inspection will be conducted as follows:

- Conduct a visual inspection of the complete system (e.g., vent fans, piping, warning devices, labeling).
- Inspect all components for condition and proper operation.
- Identify and repair any leaks in accordance with Sections 4.3.1(a) and 4.3.4(a) of the NYS DOH VI Guidance (i.e.; with the systems running, use smoke sticks to check for leaks through concrete cracks, floor joints and at the suction points; any leaks will be resealed until smoke is no longer observed flowing through the opening).
- Inspect the exhaust or discharge point of each exhaust fan to verify that no air intakes have been located within 10 feet.
- Conduct pressure field extension testing to ensure that the system is maintaining a vacuum beneath the entire slab. Perform a differential pressure reading at least one vacuum test point.
- Interview appropriate building occupants seeking comments and observations regarding the operation of the system.
- Confirm that the circuit breakers controlling the circuits on which the soil vapor vent fans operate are labeled "Soil Vapor System."

4.5 Contact Information

The following is a list of contacts for use regarding the SSDS operation, maintenance and monitoring:

Environmental Consultant
C&S Engineers, Inc.
Cody Martin
141 Elm Street
Buffalo NY, 14203
(716) 955-3021

SSDS Installation Contractor
Mitigation Tech
Nicholas Mouganis
55 Shumway Road
Brockport, NY 14420
(585) 637-7430

4.6 Sampling Methods, Analytical Procedures and Documentation

4.6.1 Sampling Methods

Sampling procedures will be conducted in accordance with the NYSDEC *Sampling Guidelines and Protocols Manual*. Collection of representative samples will include the following procedures:

- Ensuring that the sample taken is representative of the material being sampled;
- Using proper sampling, handling and preservation techniques;
- Properly identifying the collected samples and documenting their collection in field records;
- Maintaining chain-of-custody; and
- Properly preserving samples after collection.

Water Sampling

Groundwater sampling will be conducted in accordance with USEPA guidance for low-flow purging and sampling, as described in **Section 4**.

Water samples will be collected in 40 ml vial and immediately placed on ice. The water will be analyzed for VOC on a standard turnaround time.

In addition to collecting VOC samples for laboratory analysis, groundwater chemistry will be continuously monitored during sample collection. Groundwater chemistry will be monitored for the following:

- pH;
- Turbidity;
- Oxidation Reduction Potential;
- Specific Conductance;
- Dissolved Oxygen; and
- Temperature

QA/QC Sampling

Table 4-1 summarizes the sampling program described in the sections above. Additionally, Quality Assurance/Quality Control (QA/QC) samples will be collected, and the following describes the minimum number of groundwater QA/QC samples.

- Trip blank – 1 per shipment
- Blind Duplicate – 1 per monitoring event
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) – 1 MS / 1 MSD per monitoring event

Table 4-1: Summary of Estimated Sampling

Sample Type	***Matrix***	***Estimated Samples (one sample event)***	***Estimated Samples (total – 5 years)***	***Purpose***
Groundwater	Water	11	55	Characterization
Duplicate Groundwater	Water	1	5	QA/QC (VOC Only)
MS/MSD –Aq.	Water	1/1	5/5	QA/QC (VOC Only)
	Total	**14**	**70**	

4.6.2 Analytical Procedures

Laboratory Analysis

Laboratory analysis will be conducted by a third-party laboratory that is accredited by the NYSDOH Environmental Laboratory Accreditation Program (ELAP). Laboratory analytical methods will include the most current NYSDEC Analytical Services Protocol (ASP).

Groundwater samples sent to a certified laboratory will be analyzed in accordance with EPA SW-846 methodology for Target Compound List for Volatile Organic Compounds (USEPA Method 8260) and Chloride (USEPA Method 9251).

4.6.3 Documentation

Custody Procedures

As outlined in NYSDEC *Sampling Guidelines and Protocols*, a sample is in custody under the following conditions:

- It is in your actual possession;
- It is in your view after being in your physical possession;
- It was in your possession and then you locked or sealed it up to prevent tampering; or
- It is in a secure area.

The environmental professional will maintain all chain-of-custody documents that will be completed for all samples that will leave the Site to be tested in the laboratory.

5 HEALTH AND SAFETY

A Health and Safety Plan (HASP) was prepared that details procedures for maintaining safe working conditions and minimizing the potential for exposure to hazardous material. The HASP is provided in **Appendix B**.

6 REPORTING

Monitoring Reports will be submitted to NYSDEC annually. The Monitoring Reports will include:

- Analytical results and appropriate QA/QC data
- Hydraulic monitoring data
- An evaluation of the effectiveness of the Remedial Action
- Recommendations for program revisions, if appropriate

An Annual Periodic Review Report will also be submitted and will include:

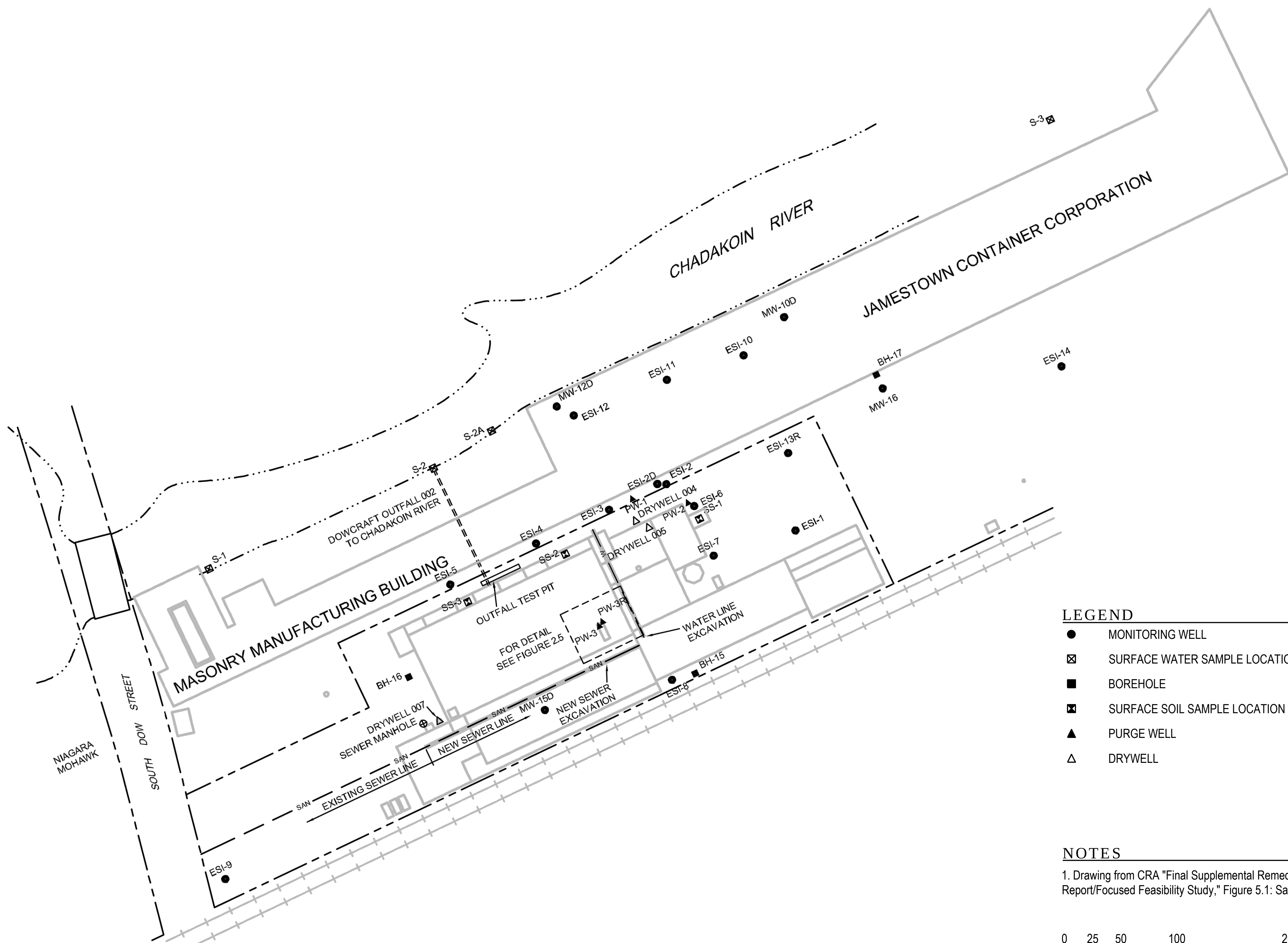
- Monitoring Plan Compliance Report
- An evaluation of the performance, effectiveness and protectiveness of the Remedial Action
- Institutional and Engineering Controls Compliance Report
- Operation and Maintenance Compliance Report
- Recommendations for program revisions, if appropriate

7 SCHEDULE

The schedule for Site work is as follows:

- Initiating Groundwater Sampling Event:
  - Within 30 days of NYSDEC approval of this Work Plan.
- Groundwater Monitoring:
  - Annually for five years.
  - After five years, JCC, C&S and the NYSDEC will discuss the status of the OM&M Plan.
- Reporting:
  - Periodic Review / Monitoring Report will be submitted annually starting 15 months after approval of the Work Plan.

FIGURES



LEGEND

- ● MONITORING WELL
- ⊠ SURFACE WATER SAMPLE LOCATION
- ■ BOREHOLE
- SURFACE SOIL SAMPLE LOCATION
- ▲ PURGE WELL
- △ DRYWELL

NOTES

1. Drawing from CRA "Final Supplemental Remedial Investigation Report/Focused Feasibility Study," Figure 5.1: Sample Locations, 2001.

0 25 50 100 200 FEET

f:\Project\n30 - jamestown container\n3001001 - jamestown container\environmental\CADD-GIS\Sheet Files\FIGURE 1 HISTORIC AND EXISTING SITE FEATURES.dwg

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FORMER DOWCRAFT FACILITY
GROUNDWATER REMEDIATION

FALCONER, NEW YORK

MARK	DATE	DESCRIPTION

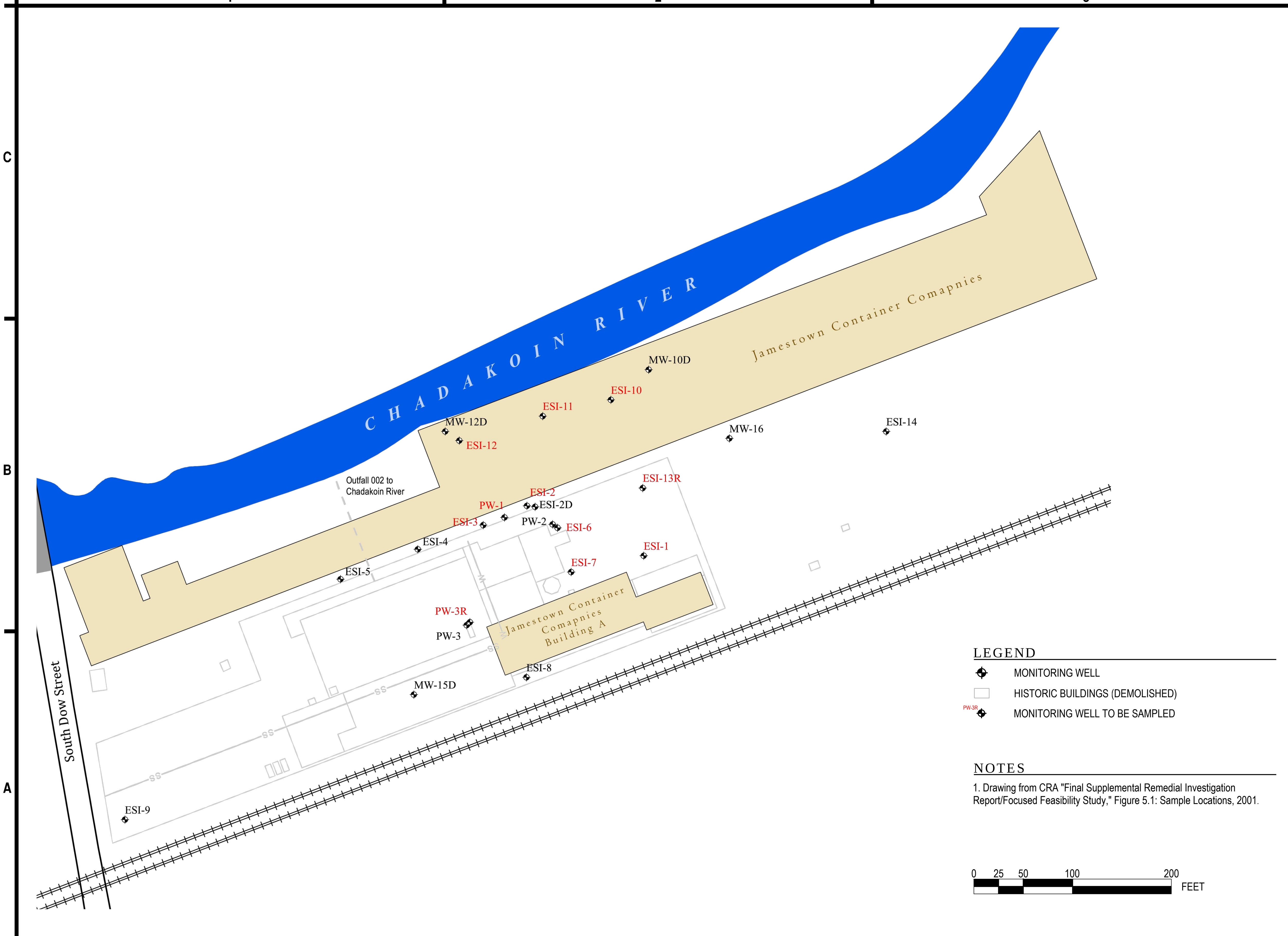
REVISIONS

PROJECT NO:	N30.001.001
DATE:	MAY 28, 2015
DRAWN BY:	C. MARTIN
DESIGNED BY:	C. MARTIN
CHECKED BY:	M. COLMERAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

HISTORIC AND EXISTING SITE FEATURES

FIGURE 1



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DESIGNED BY:	C. MARTIN
CHECKED BY:	M. COLMERAUER

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GROUNDWATER MONITORING

FIGURE 2

f:\Project\n30 - jamestown container\n30001001 - jamestown container\environmental\CADD-GIS\Sheet Files\FIGURE 2 GROUNDWATER MONITORING.dwg

APPENDICES

APPENDIX A
SUB-SLAB DEPRESSURIZATION SYSTEM WORK PLANS

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Buffalo, NY 14203
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f: (716) 847-1454
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January 12, 2017

David Szymanski
Department of Environmental Conservation
Division of Environmental Remediation
270 Michigan Avenue
Buffalo, New York 14203

Re: Soil Vapor Mitigation System Work Plan
Former Dowcraft Facility, Falconer, New York

Mr. Szymanski:

C&S Engineers (C&S) is providing New York State Department of Environmental Conservation (NYSDEC) a work plan for the installation of a sub-slab depressurization system by Mitigation Tech with C&S oversight at former Dowcraft Facility in Falconer, New York.

I. PROJECT UNDERSTANDING

The Former Dowcraft Site is located at 65 South Dow Street in Falconer, New York and occupies approximately 2.2 acres of land situated immediately east of South Dow Street and approximately 100 feet south of the Chadakoin River. The Jamestown Container Company currently owns the Dowcraft site. The JCC primary manufacturing building is situated on the northern portion of the Site, adjacent to the Chadakoin River and a smaller structure (Building 9) is located on the southern portion of the Site.

Based on the presence of the VOC plume proximal to or under the site building(s), the NYSDOH requested the performance of a Soil Vapor Intrusion (SVI) study to evaluate potential impacts to indoor air quality. On November 2, 2015, Centek Laboratories performed the SVI sampling with the assistance of JCC maintenance staff. A total of nine sub-slab samples (SS-1 to SS-9) and nine indoor air samples (IA-1 to IA-9) were installed within the main building and Building #9. Sub-slab air samples indicate that TCE contaminated soil vapor has impacted the subsurface underneath the main JCC Buildings #5, #6 and #9. After review of the SVI study, the New York State Department of Health (NYSDOH) requires the installation of a mitigation system address soil vapor concerns.

II. SCOPE OF WORK

This document presents a Work Plan that consists of the installation and operation of a sub-slab depressurization system (SSDS) that is designed to mitigate the migration or potential migration of sub surface vapors into the building interiors. The subject area is the foundation footprint of Buildings #5, #6 and #9 of Jamestown Container Companies – 65 South Dow St., Falconer, NY 14733. The SSDS is intended to protect the occupants of the subject area and is not intended to remove or diminish the source of the contamination. After start-up, demonstration of SSDS effectiveness will be confirmed and thereafter, a program of periodic maintenance and monitoring will be proposed.

III. OBJECTIVES

This work plan was developed by Mitigation Tech in general accordance with the NYS DOH document, "Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006". The performance objective of the SSDS is to create and maintain a minimum negative pressure differential of .002 inches of water column (wci) below certain concrete slabs which function as boundaries between subject area sub-slab space and occupied interior space. In the case of Building #9, this includes the entire building footprint. In the cases of Buildings #5 and #6, several complicating factors (see sec 3.2 below) are present and a specific area of vacuum influence is not defined as part of this proposal. Rather, reasonably scaled soil vapor intrusion mitigation systems are proposed that would furnish substantial depressurization and ventilation focused along the interior southern walls of #5 & #6. This would constitute a line of defense to intercept soil vapor migrating from the south. The exact northern boundary of the pressure extension field cannot be predicted prior to construction except by elaborate simulation, expensive enough as to suggest construction of a partial system as an alternative.

We therefore recommend a partial approach to function like a permanent pilot study, the effect of which could be ascertained by interim testing. If further post-construction mitigation is desired, additional measures at additional expense would further extend the pressure field. We would specify these measures exactly based on information obtained during the first phase. We have proposed this strategy because it provides a reasonable response to the degree of known contamination and may well be sufficient by itself. In the event testing shows that additional measures are required, such measures would be incremental to work already performed and therefore no work done under the first phase would be inappropriate or wasteful.

IV. WORK PLAN DESIGN AND SPECIFICATIONS

Work descriptions are based on certain assumptions identified herein and are subject to modification based on further field observations and measurements before and during construction. In the interest of achieving efficiency of design, this Work Plan is presented on a "Design/Build" basis which allows for adjustment to quantity, type and placement of system components. Adjustments are informed by analysis of data continuously obtained during construction.

A. Pre-design Communication Testing and Cost Factors

The enclosed system configuration is informed by a general building assessment and sub-slab air communication testing performed August 19, 2016 deemed necessary to determine the most efficient system configuration. Included were interviews of key site personnel and document review, although no foundation plans were available. The test procedure included drilling into the concrete at likely suction cavity locations and applying a vacuum to simulate operation of an SSDS fan. Small diameter test holes were established to measure vacuum influence. The enclosed design is a result of weighing key elements (fan type, suction point location, pipe diameter, etc.) against the cost of different construction techniques and materials.

Also included was assessment of the confined space beneath buildings #5 and #6. There is a network of tunnel like structures supporting the floor, some backfilled and some with open voids. In some cases, the voids taper down to less than a foot. Standing water, large scale debris and other obstacles to work are present. The effect of these structures is to create a dense grid of grade beams that effectively restrict airflow due to compartmentalization. As a consequence, comprehensive depressurization would involve either a very dense network of suction cavities or trenching in the main floor of the building.

A further complicating factor is the continuous operation of Cyclone type rooftop vacuum systems. These systems collect scraps of cardboard generated during production and are always running during plant operation. They create a vacuum in the building by generating air flow exhaust on the order of 5000 CFM. These systems introduce high rate of building air exchange and also potentially interfere with the operation of sub slab depressurization systems.

B. Scope of Work

The Scope of Work is to furnish and install multi-point active sub-slab depressurization systems consisting of high performance exhaust blower and suction cavity network, combined with sealing of slab openings. The Scope of Work for Building #9 is based on the minimum construction necessary to achieve the design objective of creating a minimum .002 wci pressure differential at all areas of the sub-slab. The Scope of Work for Building #5 and #6 is to create sub-slab depressurization or ventilation in the southern section of the buildings. At conclusion, documentation will be provided showing the pressure field extension values. The system configuration is subject to change based on field observations made during construction.

Furnish and Install:

Building 9

- (1) OBAR GBR 76 or 89 high performance radial blower [or as indicated by field testing], roof mount or sidewall mount on south side, to provide sub-slab depressurization via 4” schedule 40 PVC trunk line to conduct soil vapor from riser pipes to exhaust fan roof exhaust, with penetration through main roof deck; with mounting frame and rubber connector fittings.
- (6) Suction points, with risers surface mounted at alternating columns on south wall, 3” Schedule 40 PVC pipe; add suction cavities where necessary to achieve minimum performance objective.

Building 5

- (1) OBAR GBR 76 or 89 high performance radial blower [or as indicated by field testing], roof mount or sidewall mount on south side, to provide sub-slab depressurization via 4” schedule 40 PVC trunk line to conduct soil vapor from riser pipes to exhaust fan roof exhaust, with penetration through main roof deck; with mounting frame and rubber connector fittings.
- (8) Suction points, with risers surface mounted on south wall, 3” Schedule 40 PVC pipe.

Building 6

- (1) OBAR GBR 76 or 89 high performance radial blower [or as indicated by field testing], roof mount or sidewall mount on south side, to provide sub-slab depressurization via 4” schedule 40 PVC trunk line to conduct soil vapor from riser pipes to exhaust fan roof exhaust, with penetration through main roof deck; with mounting frame and rubber connector fittings
- (5) Suction points, with risers surface mounted on south wall or at office partitions, 3” Schedule 40 PVC pipe

Common Elements

- Continuous building assessment and sub-slab vacuum measurement to optimize design
- Pre-construction consultation to obtain approval for component placements
- All interior pipe SCH 40 PVC with appropriate metal hangers, riser clamps, and additional accessories to properly attach components directly to structural members; sloped as required; routing to avoid interference with other building systems
- Fire stop devices and other fire code compliance measures
- Suction cavities to consist of approximately 1 cu. ft. excavated material in sub-slab, with urethane seal; access hole to suction cavity by 5”core drill or hand drill; trenching around footers where required, with concrete restoration

- Proportioning valves for suction risers where required
- All exhaust points minimum 10’ from any air intakes
- Exterior-interior penetrations shall have appropriate sealing systems
- Mobilization and Demobilization per work shift, with daily temporary restorations and basic dust control measures
- Exterior switch and Sealtight and/or MC conduit from fan housing to nearest electrical panel; extra cost if panel has insufficient capacity; final panel hookup by others at other’s expense
- Vacuum indicator, (1) oil filled U-tube manometer or dial type Magnehelic vacuum gauge; and audible low pressure alarm at location TBD
- Urethane sealant at slab joints, accessible cracks and penetrations; backer where necessary
- Horizontal pipe at highest practicable height, with metal bracketing, sloped as required, with valves or restrictor plates as required
- Consult with occupant to minimize disruption to operations and provide access to work areas
- Additional SSDS components necessary to achieve performance objective
- At completion, perform backdraft testing, label components and provide system description and operating instructions
- At completion, measure pressure differentials and document
- Consult with client representatives to develop operation, maintenance and periodic inspection plan
- Two-year warranty; labor, installed components and sub-slab depressurization to objective (or greater)

C. Post Installation Pressure Field Extension Testing

A digital micromanometer will be used to measure pressure differentials and values will be recorded on a floor plan. All test holes will be repaired with urethane caulk (MSDS available) applied over a closed cell backer rod. Smoke tubes will be used to identify floor cracks and other openings to the sub-slab that could “short circuit” the pressure field. Backdrafting testing will be performed.

D. IRM Construction Completion Report

At conclusion of construction, a Construction Completion Report (CCR) will be submitted. This report will include an as-built sketch or an overlay of client furnished building drawings, showing SSDS locations and components. The CCR will include measurements of created sub-slab to ambient air static pressure differentials, detailed descriptions of SSDS components, and post-installation sampling results.

An Operations, Maintenance, and Monitoring (OM&M) Plan will be submitted with the CCR. The OM&M Plan will be provided to the owner and occupants to facilitate their understanding of the system's operation, maintenance and monitoring.

E. Maintenance and Monitoring

Future maintenance and monitoring will be proposed to verify system effectiveness by inspection procedures and via differential pressure measurements. The monitoring will be performed annually until a less-frequent monitoring frequency is approved. In addition, non-routine maintenance may be conducted should it appear that the SSDS has reduced its effectiveness due to malfunction, renovation, or other unplanned circumstance.

V. SCHEDULE

Installation of the soil vapor system can begin immediately once the NYSDOH approves the work plan. Installation will take 45 – 60 days to complete.

Should you have any questions regarding this work plan or the information contained herein, please feel free to contact me at (716) 847-1630.

Sincerely,

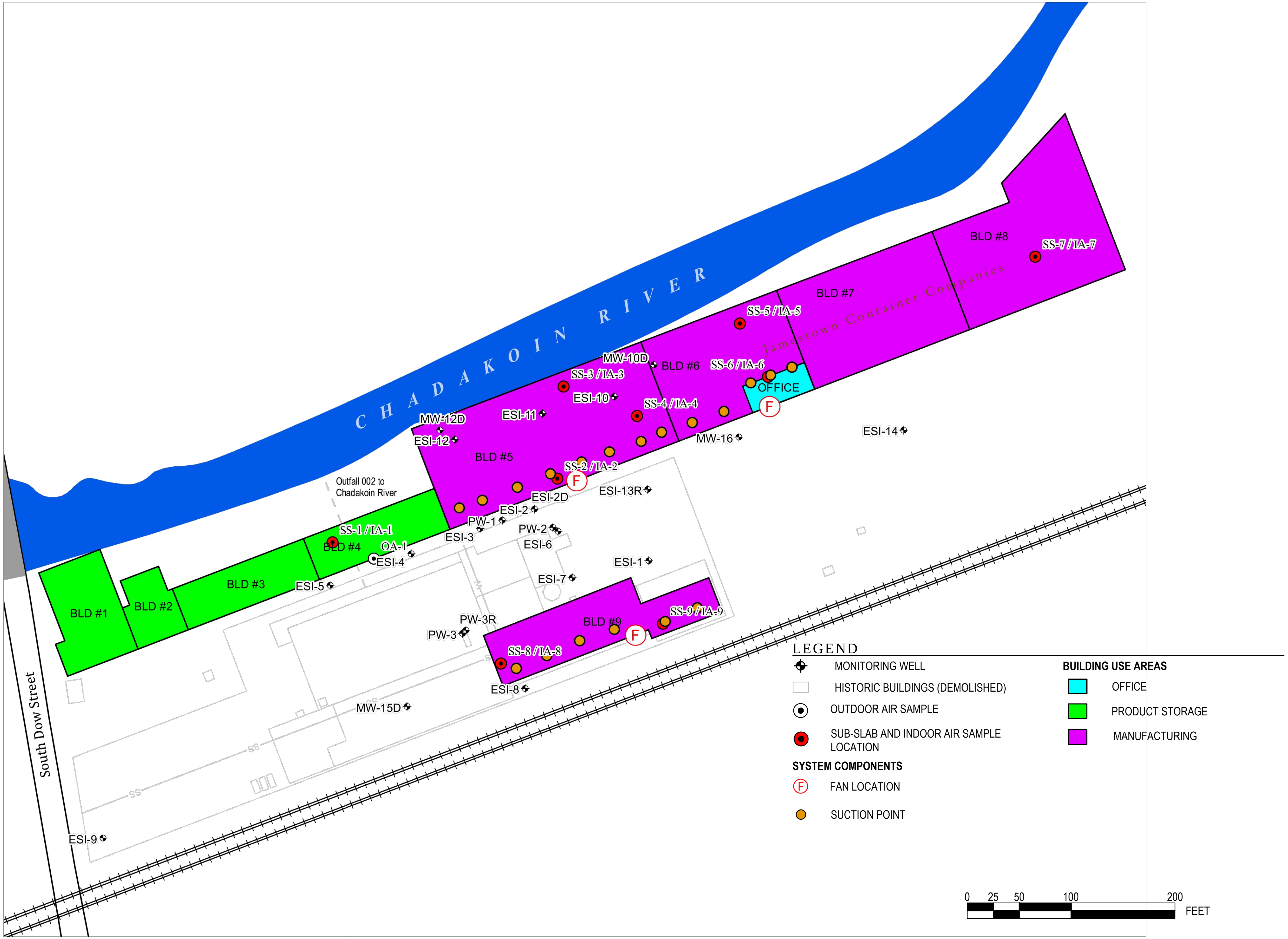
C&S ENGINEERS, INC.

Cody Martin
Environmental Scientist

Daniel E. Riker, P.G.
Managing Geologist

Enclosed: Sub-slab Depressurization System Map

F:\PROJECT\N30 - JAMESTOWN CONTAINER\N30001001 - JAMESTOWN CONTAINER\CORRESPONDENCE\SOIL VAPOR MITIGATION SYSTEM WORK Plan.docx



F:\Project\N30 - Jamestown Container\N30001001 - Jamestown Container\Environmental\CADD-GIS\Sheet Files\FIGURE 1 SUB-SLAB DEPRESSURIZATION SYSTEM.dwg

C&S COMPANIES®

C&S Engineers, Inc.
141 Elm Street,
Buffalo, New York 14203
Phone: 716-847-1630
Fax: 716-847-1454
www.cscos.com

-N-

FORMER DOWCRAFT FACILITY
SOIL VAPOR REMEDIATION
FALCONER, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO: N30.001.001
DATE: NOVEMBER 9, 2016
DRAWN BY: C. MARTIN
DESIGNED BY: C. MARTIN
CHECKED BY: D. RIKER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

SUB-SLAB DEPRESSURIZATION SYSTEM MAP

FIGURE 1

C&S Companies
141 Elm Street
Suite 100
Buffalo, NY 14203
p: (716) 847-1630
f: (716) 847-1454
www.cscos.com

April 6, 2017

David Szymanski
Department of Environmental Conservation
Division of Environmental Remediation
270 Michigan Avenue
Buffalo, New York 14203

Re: Building 5 and 6 Revised Soil Vapor Mitigation System Work Plan
Former Dowcraft Facility, Falconer, New York

Mr. Szymanski:

C&S Engineers (C&S) and Mitigation Tech offer an alternative approach to mitigating soil vapor impacts on Buildings 5 and 6 at the Jamestown Container Company (JCC) facility in Falconer, New York. On February 8, 2017 the New York State Department of Environmental Conservation (NYSDEC) approving C&S's work plan for the installation of sub-slab depressurization systems (SSDS) in Buildings 5, 6 and 9. On March 24, 2017, the SSDS for Building 9 was installed according to the approved work plan.

Buildings 5 and 6 are a particular challenge for installing the approved SSDS due to multiple factors that were presented to the NYSDEC and the New York State Department of Health (NYSDOH) during their site visit on March 28, 2017. These factors include the following:

- The high rate of air exchange within the building from the continuous operation of the Cyclone rooftop vacuum systems;
- Confined spaces underneath the majority of the floor within the building that are either open or partially backfilled with large debris; and
- Network of tunnel-like structures or arches supporting the floor.

Due to these constraining factors associated with the construction and use of Buildings 5 and 6, the SSDS designs within these buildings have been continually re-evaluated by Mitigation Tech to achieve reasonable performance goals for mitigating soil vapor impacts.

As discussed on March 28th, C&S and Mitigation Tech propose to mitigate soil vapor beneath the sub-slab of Buildings 5 and 6 using targeted SSDS in areas not impeded by sub-slab obstacles and the installation of a crawl space ventilation system in areas with sub-slab obstacles. The size and location of the SSDS will be determined in the field through sub-slab air communication testing prior to installation. The crawl space ventilation system (CVS) consists of two high air flow blowers located on the perimeter of Building 6. A detailed description of this revised system, developed by Mitigation Tech, for Buildings 5 and 6 is attached to this letter.

We request that NYSDEC and NYSDOH review the attached revised work plan for Buildings 5 and 6. As requested by the NYSDOH for the previously approved work plan, indoor air analytical sampling will be conducted after the SSDS / CVS is operational. These samples will assess the systems' impact on indoor air quality. A total of 9 indoor air locations and one outdoor air location will be sampled to evaluate indoor air quality. Future indoor air monitoring events will use the same locations to collect samples during the operation of the SSDS / CVS.

Should you have any questions regarding this work plan or the information contained herein, please feel free to contact me at (716) 847-1630.

Sincerely,

C&S ENGINEERS, INC.

Cody Martin
Environmental Scientist

Daniel E. Riker, P.G.
Managing Geologist

Enclosed: Mitigation Tech Revised Work Plan

F:\PROJECT\N30 - JAMESTOWN CONTAINER\N30001001 - JAMESTOWN CONTAINER\CORRESPONDENCE\BUILDING 5 AND 6 REVISED Soil Vapor Mitigation Work Plan.docx

mitigation tech *vapor intrusion specialists*

April 5, 2017

Mr. Cody Martin
Project Manager
C & S Companies
141 Elm Street, Suite 100
Buffalo, NY 14203
Via email: Cody Martin <cmartin@cscos.com>

Re: Jamestown Container Companies – 65 South Dow St., Falconer, NY 14733
Revised Work Plan

Dear Mr. Martin,

Based additional building investigation and on our recent meeting with representatives of NYS DEC, we submit the following revised work plan:

1.0 Introduction

Soil vapor containing chlorinated volatile organic compounds has been detected at or near this site. This document presents a Work Plan that consists of the installation and operation of both a sub-slab depressurization system (SSDS) and a Crawlspace Ventilation System (CVS) that are designed to mitigate the migration or potential migration of sub surface vapors into the building interiors. The subject area is the foundation footprint of Buildings #5 and #6 of Jamestown Container Companies – 65 South Dow St., Falconer, NY 14733. The SSDS and CVS are intended to protect the occupants of the subject area and are not intended to remove or diminish the source of the contamination. After start-up, system effectiveness will be assessed and thereafter, a program of periodic maintenance and monitoring will be proposed. It is expected that oversight of construction, confirmation of effectiveness and post mitigation air sampling will be provided by *C & S Companies* under separate contract and at additional expense.

2.0 Objectives

This work plan was developed in general accordance with the NYS DOH document, "Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006". The performance objective of the SSDS is to create and maintain a minimum negative pressure differential of .002 inches of water column (wci) below the southernmost concrete slab sections of Building #5, which function as boundaries between subject area sub-slab space and occupied interior space. The performance objective of the CVS is to create continuous air exchange with outside air in the Building #6 crawlspace beneath the ground level concrete slab.

Both building #5 and #6 are characterized mostly by systems of sub-slab structural arches and grade beams crisscrossing in a north to south and east to west pattern.

In the case of Building #5, extensive backfilling has occurred over time, mostly via concrete patch, so that soil is present immediately below the surface. Four east to west grade beams define five compartments. A reasonably scaled soil vapor intrusion mitigation system is proposed that would furnish depressurization in the southernmost sub-slab compartment bounded by Buildings # 4 and #6.

This would constitute a line of defense to intercept soil vapor migrating from the south. Some limited depressurization may be created north of the first grade beam. The exact northern boundary of the pressure extension field cannot be predicted prior to construction of the proposed system.

In the case of Building #6, several complicating factors (see sec 3.2 below) are present and the construction of an SSDS is judged to be impracticable. We judge that most of the sub-space of Building #6 is in essence a crawlspace and that ventilation is the most appropriate strategy to divert vapors from the building interior. A portion of Building #6 that includes the office area does not have a crawlspace, and SSDS is proposed for that area.

Therefore this proposal advocates a mixed and balanced soil vapor intrusion mitigation strategy, wherein measures most likely to yield good outcomes efficiently are applied first. If desired, additional measures at additional expense would further mitigate vapor intrusion. We would specify these measures exactly based on information obtained during the first phase. We have proposed this strategy because it provides a reasonable response to the degree of known contamination and may well be sufficient by itself. In the event testing shows that additional measures are required, such measures would be incremental to work already performed and therefore no work done under this proposed phase would be inappropriate or wasteful.

3.0 Work Plan Design and Specifications

3.1 Overview

Work descriptions are based on certain assumptions identified herein and are subject to modification based on further field observations and measurements before and during construction. In the interest of achieving efficiency of design, this Work Plan is presented on a “Design/Build” basis which allows for adjustment to quantity, type and placement of system components. Adjustments are informed by analysis of data continuously obtained during construction.

3.2 Pre-design Communication Testing

The enclosed system configuration is informed by a general building assessment and sub-slab air communication testing performed August 19, 2016 and subsequently, deemed necessary to determine the most efficient system configuration. Included were interviews of key site personnel, document and historical photograph review, although no foundation plans were available. The test procedure (Building #5) included drilling into the concrete at likely suction cavity locations and applying a vacuum to simulate operation of an SSDS fan. Small diameter test holes were established to measure vacuum influence. The enclosed design is a result of weighing key elements (fan type, suction point location, pipe diameter, etc.) against the cost of different construction techniques and materials.

Also included was assessment of the confined space beneath a small portion of Building #5 and Building #6. There is a network of tunnel like structures supporting the floor, some partially backfilled and some with open voids. In some cases, the voids taper down to less than a foot. Standing water, silt, large scale debris and other obstacles to work are present. The floor of this space was observed to be difficult to access and in many cases degraded. As a consequence, depressurization of the sub-slab of the confined space is judged to be impracticable.

Another factor is the continuous operation of *Cyclone* type rooftop vacuum systems. These systems collect scraps of cardboard generated during production and are always running during plant operation. They create a vacuum in the building by generating air flow exhaust on the order of 5000 CFM. These systems introduce high rate of building air exchange and also potentially interfere with the operation of sub-slab depressurization systems. Compensation for this effect includes establishment and maintenance of secure boundaries between ambient and sub-slab air.

3.3 Scope of Work

The Scope of Work is to furnish and install 1) a multi-point active sub-slab depressurization system in Building #5 and a crawl space ventilation system in Building #6. At conclusion, documentation will be provided showing the pressure field extension or air exchange values. The system configuration is subject to change based on field observations made during construction.

Furnish and Install:

- **Building 5 - east to west space defined by south perimeter wall and southernmost east to west interior footer**
- (1) OBAR GBR 76 or 89 high performance radial blower [or as indicated by field testing], roof mount or sidewall mount on south side, to provide sub-slab depressurization via 4" schedule 40 PVC trunk line to conduct soil vapor from riser pipes to exhaust fan roof exhaust; with mounting frame and rubber connector fittings
- (5-6) Suction points, with risers surface mounted on south wall, 3" Schedule 40 PVC pipe
- **Building 6 - (includes influence at Building #5 sump room)**
- (2) RADONAWAY RP-380 high air flow blowers [or as indicated by field testing], roof mount or sidewall mount, to provide sub-slab ventilation via 8" schedule 40 PVC; to conduct soil vapor from riser pipes to exhaust fan roof exhaust, with penetration through main roof deck; with rubber connector fittings
- Sub floor ducting
- Evaluate and repair as necessary, north side foundation vents and openings
- **Building 6 - (includes portion office area not over crawl space)**
- (1) RADONAWAY HS-5000 blower [or as indicated by field testing], roof mount or sidewall mount on south side, to provide sub-slab depressurization via 3" schedule 40 PVC trunk line to conduct soil vapor from riser pipes to exhaust fan roof exhaust; with mounting frame and rubber connector fittings
- (2-3) Suction points, with risers surface mounted on south wall, 3" Schedule 40 PVC pipe
- **Common Elements:**
- Continuous building assessment and sub-slab vacuum measurement to optimize design and meet stated objectives
- Pre-construction consultation to obtain approval for component placements
- All interior pipe SCH 40 PVC with appropriate metal hangers, riser clamps, and additional accessories to properly attach components directly to structural members; sloped as required; routing to avoid interference with other building systems
- Fire stop devices and other fire code compliance measures
- Suction cavities to consist of approximately 1 cu. ft. excavated material in sub-slab, with urethane seal; access hole to suction cavity by 5"core drill or hand drill; trenching around footers where required, with concrete restoration
- Proportioning valves for suction risers where required
- All exhaust points minimum 10' from any air intakes
- Exterior-interior penetrations shall have appropriate sealing systems
- Mobilization and Demobilization per work shift, with daily temporary restorations and basic dust control measures
- Exterior switch and *Sealtight* and/or MC conduit from fan housing to nearest electrical panel; extra cost if panel has insufficient capacity; final panel hookup by others at other's expense

- Vacuum indicator, (1) per system
- Urethane sealant at slab joints, accessible cracks and penetrations; backer where necessary
- Horizontal pipe at highest practicable height , with metal bracketing, sloped as required, with valves or restrictor plates as required
- Consult with occupant to minimize disruption to operations and provide access to work areas
- At completion, perform backdraft testing, label components and provide system description and operating instructions
- At completion, measure and document pressure differentials and airflow volumes
- Consult with client representatives to develop operation, maintenance and periodic inspection plan
- Two year warranty; labor, installed components and sub-slab depressurization to objective (or greater)

3.4 Post Installation Pressure Field Extension Testing

A digital micromanometer will be used to measure pressure differentials and values will be recorded on a floor plan. All test holes will be repaired with urethane caulk (MSDS available) applied over a closed cell backer rod. Smoke tubes will be used to identify floor cracks and other openings to the sub-slab that could "short circuit" the pressure field. Backdrafting testing will be performed.

3.5 General Work Plan Provisions

- Daily tailgate meeting for safety review
- HAZWOPER trained personnel to perform drilling operations
- PID or Particulate monitoring not included
- Level 4 PPE for on-site personnel
- Procedures to follow site specific HASP

3.6 IRM Construction Completion Report

At conclusion of construction, a Construction Completion Report (CCR) will be submitted. This report will include an as-built sketch or an overlay of client furnished building drawings, showing SSDS locations and components. The CCR will include measurements of created sub-slab to ambient air static pressure differentials, detailed descriptions of SSDS components, and post-installation sampling results.

An Operations, Maintenance, and Monitoring (OM&M) Plan will be submitted with the CCR. The OM&M Plan will be provided to the owner and occupants to facilitate their understanding of the system's operation, maintenance and monitoring. Future maintenance and monitoring will be proposed to verify system effectiveness by inspection procedures and measurements.

Thank you.

Nicholas E. Mouganis EPA listing # 15415-I; NEHA ID# 100722

55 SHUMWAY ROAD, BROCKPORT, NEW YORK, 14420 * OFFICE/FAX 585-637-7430

APPENDIX B
HEALTH AND SAFETY PLAN

Health and Safety Plan

Former Dowcraft Site
65 South Dow Street
Falconer, NY

Site ID # 9-07-020

Prepared by

C&S Engineers, Inc.
141 Elm Street, Suite 100
Buffalo, New York 14203

August 2017

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

APPENDICES

SECTION 1 – GENERAL INFORMATION

The Health and Safety Plan (HASP) described in this document will address health and safety considerations for all those activities that personnel employed by C&S Engineers, Inc., may be engaged in during site investigation and remediation work at the Former Dowcraft Site located on 65 South Dow Street in Falconer, Chautauqua County, New York (Site). Figure 1 shows the approximate location of the Site. This HASP will be implemented by the Health and Safety Officer (HSO) during site work.

Compliance with this HASP is required of all C&S personnel who enter this Site. The content of the HASP may change or undergo revision based upon additional information made available to the health, safety, and training (H&S) committee, monitoring results or changes in the technical scope of work. Any changes proposed must be reviewed by the H&S committee.

Responsibilities

Project Manager……………………………………………………	Daniel Riker Phone: (716) 847-1630 Cell: (716) 572-5312
Site Health and Safety Officer…………………………...	Cody Martin Phone: (716) 847-1630 Cell: (716) 864-3752
Emergency Coordinator………………………………….	Cody Martin Phone: (716) 847-1630 Cell: (716) 864-3752
Health and Safety Manager………………………………	Cody Martin Phone: (716) 847-1630 Cell: (716) 864-3752

Emergency Phone Numbers

Emergency Medical Service..911

Police: Buffalo Police Department (NYPD) 911

Hospital: Buffalo General Hospital...(716) 859-5600

Fire: Buffalo Fire Department...911

National Response Center ....(800) 424-8802

Poison Control Center ....(800) 222-1222
Center for Disease Control...(800) 311-3435
NYSDEC Region 9 (Buffalo, New York) ....(716) 851-7220
C&S Engineers..(716) 847-1630
Site Superintendent .... TBD

Project Field Office Trailer ....(716) 847-1630

SECTION 2 - HEALTH AND SAFETY PERSONNEL

2.0 Health and Safety Personnel Designations

The following information briefly describes the health and safety designations and general responsibilities for this Site.

2.1 Project Manager (PM)

The PM is responsible for the overall project including the implementation of the HASP. Specifically, this includes allocating adequate manpower, equipment, and time resources to conduct Site activities safely.

2.2 Health and Safety Manager

- Has the overall responsibility for coordinating and reporting all health and safety activities and the health and safety of Site Workers.
- Must have completed, at a minimum, the OSHA 30-Hour Construction Safety Training, and either the 24-Hour training course for the Occasional Hazardous Waste Site Worker or the 40-Hour training course for the Hazardous Waste Operations Worker that meets OHSA 29 CFR 1910.
- Must have completed the 8-Hour Site supervisor/manager's course for supervisors and managers having responsibilities for hazardous waste Site operations and management.
- Directs and coordinates health and safety monitoring activities.
- Ensures that field teams utilize proper personal protective equipment (PPE).
- Conducts initial on-site specific training prior to Site Workers commencing work.

- Conducts and documents daily and periodic safety briefings.
- Ensures that field team members comply with this HASP.
- Immediately notifies the Construction Manager (CM) Project Manager and Superintendent of all accident/incidents.
- Determines upgrading or downgrading of PPE based on Site conditions and/or real time monitoring results.
- Ensures that monitoring instruments are calibrated daily or as the manufacturer's instructions determine.
- Reports to the CM Project Manager and Superintendent to provide summaries of field operations and progress.
- Submits and maintains all documentation required in this HASP and any other pertinent health and safety documentation.

2.3 Health and Safety Officer (HSO)

- Must be designated to the Health and Safety Manager by each Subcontractor as a Competent Person having, at a minimum, the OSHA 30-Hour Construction Safety Training
- Must schedule and attend a Pre-Construction Safety Meeting with the Health and Safety Manager to discuss the Subcontractor Safety Requirements and must attend the Weekly Subcontractor Coordination Meeting.
- Responsible for ensuring that their lower tier contractors comply with project safety requirements.
- Must make frequent and regular inspections of their work areas and activities and ensure hazards that are under their control are corrected immediately and all other hazards are reported to the Construction Manager's Project Manager and Health and Safety Manager.

- Must report all work related injuries, regardless of severity, to the Construction Manager's Project Manager and the Health and Safety Manager within 24 hours after they occur.

2.4 Emergency Coordinator

- The Emergency Coordinator or his on-site designee will, in coordination with Campus Square, LLC., implement the emergency response procedures whenever conditions at the Site warrant such action.

- The Emergency Coordinator or his on-site designee will be responsible for assuring the evacuation, emergency treatment, emergency transport of C&S personnel as necessary, and notification of emergency response units (refer to phone listing in the beginning of this HASP) and the appropriate management staff.

2.5 Site Workers

- Report any unsafe or potentially hazardous conditions to the Health and Safety Manager.

- Maintain knowledge of the information, instructions, and emergency response actions contained in the HASP.

- Comply with rules, regulations, and procedures as set forth in this HASP, including any revisions that are instituted.

- Prevent unauthorized personnel from entering work Site.

SECTION 3 - PERTINENT SITE INFORMATION

3.1 Site Location and General History

The Dowcraft Site is located at 65 South Dow Street in Falconer, New York and occupies approximately 2.2 acres of land situated immediately east of South Dow Street and approximately 100 feet south of the Chadakoin River. The Jamestown Container manufacturing building is situated between the Site and the Chadakoin River.

The property was first developed in 1890 as a woolen mill until 1939 when it was converted into a factory which manufactured steel partitions used for offices. As part of this manufacturing process, a vapor degreaser was used which included the use of chemicals such as trichloroethene (TCE). This work continued until 1999 when the facility was closed, a portion of the Site was demolished, and the property was sold to JCC. Figure 1 presents the Site's location.

Site History and Suspect Recognized Environmental Conditions
Chlorinated solvents, primarily, trichloroethene (TCE) and its daughter compounds, were identified as the contaminants of concern (COC) for this Site. TCE is a man-made volatile organic compound used for degreasing metal and electronic parts. Remedial considerations for TCE include its low solubility value and heavy molecular weight. TCE is in a class of chemicals called dense non-aqueous phase liquids (DNAPL) that sink through the water column until they encounter an impermeable barrier.

According to previous environmental reports, the area of former degreaser pit (area of groundwater monitoring wells PW-3 and PW-3R) is a likely source area for the COC plume. The plume originates from the degreaser area and has affected groundwater in the upper and lower sand/gravel layers. The plume extends from the degreaser area to the north, under the JCC building and up to the area of the Chadakoin River. This is an area of approximately one acre. The rate of movement is approximately 2 to 3 feet per year to the north.

Five out of the ten wells that were sampled contained groundwater that exceeded water quality standard for TCE (5 ug/L). Analytical results for TCE in these wells ranged from 7.37 ug/L to 431 ug/L. Other chlorinated compounds, including TCE daughter compounds (cis-1,2-dichloroethene, trans-1,2-dichloroethane and vinyl chloride) were detected in three of the ten wells. The highest concentration of cis-1,2-Dichloroethene was detected in PW-3R (1,990 ug/L). Vinyl chloride was detected in one well, PW-3R, at 861 ug/L.

SECTION 5 - TRAINING

5.1 Site-specific Training

Training will be provided that specifically addresses the activities, procedures, monitoring, and equipment for the Site operations prior to going on site. Training will include familiarization with Site and facility layout, known and potential hazards, and emergency services at the Site, and details all provisions contained within this HASP. This training will also allow Site Workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

5.2 Safety Briefings

C&S project personnel will be given briefings by the HSO on a daily or as needed basis to further assist Site Workers in conducting their activities safely. Pertinent information will be provided when new operations are to be conducted. Changes in work practices must be implemented due to new information made available, or if Site or environmental conditions change. Briefings will also be given to facilitate conformance with prescribed safety practices. When conformance with these practices is not occurring or if deficiencies are identified during safety audits, the project manager will be notified.

SECTION 6 - ZONES

Four types of Site activity zones are identified for the Brownfield investigation activities, including the Exclusion Zone, Contamination Reduction Zone, Remediation Zone and the Support Zone. Prior to commencement of field work a further definition of where these zones will be set up will be established.

6.1 Exclusion Zone

The area where the unexpected condition is discovered would be considered the Exclusion Zone (EZ). All excavation and handling of contaminated materials generated as a result of the discovery of an unexpected condition would take place within the EZ. This zone will be clearly delineated by hay bales, jersey barriers, and/or similar methods. Safety tape may be used as secondary delineation within the EZ. The zone delineation markings may be opened in areas for varying lengths of time to accommodate equipment operation or specific construction activities. The Site Safety Manager/Director may establish more than one EZ where different levels of protection may be employed or where different hazards exist. Site Workers will not be allowed in the EZ without:

- A buddy (co-worker);
- Appropriate PPE in accordance with OSHA regulations;

- Medical authorization; and
- Training certification in accordance with 29 CFR 1910.120.

6.2 Contamination Reduction Zone

A Contamination Reduction Zone (CRZ) will be established between the EZ and the property limits. The CRZ contains the Contamination Reduction Corridor (CRC) and provides an area for decontamination of Site equipment. The CRZ will be used for general Site entry and egress, in addition to access for heavy equipment and emergency support services. Site Workers will not be allowed in the CRZ without:

- A buddy (co-worker);
- Appropriate PPE in accordance with OSHA regulations;
- Medical authorization; and
- Training certification in accordance with 29 CFR 1910.120.

In addition, the CRZ will include a Site Worker Cleaning Area that will include a field wash station for Site Workers, equipment, and PPE to allow Site Workers to wash their hands, arms, neck, and face after exiting areas of grossly contaminated soil or hazardous materials. All Site Workers will be required to pass through the Site Worker Cleaning Area and wash their hands and remove any loose fill and soils from their clothing and boots prior to exiting the CRZ.

6.3 Remediation Zone

A Remediated Zone (RZ) will be established in portions of the Site where the remediation has been completed and only general construction work will be performed. Setup of the RZ will consist of implementing several measures designed to reduce the risk of workers' exposure and prevent non-trained workers from entering the non-remediated zone. Non-trained workers will work only in areas where the potential for exposure has been minimized by removal of all hazardous materials. The remediated zone will then be separated from the non-remediated zone by installing and maintaining temporary plywood or other construction fences along the boundary between the two zones. If potentially impacted material is uncovered in the RZ, all non-trained workers will be removed and the Site Safety Manager/Director will assess the potential risks. If, at any other time, the risk of exposure increases while non-trained workers are present in the RZ, the non-trained workers will be removed. At all times, when non- trained workers are present in the RZ, air monitoring for the presence of VOCs will be conducted in the RZ, as well as at the fence line of the non-remediated zone.

6.4 Support Zone

The Support Zone (SZ) will be an uncontaminated area that will be the field support area for the Site operations. The SZ will contain the temporary project trailers and provide for field team communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated equipment or materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples. Meteorological conditions will be observed and noted from this zone, as well as those factors pertinent to heat and cold.

SECTION 7 - PERSONAL PROTECTIVE EQUIPMENT

7.1 General

The level of protection to be worn by field personnel will be defined and controlled by the HSO. Depending upon the type and levels of material present or anticipated at the site, varying degrees of protective equipment will be needed. If the possible hazards are unknown, a reasonable level of protection will be taken until sampling and monitoring results can ascertain potential risks. The levels of protection listed below are based on USEPA Guidelines. A list of the appropriate clothing for each level is also provided.

<u>Level A</u> protection must be worn when a reasonable determination has been made that the highest available level of respiratory, skin, eye, and mucous membrane protection is needed. It should be noted that while Level A provides maximum available protection, it does not protect against all possible hazards. Consideration of the heat stress that can arise from wearing Level A protection should also enter into the decision making process. Level A protection includes:

- Open circuit, pressure-demand self-contained breathing apparatus (SCBA)
- Totally encapsulated chemical resistant suit
- Gloves, inner (surgical type)

- Gloves, outer, chemical protective
- Boots, chemical protective

Level B protection must be used when the highest level of respiratory protection is needed, but hazardous material exposure to the few unprotected areas of the body (e.g., the back of the neck) is unlikely. Level B protection includes:

- Open circuit, pressure-demand SCBA or pressure airline with escape air bottle
- Chemical protective clothing: Overalls and long sleeved jacket; disposal chemical resistant coveralls; coveralls; one or two piece chemical splash suit with hood
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective

Level C must be used when the required level of respiratory protection is known, or reasonably assumed to be, not greater than the level of protection afforded by air purifying respirators; and hazardous materials exposure to the few unprotected areas of the body (e.g.., the back of the neck) is unlikely. Level C protection includes:

- Full or half face air-purifying respirator
- Chemical protective clothing: Overalls and long-sleeve jacket; disposable chemical resistant coveralls; coveralls; one or two piece chemical splash suit
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective

Level D is the basic work uniform. It cannot be worn on any site where respiratory or skin hazards exist. Level D protection includes:

- Safety boots/shoes
- Safety glasses
- Hard hat with optional face shield

Note that the use of SCBA and airline equipment is contingent upon the user receiving special training in the proper use and maintenance of such equipment.

7.2 Personal Protective Equipment – Site Specific

Level D with some modification will be required when working in the work zone on this Site. In addition to the basic work uniform specified by Level D protection, Nitrile gloves will be required when contact with soil or ground water is likely. Hearing protection will be worn when power equipment is used to perform subsurface investigation work. An upgrade to a higher level (Level C) of protection may occur if determined necessary by the HSO.

SECTION 8 - MONITORING PROCEDURES

8.1 Monitoring During Site Operations

All Site environmental monitoring should be accompanied by periodic meteorological monitoring of appropriate climatic conditions.

8.1.1 Drilling Operations (Monitoring Well Installation and Subsurface Borings) and Test Pit Excavations

Monitoring will be performed by the HSO or drilling observer during the conduct of work. A photoionization detector (PID) equipped with a 10.0 eV lamp will be utilized to monitor for the presence of volatile organic vapors within the breathing zone, the borehole, and subsurface samples upon their retrieval. Drill cuttings and excavation spoils will also be monitored by use of the PID. The PID will be field checked for calibration accuracy three times per day (morning, lunch, and end of day. If subsurface conditions warrant, a combustible gas indicator (CGI) with oxygen alarm may also be used to monitor the borehole for the presence of combustible gases. Similar monitoring of fluids produced during well development will also be conducted.

8.1.2 Interim Remedial Measures

If future Interim Remedial Measures (IRM) occurs, monitoring will be performed during excavation and sampling operations when C&S personnel are within the work zone. Although historical information previously obtained at the Site indicates low level of volatile organic vapors and compounds, a photoionization detector (PID) will be used during subsurface activities. If an IRM is performed, the, the remedial contractor will be required to employ dust control practices during work.

8.2 Action Levels

If readings on the PID exceed 10 ppm for more than fifteen minutes consecutively, then personal protective equipment should be upgraded to Level C. The air purifying respirator used with Level C protective equipment must be equipped with organic vapor cartridges. If readings on the explosive gas meter are within a range of 10%-25% of the LEL then continuous monitoring will be implemented. Readings above 25% of the LEL indicate the potential for an explosive condition. Sources of ignition should be removed and the Site should be evacuated.

8.3 Personal Monitoring Procedures

Personal monitoring shall be performed as a contingency measure in the event that VOC concentrations are consistently above the 10 ppm action level as detected by the PID. If the concentration of VOCs is above this action level, then amendments to the HASP must be made before work can continue at the Site.

SECTION 9 - COMMUNICATIONS

A phone will be located on Site to be utilized by personnel conducting investigation and IRM efforts. Cell phones will be the primary means of communicating with emergency support services/facilities.

SECTION 10 - SAFETY CONSIDERATIONS FOR SITE OPERATIONS

10.1 General

Standard safe work practices that will be followed include:

- Do not climb over/under drums, or other obstacles.
- Do not enter the work zone alone.
- Practice contamination avoidance, on and off-site.
- Plan activities ahead of time, use caution when conducting concurrently running activities.
- No eating, drinking, chewing or smoking is permitted in work zones.
- Due to the unknown nature of waste placement at the Site, extreme caution should be practiced during excavation activities.
- Apply immediate first aid to any and all cuts, scratches, abrasions, etc.

- Be alert to your own physical condition. Watch your buddy for signs of fatigue, exposure, etc.
- A work/rest regimen will be initiated when ambient temperatures and protective clothing create a potential heat stress situation.
- No work will be conducted without adequate natural light or without appropriate supervision.
- Task safety briefings will be held prior to onset of task work.
- Ignition of flammable liquids within or through improvised heating devices (barrels, etc.) or space heaters is forbidden.
- Entry into areas of spaces where toxic or explosive concentrations of gases or dust may exist without proper equipment is prohibited.
- Any injury or unusual health effect must be reported to the Site health and safety officer.
- Prevent splashing or spilling of potentially contaminated materials.
- Use of contact lenses is prohibited while on site.
- Beards and other facial hair that would impair the effectiveness of respiratory protection are prohibited if respiratory protection is necessary.
- Field crew members should be familiar with the physical characteristics of investigations, including:
  - Wind direction in relation to potential sources
  - Accessibility to co-workers, equipment, and vehicles
  - Communication
  - Hot zones (areas of known or suspected contamination)
  - Site access
  - Nearest water sources
- The number of personnel and equipment in potentially contaminated areas should be minimized consistent with site operations.

10.2 Field Operations

10.2.1 Intrusive Operations

The HSO or designee will be present on-site during all intrusive work, e.g., drilling operations, excavations, trenching, and will provide monitoring to oversee that appropriate levels of protection and safety procedures are utilized by C&S Engineers, Inc., personnel. The use of salamanders or other equipment with an open flame is prohibited and the use of protective clothing, especially hard hats and boots, will be required during drilling or other heavy equipment operations.

10.2.2 Excavations and Excavation Trenching

Guidance relating to safe work practices for C&S employees regarding excavations and excavating/trenching operation is presented in Appendix A of this HASP.

SECTION 11 - DECONTAMINATION PROCEDURES

Decontamination involves physically removing contaminants and/or converting them chemically into innocuous substances. Only general guidance can be given on methods and techniques for decontamination. Decontamination procedures are designed to:

- Remove contaminant(s).
- Avoid spreading the contamination from the work zone.
- Avoid exposing unprotected personnel outside of the work zone to contaminants.

Contamination avoidance is the first and best method for preventing spread of contamination from a hazardous site. Each person involved in site operations must practice the basic methods of contamination avoidance listed below. Additional precautions may be required in the HASP.

- Know the limitations of all protective equipment being used.
- Do not enter a contaminated area unless it is necessary to carry out a specific objective.
- When in a contaminated area, avoid touching anything unnecessarily.
- Walk around pools of liquids, discolored areas, or any area that shows evidence of possible contamination.
- Walk upwind of contamination, if possible.
- Do not sit or lean against anything in a contaminated area. If you must kneel (e.g., to take samples), use a plastic ground sheet.
- If at all possible, do not set sampling equipment directly on contaminated areas. Place equipment on a protective cover such as a ground cloth.
- Use the proper tools necessary to safely conduct the work.

Specific methods that may reduce the chance of contamination are:

- Use of remote sampling techniques.
- Opening containers by non-manual means.
- Bagging monitoring instruments.

- Use of drum grapplers.
- Watering down dusty areas.

Equipment which will need to be decontaminated includes tools, monitoring equipment, and personal protective equipment. Items to be decontaminated will be brushed off, rinsed, and dropped into a plastic container supplied for that purpose. They will then be washed with a detergent solution and rinsed with clean water. Monitoring instruments may be wrapped in plastic bags prior to entering the field in order to reduce the potential for contamination. Instrumentation that is contaminated during field operations will be carefully wiped down. Heavy equipment, if utilized for operations where it may be contaminated, will have prescribed decontamination procedures to prevent contaminant materials from potentially leaving the Site. On-site contractors, such as drillers or backhoe operators, will be responsible for decontaminating all construction equipment prior to demobilization.

SECTION 12 – DISPOSAL PROCEDURES

All discarded materials, waste materials, or other objects shall be handled in such a way as to reduce or eliminate 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 and segregated for proper disposal. All contaminated waste materials shall be disposed of as required by the provisions included in the contract and consistent with regulatory provisions. All non-contaminated materials shall be collected and bagged for appropriate disposal. Investigation derived waste will be managed consistent with the work plan for this Site and DER-10 Technical Guidance for Site Investigation and Remediation dated May 2010.

SECTION 13 - EMERGENCY RESPONSE PROCEDURES

As a result of the hazards at the Site, and the conditions under which operations are conducted, there is the possibility of emergency situations. This section establishes procedures for the implementation of an emergency plan.

13.1 Emergency Coordinator

Emergency Coordinator: .... Cody Martin ....Work Phone: (716) 847-1630

The Emergency Coordinator or his on-site designee will, in concert with Campus Square LLC, implement the emergency response procedures whenever conditions at the Site warrant such action. The Emergency Coordinator or his on-site designee will be responsible for assuring the evacuation, emergency treatment, emergency transport of C&S personnel as necessary, and notification of emergency response units (refer to phone listing in the beginning of this HASP) and the appropriate management staff.

13.2 Evacuation

In the event of an emergency situation, such as fire, explosion, significant release of toxic gases, etc., all personnel will evacuate and assemble in a designated assembly area. The Emergency Coordinator or his on-site designee will have authority to contact outside services as required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The Emergency Coordinator or his on-site designee must see that access for emergency equipment is provided and that all ignition sources have been shut down once the emergency situation is established. Once the safety of all personnel is established, the Fire Department and other emergency response groups will be notified by telephone of the emergency.

13.3 Potential or Actual Fire or Explosion

Immediately evacuate the Site and notify local fire and police departments, and other appropriate emergency response groups, if LEL values are above 25% in the work zone or if an actual fire or explosion has taken place.

13.4 Environmental Incident (spread or release of contamination)

Control or stop the spread of contamination if possible. Notify the Emergency Coordinator and the Project Manager. Other appropriate response groups will be notified as appropriate.

13.5 Personnel Injury

Emergency first aid shall be applied on-site as necessary. Then, decontaminate (en route if necessary) and transport the individual to nearest medical facility if needed. The ambulance/rescue squad shall be contacted for transport as necessary in an emergency. The directions to the hospital are shown in Section 1 of this HASP and a map is shown in Attachment A.

13.6 Personnel Exposure

- *Skin Contact*: Use copious amounts of soap and water. Wash/rinse affected area thoroughly, and then provide appropriate medical attention. Eyes should be thoroughly rinsed with water for at least 15 minutes.
- *Inhalation*: Move to fresh air and/or, if necessary, decontaminate and transport to emergency medical facility.
- *Ingestion*: Decontaminate and transport to emergency medical facility.
- *Puncture Wound/Laceration*: Decontaminate, if possible, and transport to emergency medical facility.

13.7 Adverse Weather Conditions

In the event of adverse weather conditions, the HSO will determine if work can continue without sacrificing the health and safety of field workers.

13.8 Incident Investigation and Reporting

In the event of an incident, procedures discussed in the Medical Emergency/Incident Response Protocol, presented in Appendix B of this HASP, shall be followed.

SECTION 14 - COMMUNITY RELATIONS

14.1 Community Health and Safety Plan

14.1.1 Community Air Monitoring Plan

Efforts will be taken to complete field work in a manner which will minimize the creation of airborne dust or particulates. Under dry conditions, work areas may be wetted to control dust. During periods of extreme wind, intrusive field work may be halted until such time as the potential for creating airborne dust or particulate matter as a result of investigation activities is limited.

SECTION 15 - AUTHORIZATIONS

Personnel authorized to enter the Site while operations are being conducted must be approved by the HSO. Authorization will involve completion of appropriate training courses, medical examination requirements, and review and sign-off of this HASP. No C&S personnel should enter the work zone alone. Each site visitor should check in with the HSO or Project Manager prior to entering the work zones.

FIGURE 1

SITE LOCATION MAP

C&S ENGINEERS

0 1,000 2,000 4,000 Feet

C&S COMPANIES®

C&S Engineers, Inc.
90 Broadway
Buffalo, New York 14203
Phone: 716-847-1630
Fax: 716-847-1454
www.cscos.com

JAMESTOWN CONTAINER CORP

FALCONER, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	N30.001.001
DATE:	August 21, 2017
DRAWN BY:	C. Martin
DESIGNED BY:	C. Martin
CHECKED BY:	

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

SITE LOCATION MAP

FIGURE 1

Path: F:\Project\N30 - Jamestown Container\N30001001 - Jamestown Container\Environmental\CADD-GIS\GIS\Projects\Untitled.mxd

FIGURE 2

SITE AERIAL PHOTO

1 2 3

C B A

Legend

- Existing Building
- Historic Buildings
- Groundwater Contours
- Rail Road

0 50 100 200 Feet

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3

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SITE LOCATION MAP

FIGURE 1

Path: F:\Project\N30 - Jamestown Container\N30001001 - Jamestown Container\Environmental\CADD-GIS\GIS\Projects\Untitled.mxd

ATTACHMENT A

MAP TO HOSPITAL

C&S ENGINEERS

bing maps

A 65 S Dow St, Falconer, NY 14733
B Upmc Chautauqua Wca Hospital, 51 Glasgow Ave, Jamestown, NY 14701

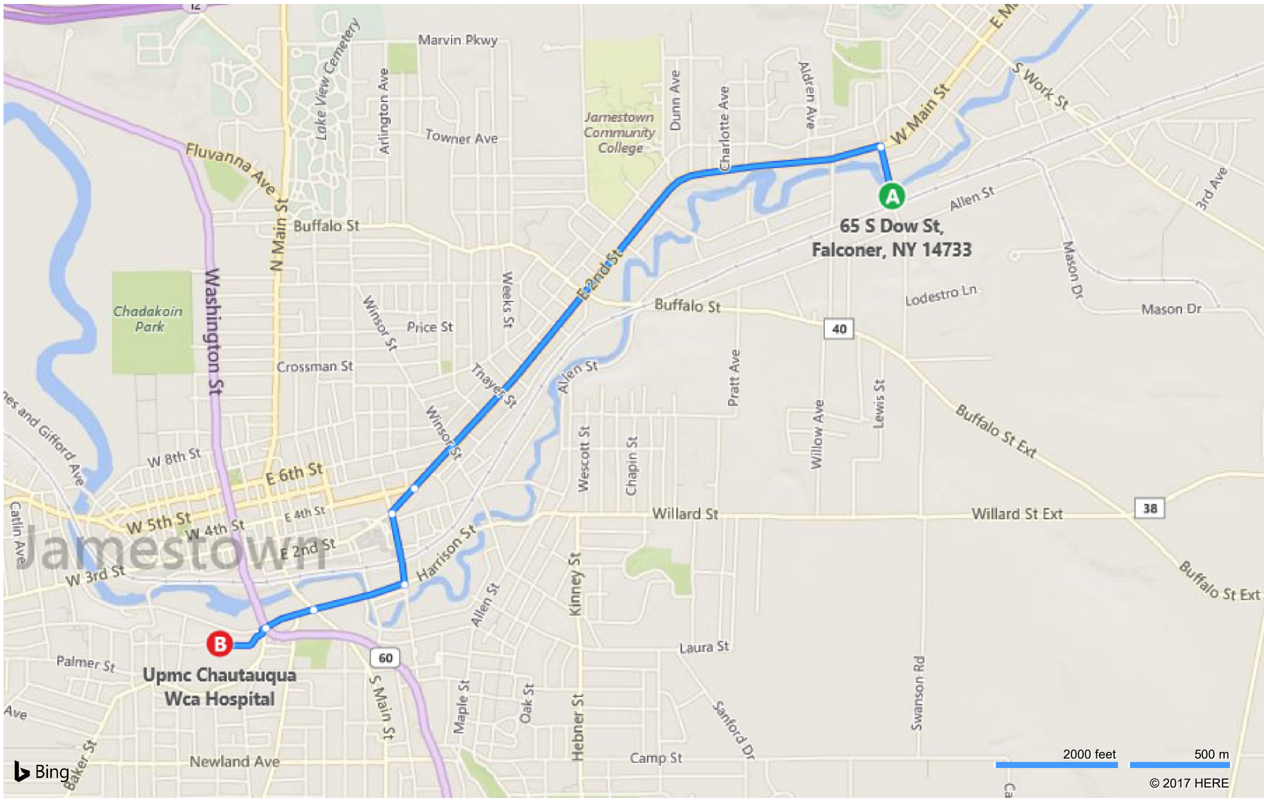
10 min, 3.0 mi
Light traffic (9 min without traffic)
Via RT-394

Type your route notes here

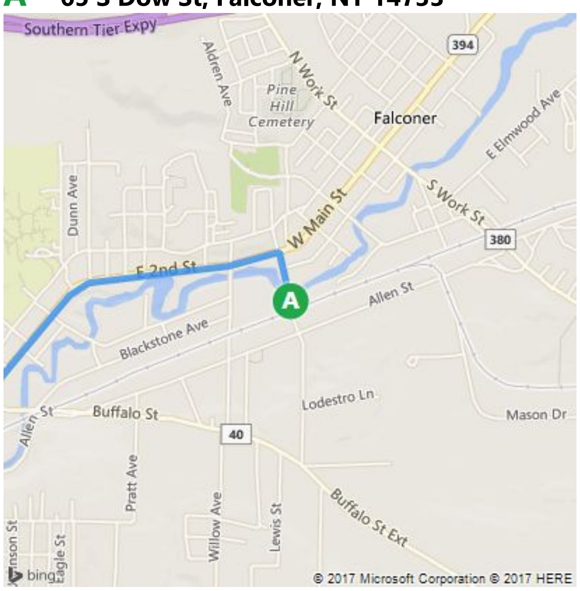
A 65 S Dow St, Falconer, NY 14733

↑	1.	Depart **S Dow St** toward W Everett St	0.2 mi
↰	2.	Turn **left** onto **RT-394 / W Main St** Pass 7-Eleven in 1.1 mi	1.9 mi
↑	3.	Keep **left** onto **E 2nd St** KFC on the corner	0.1 mi
↰	4.	Turn **left** onto **Foote Ave**	0.2 mi
↱	5.	Turn **right** onto **Harrison St**	0.3 mi
↑	6.	Road name changes to **W Harrison St**	0.2 mi
↑	7.	Keep **right** onto **Steele St**	72 ft
↰	8.	Turn **left** onto **Glasgow Ave**	0.2 mi
	9.	Arrive at **Glasgow Ave** on the left The last intersection is Steele St If you reach Culver St, you've gone too far	

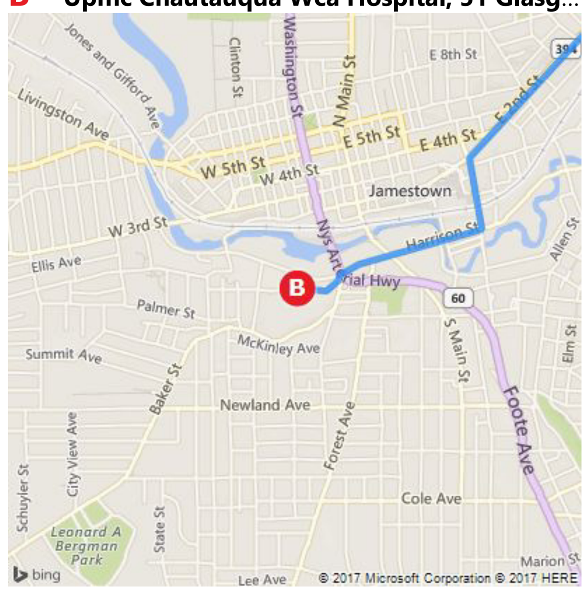
B Upmc Chautauqua Wca Hospital



A 65 S Dow St, Falconer, NY 14733



B Upmc Chautauqua Wca Hospital, 51 Glasg...



These directions are subject to the Microsoft® Service Agreement and are for informational purposes only. No guarantee is made regarding their completeness or accuracy. Construction projects, traffic, or other events may cause actual conditions to differ from these results. Map and traffic data © 2017 HERE™.

Appendix A

EXCAVATION/TRENCHING GUIDELINE

C&S ENGINEERS

C&S ENGINEERS, INC. HEALTH & SAFETY GUIDELINE #14
EXCAVATION/TRENCHING OPERATIONS

TABLE OF CONTENTS

C&S ENGINEERS, INC.
EXCAVATION/TRENCHING OPERATIONS

1.0 PURPOSE

To establish safe operating procedures for excavation/trenching operations at C&S work sites.

2.0 SCOPE

Applies to all C&S activity where excavation or trenching operations take place.

3.0 DEFINITIONS

Excavation — Any manmade cavity or depression in the earth's surface, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation.

Trench — A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet.

4.0 RESPONSIBILITY EMPLOYEES

Employees — All employees must understand and follow the procedures outlined in this guideline during all excavation and trenching operations.

Health and Safety Coordinator/Officer (HSC/HSO) - The HSC/HSO is responsible for ensuring that these procedures are implemented at each work site.

5.0 GUIDELINES

5.1 Hazards Associated With Excavation/Trenching

The principal hazards associated with excavation/trenching are:

- Suffocation, crushing, or other injury from falling material.
- Damage/failure of installed underground services and consequent hazards.
- Tripping, slipping, or falling.
- Possibility of explosive, flammable, toxic, or oxygen-deficient atmosphere in excavation.

5.2 Procedures Prior to Excavation

1. Underground Utilities

   - Determine the presence and location of any underground chemical or utility pipes, electrical, telephone, or instrument wire or cables.
   - If the local DigSafely NY is unable to locate private/domestic or plant utilities, then an independent utility locating service must be contacted and mobilized to the site.
   - Identify the location of underground services by stakes, markers or paint.
   - Arrange to de-energize or isolate underground services during excavation. If not possible, or if location is not definite, method of excavation shall be established to minimize hazards by such means as:

     a) Use of hand tools in area of underground services.
     b) Insulating personnel and equipment from possible electrical contact.
     c) Use of tools or equipment that will reduce possibility of damage to underground services and hazard to worker.

2. Identify Excavation Area — Areas to be excavated shall be identified and segregated by means of barricades, ropes, and/or signs to prevent access of unauthorized personnel and equipment. Suitable means shall be provided to make barriers visible at all times.
3. Surface Water Provide means of diverting surface water from excavation.
4. Shoring/Bracing — Shoring or bracing that may be required for installed equipment adjacent to the excavation shall be designed by a competent person.
5. Structural Ramps — Structural ramps that are used solely by employees as a means of access to or egress from the excavation shall be designed by a competent person.

5.3 Procedures For Doing The Excavation

1. **Determine the need for shoring/sloping** — the type of soil will establish the need for shoring, slope of the excavation, support systems, and equipment to be used. The soil condition may change as the excavation proceeds. Appendices A, B, C, D, E, and F of the OSHA Excavation Regulation, 29 CFR 1926 Subpart P, are to be used in defining shoring and sloping requirements.

2. **Mobile equipment** — For safe use of mobile industrial equipment in or near the excavation, the load carrying capacity of soil shall be established and suitable protection against collapse of soil provided by the use of mats, barricades, restricting the location of equipment, or shoring.

3. Excavated material (spoil) shall be stored at least two (2) feet from the edge of the excavation.

4. All trench (vertical sides) excavations greater than five (5) feet deep shall be shored.

5. The excavation shall be inspected daily for changes in conditions, including the presence of ground water, change in soil condition, or effects of weather such as rain or freeze. A safe means of continuing the work shall be established based on changes in condition. Typically test trench excavations made as part of an environmental subsurface nvestigation are made and backfilled the same day.

6. Appropriate monitoring for gas, toxic, or flammable materials will be conducted to establish the need for respiratory equipment, ventilation, or other measures required to continue the excavation safely.

7. Adequate means of dewatering the excavation shall be provided by the contractor as required.

8. A signal person shall be provided to direct powered equipment if working in the excavation with other personnel.

9. A signal person shall be provided when backfilling excavations to direct powered equipment working in the excavation with other personnel.

10. Warning vests will be worn when employees are exposed to public vehicular traffic.

11. Employees shall stand away from vehicles being loaded or unloaded, and shall not be permitted underneath loads handled by lifting or dragging equipment.

12. Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available if hazardous atmospheric conditions exist or may be expected to develop. The specifics will be determined by the HSC/HSM.

13. Walkways or bridges with standard guardrail shall be provided where employees or equipment are required or permitted to cross over excavations.

5.4 Entering the Excavation

No C&S Engineers, Inc., employee shall enter an excavation which fails to meet the requirements of Section 5.3 of this guideline.

6.0 REFERENCES

29 CFR 1926, Subpart P - Excavations

7.0 ATTACHMENTS

29 CFR 1926 Subpart P - Appendices A, B, F

- **Part Number:** 1926
- **Part Title:** Safety and Health Regulations for Construction
- **Subpart:** P
- **Subpart Title:** Excavations
- **Standard Number:** 1926 Subpart P App A
- **Title:** Soil Classification

(a) Scope and application - (1) Scope. This appendix describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. The appendix contains definitions, sets for requirements, and describes acceptable visual and manual tests for use in classifying soils.

(2) Application. This appendix applies when a sloping or benching system is designed in accordance with the requirements set fo 1926.652(b)(2) as a method of protection for employees from cave-ins. This appendix also applies when timber shoring for exca designed as a method of protection from cave-ins in accordance with appendix C to subpart P of part 1926, and when aluminum shoring is designed in accordance with appendix D. This Appendix also applies if other protective systems are designed and selec from data prepared in accordance with the requirements set forth in 1926.652(c), and the use of the data is predicated on the us classification system set forth in this appendix.

(b) Definitions. The definitions and examples given below are based on, in whole or in part, the following; American Society for T Materials (ASTM) Standards D653-85 and D2488; The Unified Soils Classification System; The U.S. Department of Agriculture (US Textural Classification Scheme; and The National Bureau of Standards Report BSS-121.

"Cemented soil" means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

"Cohesive soil" means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sideslopes, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

"Dry soil" means soil that does not exhibit visible signs of moisture content.

"Fissured" means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

"Granular soil" means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

"Layered system" means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

"Moist soil" means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

"Plastic" means a property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.

"Saturated soil" means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or sheer vane.

"Soil classification system" means, for the purpose of this subpart, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the characteristics of the deposits and the environmental conditions of exposure.

"Stable rock" means natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

"Submerged soil" means soil which is underwater or is free seeping.

"Type A" means cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:

(i) The soil is fissured; or

(ii) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or

(iii) The soil has been previously disturbed; or

(iv) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or

(v) The material is subject to other factors that would require it to be classified as a less stable material.

"Type B" means:

(i) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or

(ii) Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.

(iii) Previously disturbed soils except those which would otherwise be classed as Type C soil.

(iv) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or

(v) Dry rock that is not stable; or

(vi) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

"Type C" means:

(i) Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or

(ii) Granular soils including gravel, sand, and loamy sand; or

(iii) Submerged soil or soil from which water is freely seeping; or

(iv) Submerged rock that is not stable, or

(v) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

"Unconfined compressive strength" means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.

"Wet soil" means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

(c) Requirements - (1) Classification of soil and rock deposits. Each soil and rock deposit shall be classified by a competent perso Rock, Type A, Type B, or Type C in accordance with the definitions set forth in paragraph (b) of this appendix.

(2) Basis of classification. The classification of the deposits shall be made based on the results of at least one visual and at least analysis. Such analyses shall be conducted by a competent person using tests described in paragraph (d) below, or in other reco methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Depart Agriculture textural classification system.

(3) Visual and manual analyses. The visual and manual analyses, such as those noted as being acceptable in paragraph (d) of thi shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify pro properties, factors, and conditions affecting the classification of the deposits.

(4) Layered systems. In a layered system, the system shall be classified in accordance with its weakest layer. However, each laye classified individually where a more stable layer lies under a less stable layer.

(5) Reclassification. If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any w changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumst

(d) Acceptable visual and manual tests. - (1) Visual tests. Visual analysis is conducted to determine qualitative information regarc excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil take samples from excavated material.

(i) Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the amounts of the particle sizes. Soil that is primarily composed of fine-grained material material is cohesive material. Soil composec of coarse-grained sand or gravel is granular material.

(ii) Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does nc clumps is granular.

(iii) Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tens could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of m ground and are indications of potentially hazardous situations.

(iv) Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground s and to identify previously disturbed soil.

(v) Observed the opened side of the excavation to identify layered systems. Examine layered systems to identify if the layers slop the excavation. Estimate the degree of slope of the layers.

(vi) Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water see the sides of the excavation, or the location of the level of the water table.

(vii) Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the s the excavation face.

(2) Manual tests. Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil a provide more information in order to classify soil properly.

(i) Plasticity. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohe material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of 1/8-inch be held on one end without tearing, the soil is cohesive.

(ii) Dry strength. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is g combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller cl only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps wh break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the s considered unfissured.

(iii) Thumb penetration. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive so test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designatior "Standard Recommended Practice for Description of Soils (Visual - Manual Procedure).") Type A soils with an unconfined compre: strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great eff soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molde finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practical excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influe flooding), the classification of the soil must be changed accordingly.

(iv) Other strength tests. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetron using a hand-operated shearvane.

(v) Drying test. The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesi and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.5 six inches (15.24 cm) in diameter until it is thoroughly dry:

(A) If the sample develops cracks as it dries, significant fissures are indicated.

(B) Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil ha cohesive material content. The soil can be classified as an unfissured cohesive material and the unconfined compressive strength determined.

(C) If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cc fissures. If they pulverize easily into very small fragments, the material is granular.

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- **Part Number:** 1926
- **Part Title:** Safety and Health Regulations for Construction
- **Subpart:** P
- **Subpart Title:** Excavations
- **Standard Number:** 1926 Subpart P App B
- **Title:** Sloping and Benching

(a) ***Scope and application***. This appendix contains specifications for sloping and benching when used as methods of protecting working in excavations from cave-ins. The requirements of this appendix apply when the design of sloping and benching protectiv is to be performed in accordance with the requirements set forth in § 1926.652(b)(2).

(b) ***Definitions***.

Actual slope means the slope to which an excavation face is excavated.

Distress means that the soil is in a condition where a cave-in is imminent or is likely to occur. Distress is evidenced by such phen the development of fissures in the face of or adjacent to an open excavation; the subsidence of the edge of an excavation; the slu material from the face or the bulging or heaving of material from the bottom of an excavation; the spalling of material from the fa excavation; and ravelling, i.e., small amounts of material such as pebbles or little clumps of material suddenly separating from the excavation and trickling or rolling down into the excavation.

Maximum allowable slope means the steepest incline of an excavation face that is acceptable for the most favorable site condi protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V).

Short term exposure means a period of time less than or equal to 24 hours that an excavation is open.

(c) ***Requirements*** -- (1) ***Soil classification***. Soil and rock deposits shall be classified in accordance with appendix A to subpart I 1926.

(2) ***Maximum allowable slope***. The maximum allowable slope for a soil or rock deposit shall be determined from Table B-1 of tl appendix.

(3) ***Actual slope***. (i) The actual slope shall not be steeper than the maximum allowable slope.

(ii) The actual slope shall be less steep than the maximum allowable slope, when there are signs of distress. If that situation occur slope shall be cut back to an actual slope which is at least ½ horizontal to one vertical (½H:1V) less steep than the maximum allo slope.

(iii) When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person sh determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such achieved. Surcharge loads from adjacent structures shall be evaluated in accordance with § 1926.651(i).

(4) ***Configurations***. Configurations of sloping and benching systems shall be in accordance with Figure B-1.

TABLE B-1
MAXIMUM ALLOWABLE SLOPES

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V)(1) FOR EXCAVATIONS LESS THAN 20 FEET DEEP(3)
STABLE ROCK	VERTICAL (90°)
TYPE A (2)	3/4:1 (53°)
TYPE B	1:1 (45°)
TYPE C	1 ½:1 (34°)

Footnote(1) Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angle: rounded off.

Footnote(2) A short-term maximum allowable slope of 1/2H:1V (63°) is allowed in excavations in Type A soil that are 12 feed (3.67 m) or l depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4H:1V (53°).

Footnote(3) Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

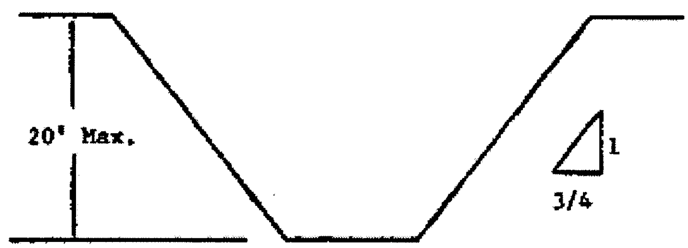
Figure B-1

Slope Configurations

(All slopes stated below are in the horizontal to vertical ratio)

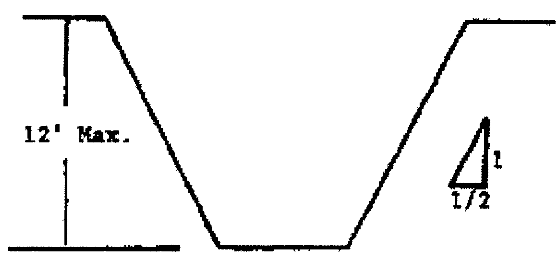
B-1.1 Excavations made in Type A soil.

1. All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of ¾:1.



SIMPLE SLOPE -- GENERAL

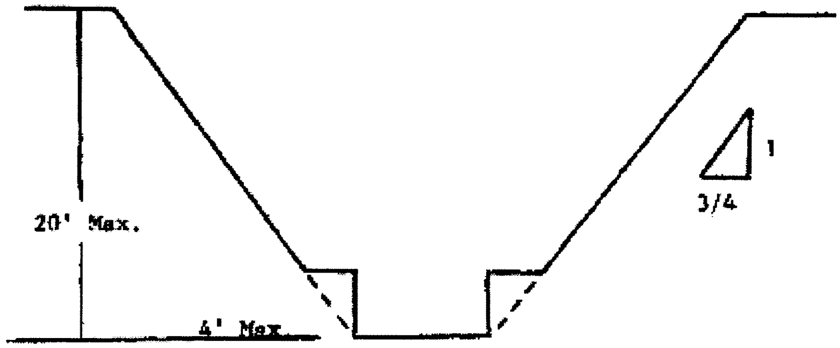
Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have maximum allowable slope of ½:1.



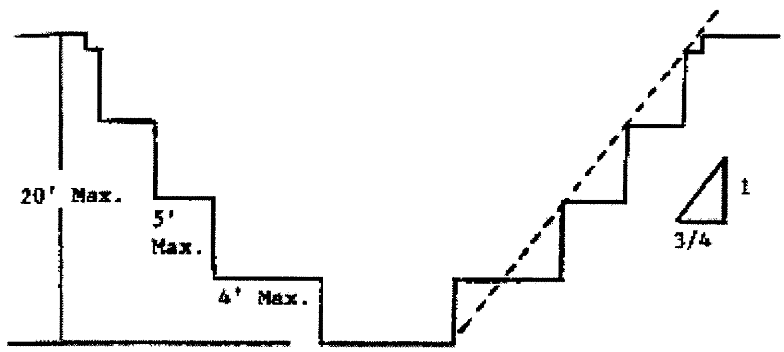
SIMPLE SLOPE -- SHORT TERM

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4 to 1 and maximum bench dimens

follows:

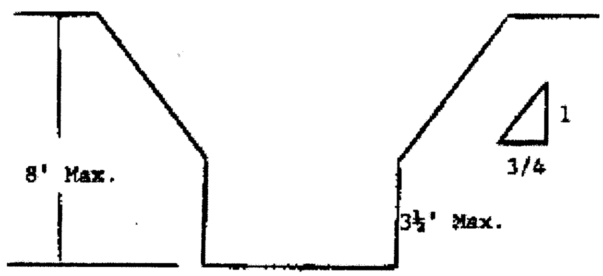


SIMPLE BENCH



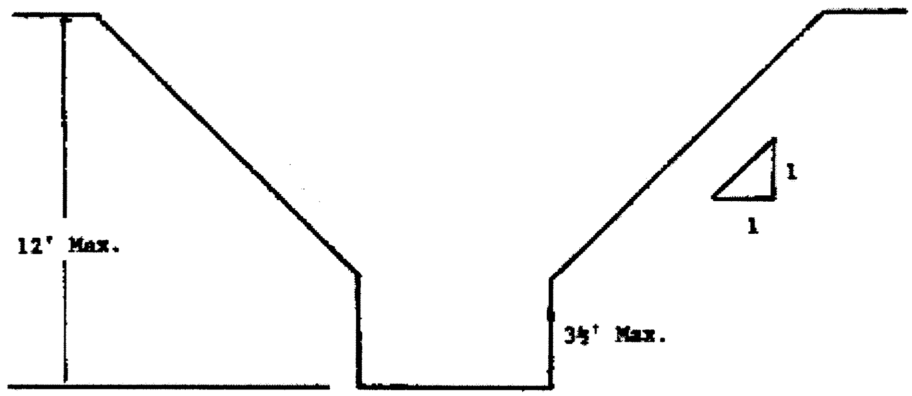
MULTIPLE BENCH

3. All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical sid
feet.



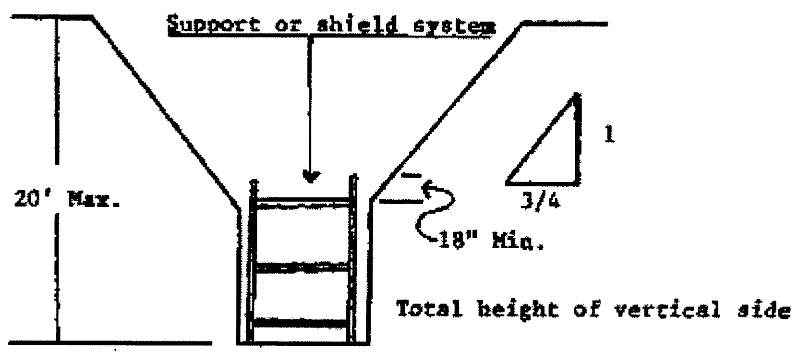
UNSUPPORTED VERTICALLY SIDED LOWER PORTION -- MAXIMUM 8 FEET IN DEPTH)

All excavations more than 8 feet but not more than 12 feet in depth with unsupported vertically sided lower portions shall have a r
allowable slope of 1:1 and a maximum vertical side of 3½ feet.



UNSUPPORTED VERTICALLY SIDED LOWER PORTION -- MAXIMUM 12 FEET IN DEPTH)

All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maxii allowable slope of ¾:1. The support or shield system must extend at least 18 inches above the top of the vertical side.

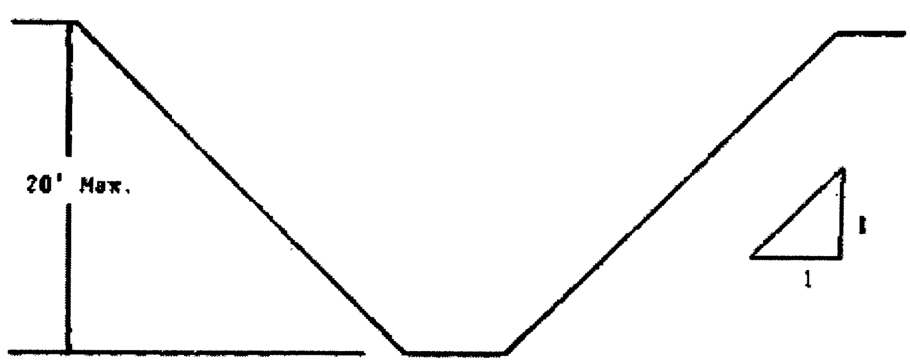


SUPPORTED OR SHIELDED VERTICALLY SIDED LOWER PORTION

4. All other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with the other opt permitted under § 1926.652(b).

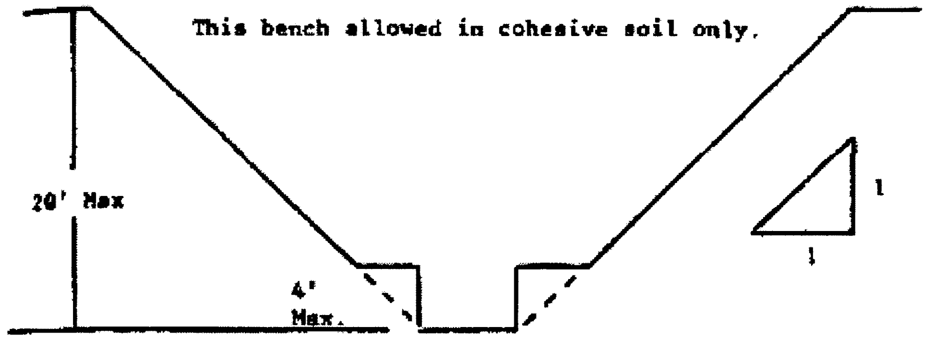
B-1.2 Excavations Made in Type B Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

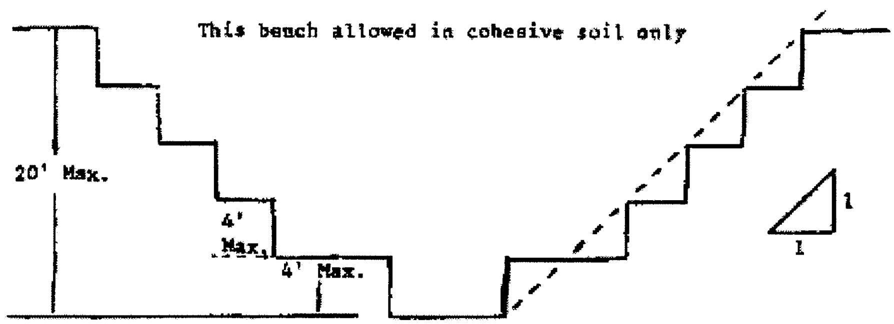


SIMPLE SLOPE

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions

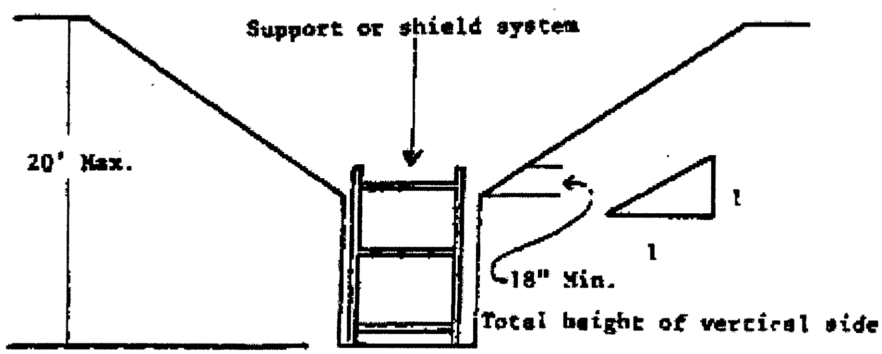


SINGLE BENCH



MULTIPLE BENCH

3. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at le inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.

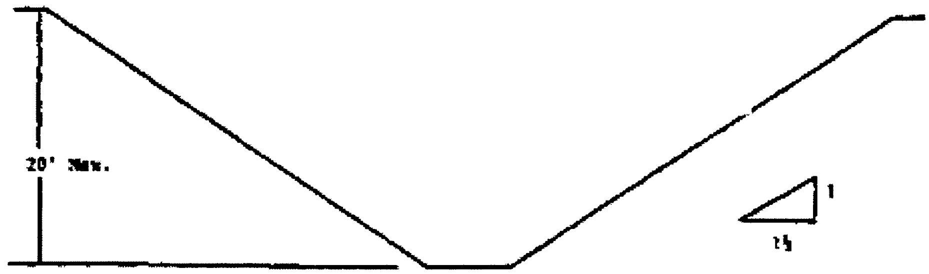


VERTICALLY SIDED LOWER PORTION

4. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

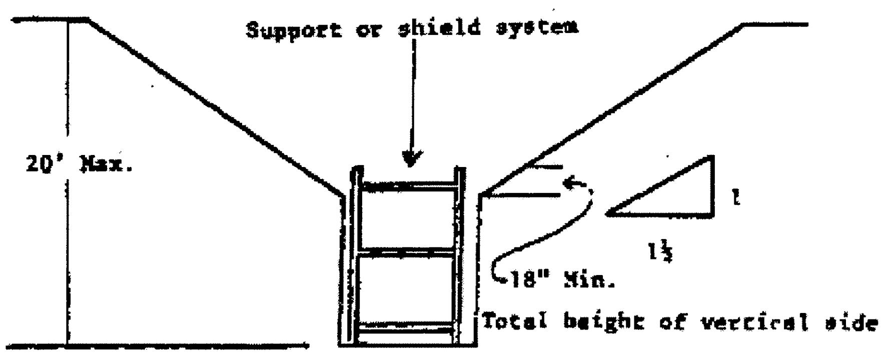
B-1.3 Excavations Made in Type C Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1½:1.



SIMPLE SLOPE

2. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at le inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1½:1.

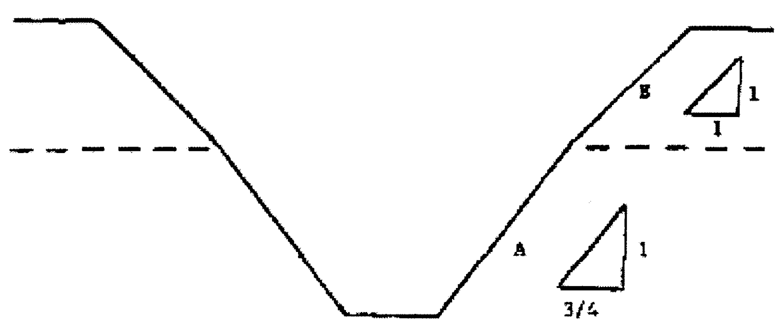


VERTICAL SIDED LOWER PORTION

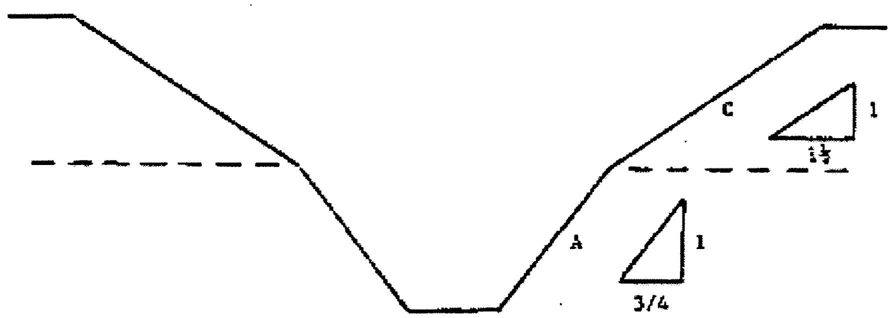
3. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

B-1.4 Excavations Made in Layered Soils

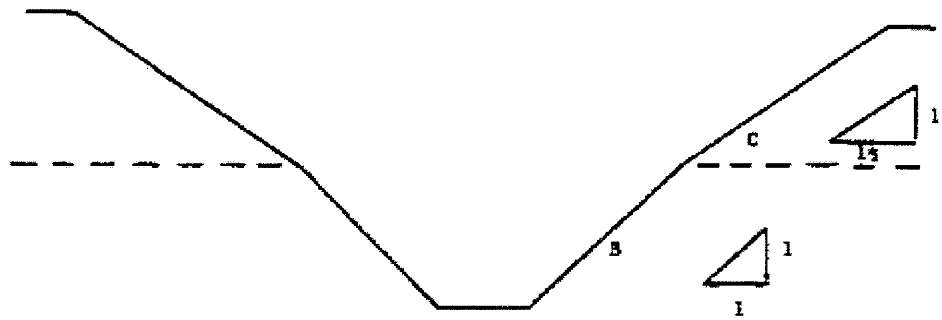
1. All excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth b



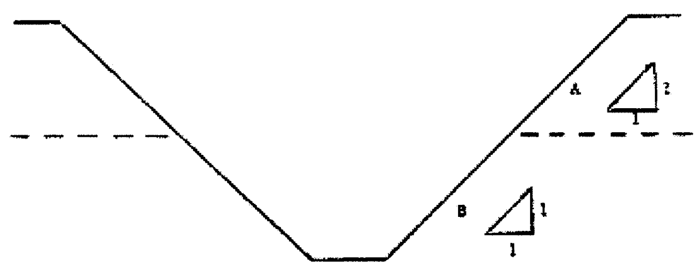
B OVER A



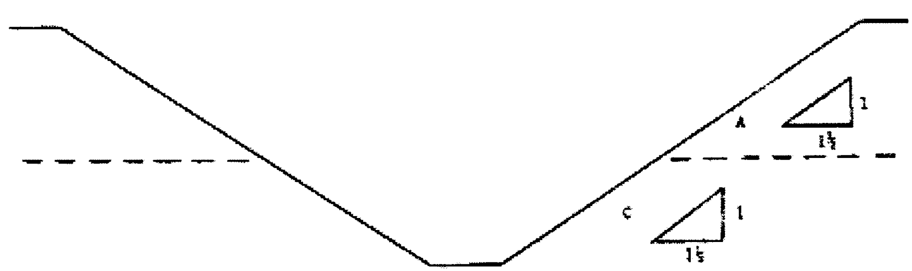
C OVER A



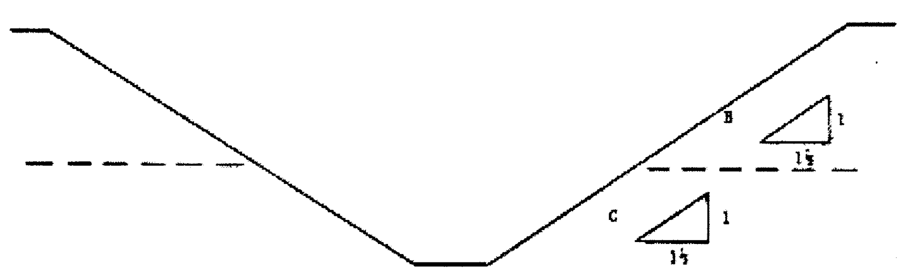
C OVER B



A OVER B



A OVER C



B OVER C

2. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

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- **Part Number:** 1926
- **Part Title:** Safety and Health Regulations for Construction
- **Subpart:** P
- **Subpart Title:** Excavations
- **Standard Number:** 1926 Subpart P App F
- **Title:** Selection of Protective Systems

The following figures are a graphic summary of the requirements contained in subpart P for excavations 20 feet or less in depth. Prc systems for use in excavations more than 20 feet in depth must be designed by a registered professional engineer in accordance wit 1926.652(b) and (c).

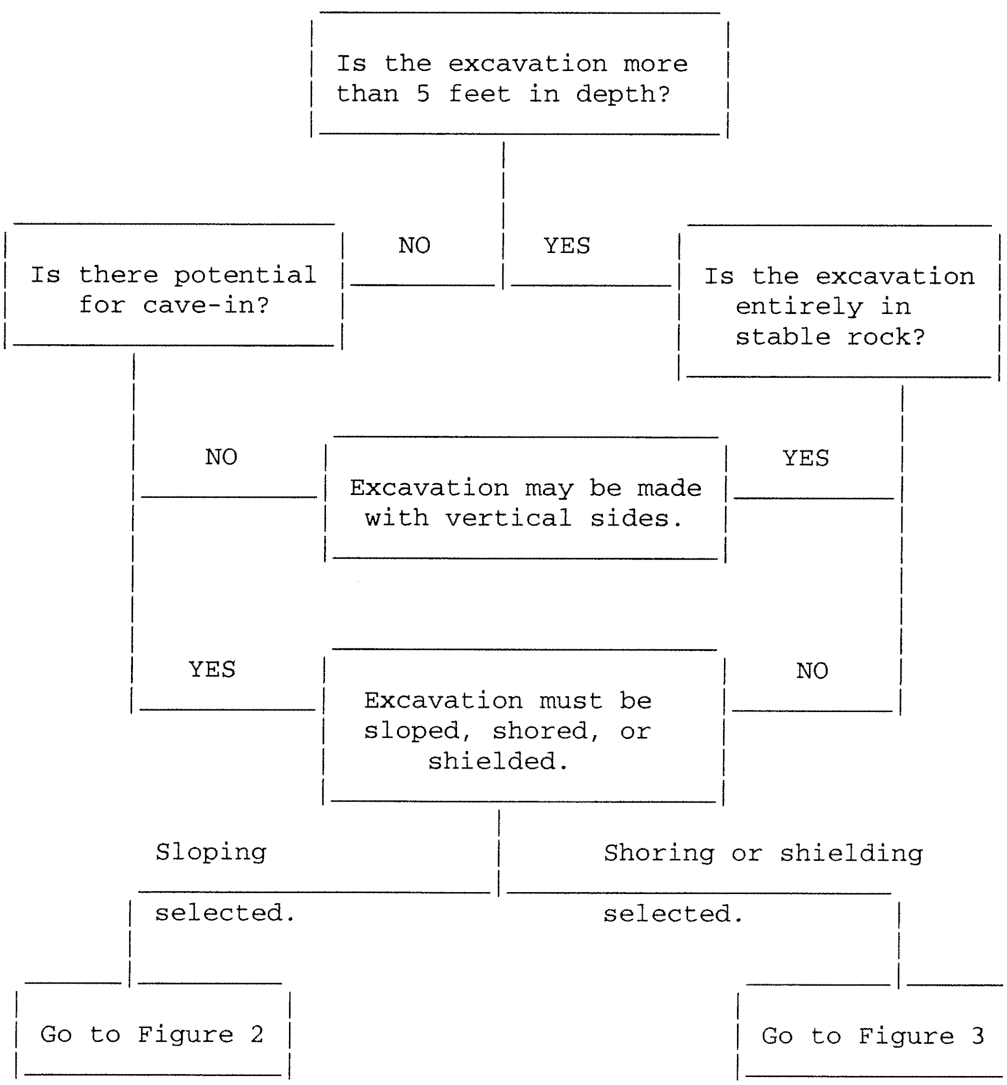

FIGURE 1 - PRELIMINARY DECISIONS

Sloping selected as the method of protection

Will soil classification be made in accordance with Sec. 1926.652(b)?

YES

Excavation must comply with one of the following three options:

Option 1:

Sec. 1926.652(b)(3) which requires Appendices A and B to be followed

Option 2:

Sec. 1926.652(b)(3) which requires other tabulated data (see definition to be followed.

Option 3:

Sec. 1926.652(b)(4) which requires the excavation to be designed by a registered professional engineer.

NO

Excavations must comply with Sec. 1926.652(b)(1) which requires a slope of 1 1/2 H:1V (34 deg.).

FIGURE 2 - SLOPING OPTIONS

Shoring or shielding selected as the method of protection.

Soil Classification is required when shoring or shielding is used. The excavation must comply with one of the following four options:

Option 1

Sec. 1926.652(c)(1) which requires Appendices A and C to be followed (e.g. timber shoring).

Option 2

Sec. 1926.652(c)(2) which requires manufacturers data to be followed (e.g. hydraulic shoring, trench jacks, air shores, shields).

Option 3

Sec. 1926.652(c)(3) which requires tabulated data (see definition) to be followed (e.g. any system as per the tabulated data).

Option 4

Sec. 1926.652(c)(4) which requires the excavation to be designed by a registered professional engineer (e.g. any designed system).

FIGURE 3 - SHORING AND SHIELDING OPTIONS

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Appendix B

GUIDANCE ON INCIDENT INVESTIGATION

AND REPORTING

C&S ENGINEERS

3. Following the treatment and care of the injured employee, the emergency coordinator or his on-site designee and the project manager will initiate the completion of the first injury report. The Health & Safety Manager will assist.

Project Manager

1. Upon notification of a personal injury or illness on the job site, will notify C & S Engineers, Inc, President and Corporate Legal and C&S Companies Health and Safety Manager.
2. Will report to the worksite to initiate the first injury report.
3. Will report to the treatment facility to check on the well being of the injured employee. The project manager will ensure that the treatment facility is aware that this is a workers compensation case.
4. Will assist the Health and Safety Manager in the analysis of the incident.

Health & Safety Manager

1. Upon notification of the personal injury will determined if it is necessary to report to the treatment facility or the accident site, depending on the nature of the injuries and the circumstances of the accident.
2. Will report to the worksite to begin a root cause analysis investigation of the accident. The investigation may include interview of witnesses, field crew , and project manager, the photographing of the scene, reconstruction of the accident scene, using test instruments and taking measurements. The Health and Safety Manager may draw diagrams from the information learned.
3. The Health and Safety Manager will work with the owner/client as necessary to investigate the accident.
4. The Health & Safety manager will ensure that the site is safe to resume work.
5. The Health & Safety Manager shall initiate the New York State Compensation form requirements (C-2) and forward a copy of the C-2 to the C & S Engineers, Inc. controller for transmittal to the Compensation Carrier within 8 hrs of notification of the incident or by the end of the next business day.
6. The Health and Safety manager, upon completion of the investigation, will provide the Project Manager with a written investigative report (copy to the President)
7. The accident will be reviewed at the next Project Managers meeting with the intent to prevent further or similar events on other projects.
8. The Health & Safety Manager will assess the incident to determine OSHA record ability and make record if necessary on the OSHA 300 form, within five working days.

Incident Response

1.0 PURPOSE

To prevent the occurrence of accidents on C&S Engineers, Inc., work sites and to establish a procedure for investigation and reporting of incidents occurring in, or related to C&S work activities.

2.0 SCOPE

Applies to all incidents related to C&S Engineers, Inc. work activities.

3.0 DEFINITIONS

Accident - An undesired event resulting in personal injury and/or property damage, and/or equipment failure.

Fatality - An injury or illness resulting in death of the individual.

Incident - Any occurrence which results in, or could potentially result in, the need for medical care or property damage. Such incidents shall include lost time accidents or illness, medical treatment cases, unplanned exposure to toxic materials or any other significant occurrence resulting in property damage or in "near misses."

Incidence Rate - the number of injuries, illnesses, or lost workdays related to a common exposure base of 100 full-time workers. The rate is calculated as:

N/EH x 200,000

N = number of injuries and illnesses or lost workday cases; EH = total hours worked by all associates during calendar year. 200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year).

Injury - An injury such as a cut, fracture, sprain, amputation, etc. which results from a work accident or from a single instantaneous event in the work environment.

Lost Workday Case - A lost workday case occurs when an injured or ill employee experiences days away from work beginning with the next scheduled work day. Lost workday cases do not occur unless the employee is effected beyond the day of injury or onset of illness.

Recordable Illness - An illness that results from the course of employment and must be entered on the OSHA 300 Log and Summary of Occupational Injuries and Illnesses. These illnesses require medical treatment and evaluation of work related injury. For example, dermatitis, bronchitis, irritation of eyes, nose, and throat can result from work and non-work related incidents.

Recordable Injury - An injury that results from the course of employment and must be entered on the OSHA 300 Log and Summary of Occupational Injuries and Illnesses. These injuries require medical treatment; may involve loss of consciousness; may result in restriction of work or motion or transfer to another job; or result in a fatality.

Near Miss - An incident which, if occurring at a different time or in a different personnel or equipment configuration, would have resulted in an incident.

4.0 RESPONSIBILITIES

Employees - It shall be the responsibility of all C&S Engineers, Inc. employees to report all incidents as soon as possible to the HSC, regardless of the severity.

Human Resources - has overall responsibility for maintaining accident/ incident reporting and investigations according to current regulations and recording injuries/ illness on the OSHA 300 log, and posting the OSHA 300 log.

Emergency Coordinator - It is the responsibility of the Emergency Coordinator to investigate and prepare an appropriate report of all accidents, illnesses, and incidents occurring on or related to C&S Engineers, Inc. work. The Emergency Coordinator shall complete Attachment A within 24 hours of the incident occurrence.

Health and Safety Manager (HSM) - It is the responsibility of the HSM to investigate and prepare an appropriate report of all lost time injuries and illnesses and significant incidents occurring on or related to C&S Companies. The HSM shall maintain the OSHA 300 form.

Project Managers (PM) - It shall be the PM's responsibility to promptly correct any deficiencies in personnel, training, actions, or any site or equipment deficiencies that were determined to cause or contribute to the incident investigated.

5.0 GUIDELINES

5.1 Incident Investigation

The Project Manager will immediately investigate the circumstances surrounding the incident and will make recommendations to prevent recurrence. The HSM shall be immediately notified by telephone if a serious accident/ incident occurs. The incident shall be evaluated to determine whether it is OSHA recordable. If the incident is determined to be OSHA 300 recordable, it shall be entered on the OSHA 300 form.

The Project Manager with assistance from the HSM must submit to the office an incident report form pertaining to any incident resulting in injury or property damage.

5.2 Incident Report

The completed incident report must be completed by the Project Manager within 12 hours of the incident and distributed to the HSM, and Human Resources. This form shall be maintained by Human Resources for at least five years for all OSHA recordable cases. This form serves as an equivalent to the OSHA 101 form.

5.3 Incident Follow-up Report

The Incident Follow-Up Report (Attachment B) shall be distributed with the Incident Report within one week of the incident. Delay in filing this report shall be explained in a brief memorandum.

5.4 Reporting of Fatalities or Multiple Hospitalization Accidents

Fatalities or accidents resulting in the hospitalization of three or more employees must be reported to OSHA verbally or in writing within 8 hours. The report must contain 1) circumstances surrounding the accident(s), 2) the number of fatalities, and 3) the extent of any injuries.

5.5 OSHA 300A Summary Form

Recordable cases must be entered on the log within six workdays of receipt of the information that a recordable case has occurred. The OSHA log must be kept updated to within 45 calendar days.

OSHA 300 forms must be updated during the 5 year retention period, if there is a change in the extent or outcome of an injury or illness which affects an entry on a log. If a change is necessary, the original entry should be lined out and a corrected entry made on that log. New entries should be made for previously unrecorded cases that are discovered or for cases that initially weren't recorded but were found to be recordable after the end of the year. Log totals should also be modified to reflect these changes.

5.5.1 Posting

The log must be summarized at the end of the calendar year and the summary must be posted from February 1 through May 31.

5.6 OSHA 300A

Facilities selected by the Bureau of Labor Statistics (BLS) to participate in surveys of occupational injuries and illnesses will receive the OSHA 300A. The data from the annual summary on the OSHA 300 log should be transferred to the OSHA 300A, other requested information provided and the form returned as instructed by the BLS.

5.7 Access to OSHA Records

All OSHA records (accident reporting forms and OSHA 300 logs) should be available for inspection and copying by authorized Federal and State government officials.

Employees, former employees, and their representatives must be given access for inspection and copying to only the log, OSHA No. 300, for the establishment in which the employee currently works or formerly worked.

6.0 REFERENCES

29 CFR Part 1904

7.0 ATTACHMENTS

Attachment A - Incident Investigation Form
Attachment B - Incident Follow-Up Report
Attachment C - Establishing Recordability

ATTACHMENT A

INCIDENT INVESTIGATION FORM

Accident investigation should include:

Location: ____

Time of Day: ____

Accident Type: ____

Victim:____

Nature of Injury:____

Released Injury:____

Hazardous Material:____

Unsafe Acts:____

Unsafe Conditions:____

Policies, Decisions:____

____

Personal Factors:____

____

Environmental Factors:____

____

____

ATTACHMENT B

Date ____

Foreman: ____

INCIDENT FOLLOW-UP REPORT

Date of Incident: ____

Site:____

Brief description of incident: ____

____

____

____

____

Outcome of incident: ____

____

____

____

Physician's recommendations: ____

____

____

____

Date the injured returned to work:____

Project Manager Signature: ____

Date: ____

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

ATTACHMENT C

ESTABLISHING RECORDABILITY

1. Deciding whether to record a case and how to classify the case.

Determine whether a fatality, injury or illness is recordable.

A fatality is recordable if:

- Results from employment

An injury is recordable if:

- Results from employment and
- It requires medical treatment beyond first aid or
- Results in restricted work activity or job transfer, or
- Results in lost work day or
- Results in loss of consciousness

An illness is recordable if:

- It results from employment

2. Definition of "Resulting from Employment"

Resulting from employment is when the injury or illness results from an event or exposure in the work environment. The work environment is primarily composed of: 1) The employer's premises, and 2) other locations where associates are engaged in work-related activities or are present as a condition of their employment.

The employer's premises include company rest rooms, hallways, cafeterias, sidewalks and parking lots. Injuries occurring in these places are generally considered work related.

The employer's premises EXCLUDES employer controlled ball fields, tennis courts, golf courses, parks, swimming pools, gyms, and other similar recreational facilities, used by associates on a voluntary basis for their own benefit, primarily during off work hours.

Ordinary and customary commute, is not generally considered work related.

Employees injured or taken ill while engaged in consuming food, as part of a normal break or activity is not considered work related. Employees injured or taken ill as the result of smoking, consuming illegal drugs, alcohol or applying make up are generally not considered work related. Employee injured by un authorized horseplay is generally not considered work related, however, an employee injured as a result of a fight or other workplace violence act, may be considered work related.

Associates who travel on company business are considered to be engaged in work related activities all the time they spend in the interest of the company. This includes travel to and from customer contacts, and entertaining or being entertained for purpose of promoting or discussing business. Incidents occurring during normal living activities (eating, sleeping, recreation) or if the associate deviates from a reasonably direct route of travel are not considered OSHA recordable.

3. Distinction between Medical Treatment and First Aid.

First aid is defined as any one-time treatment, and any follow up visit for the purpose of observation, of minor scratches, cuts, burns, splinters, etc., which do not ordinarily require medical care. Such one time treatment, and follow up visit for the purpose of observation, is considered first aid even though provided by a physician or registered professional personnel.

Medical Treatment (recordable)

a) They must be treated only by a physician or licensed medical personnel.

b) They impair bodily function (i.e. normal use of senses, limbs, etc.).

c) They result in damage to physical structure of a non superficial nature (fractures).

d) They involve complications requiring follow up medical treatment.

C&S
ENGINEERS

APPENDIX C
SUB-SLAB DEPRESSURIZATION CONSTRUCTION COMPLETION REPORTS

mitigation tech *vapor intrusion specialists*

April 8, 2017

Mr. Cody Martin
Project Manager
C & S Companies
141 Elm Street, Suite 100
Buffalo, NY 14203
Via email: Cody Martin <cmartin@cscos.com>

Re: Jamestown Container Companies – 65 South Dow St., Falconer, NY 14733
Construction Completion Report for SSD System - Building 9

CONSTRUCTION COMPLETION REPORT

1. OVERVIEW

This document presents a construction report, performance evaluation, O&M advice and certification of effectiveness for the Sub-Slab Depressurization system (SSDS) installed by *Mitigation Tech* at 65 South Dow St., Falconer, NY 14733, Building 9, as commissioned March 27, 2017.

Following an SSD construction plan (dated October 18, 2016) informed by a general building assessment performed August 19, 2016, two multi-suction point SSD Systems were installed using principles and equipment typically used for soil vapor intrusion mitigation in buildings. The primary objective of implementing this preemptive measure was to mitigate potential intrusion of soil vapors. This would be achieved by maintaining a negative pressure of at least .002 water column inches (wci) below the slab relative to the air pressure above the slab. All work is in compliance with the NYS DOH document, "Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006".

2. BUILDING ASSESSMENT AND SYSTEM CONSTRUCTION

Confirmatory sub-slab air communication testing was performed at job start March 21, 2017 to refine data obtained from the preliminary building assessment. Work continued with an analysis of appropriate locations for fans, suction cavities and other SSD system components. It was determined that two fan systems were more practicable than a single fan system. Both for physical protection and minimum impact on active use areas, riser pipes were surface mounted near columns or perimeter walls; horizontal pipe was installed as close to ceiling and established raceways as possible. Work was coordinated with client to minimize disturbance of work areas, relocate obstacles and control dust. Vacuum and air flow measurements were performed continuously during construction to ensure integrity of design. Various fans were evaluated in place and in combination to determine the most effective configuration. At commissioning, all components inspected for condition and proper operation. Premises left in clean condition.

Key on site personnel were Aaron Hurysz and Robert Beck, both highly experienced soil vapor intrusion technicians. Weather conditions were favorable. Daily tailgate meetings were held to review the daily work objectives and relevant aspects of the Health & Safety Plan. No accidents or incidents occurred during the construction.

3. SUB-SLAB DEPRESSURIZATION SYSTEM GENERAL DESCRIPTION

3.1. Introduction. The SSDS is maintaining sub-slab vacuum at all subject areas. The system consists of (2) sidewall mounted fans connected by manifold piping to vapor extraction points. The system was constructed using principles and equipment typically used for radon mitigation in buildings as detailed in the United States Environmental Protection Agency (EPA) EPA 402-K-03-007 (May 2006), and the final NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006). The SSDS was installed as a permanent, integral addition to the structure. The key components of the SSDS are described below and are shown on an as-built diagram labeled "Sub-Slab System Diagram."

3.2. Suction Points. The suction points consists of a 5" core boring into the slab through which 1- 2 cubic feet of sub-slab material has been removed. Mechanically suspended 3" SCH 40 PVC pipe has been inserted into the boring and sealed with urethane sealant.

3.3. Riser Piping. The riser piping consists of 3" SCH 40 PVC pipe that follows a route from the extraction point to a 4" trunk line, then to the exterior mounted vacuum fan. Weatherproof flashing or sealant has been applied to all penetrations. Vent pipes were installed at a pitch that ensures that any rainwater or condensation within the pipes drains downward into the ground beneath the slab. Piping is independently supported, and not supported from existing building mechanical systems. Piping is labeled at each level as "Sub-Slab Vent". Piping is connected using manufacturer's approved methods.

3.4. Exhaust Fans. Exhaust fans has been field selected for specific performance properties. Models: 1) Festa Radon Technologies "Force" producing 4.5 wci at 55 CFM, at 300 watts; 2) RADONAWAY RP-265, producing 2.0 wci at 50 CFM, at 120 watts. Fans have an exterior disconnect switch. Fans are mounted with rubber Fernco couplings, for simplified replacement. No air intakes are present within 10' of the exhaust points.

3.5. Instrumentation and Control. There is no centralized instrumentation or control for the SSDS. The fans can be switched either from the adjacent positioned disconnect or at the marked breakers #36 and #42 on the panel box centrally located on the east wall. The exhaust fan systems are equipped with a vacuum indicator mounted in a visible location on a riser pipe per the attached schematic. The indicator consists of an oil filled U-tube style manometer. The indicator can be inspected by observing the level of colored fluid. The indicator is designed primarily to give a simple visual check that vacuum is present in the riser pipe, specifically by observation that the fluid levels on each side of the indicator are not even. Indicator is marked at level observed on March 27, 2017.

3.6 Sealing measures. Polyurethane sealants have been applied to control joints, floor cracks and slab penetrations to enhance the barrier between sub-slab and ambient air and improve the efficiency of the SSD System. Smoke testing has been employed to guide sealing operations. Materials used include Sika Sikaflex 1c-SLself-leveling joint sealant and Sika1a Sealant.

3.7 Monitoring Points. Monitoring Points are indicated on the system diagram. These consist of ¾" drill points through the slab into which a digital micromanometer probe can be inserted. They are semi-permanently closed with backer and urethane sealant. These were established to aid in original system design and confirmatory testing, and in some cases are difficult to access. The primary future use would be in recertification of system effectiveness.

3.8 System Configuration (see attached schematic for component locations)

Basic Systems

- West System - FESTA RADON TECHNOLOGIES "Force" centrifugal blower, roof level sidewall exhaust; w/ (3) dedicated suction points, main plant, per attached schematic
- East System - RADONAWAY RP-265 centrifugal blower roof level sidewall exhaust; w/ (2) dedicated suction points, main plant, per attached schematic

Common Elements:

- Comprehensive diagnostics to optimize component type and placement
- Suction points as follows: connection via 3" Schedule 40 PVC pipe, to cavity in sub-slab, with urethane seal; access hole to suction cavity by 5"core drill; suction cavity to consists of approximately 1 cu. ft. excavated material in sub-slab
- Proportioning valves for suction risers where required
- All exhaust points minimum 10' from any air intakes
- Exterior switch and *Sealtight* and/or MC conduit from fan housing to building interior; connection to panel with EMT or MC conduit
- U-tube style vacuum indicator per system, on vertical pipe run
- Urethane sealant with closed cell backer at slab joints, accessible cracks and penetrations
- Horizontal pipe as high as practicable, with metal bracketing direct to structure, sloped as required, above drop ceiling where applicable
- (6) vacuum test points to verify pressure extension field
- At completion, perform backdraft testing, measure pressure differentials and document; label components and provide system description and operational instructions
- Consult with client to develop operation, maintenance and periodic inspection plan
- Two year warranty; labor, installed components and sub-slab depressurization to objective (or greater); warranty is transferable and assignable to future owners of the building.

3.9 PERFORMANCE EVALUATION

Measurement date – March 27, 2017 - In order to verify system effectiveness and as a performance evaluation, test points were established at various distances from the suction cavities suitable to verify that the sub-slab of the subject area was being depressurized at least to the objective. See schematic for point locations.

TP #	Value (neg wci)
1	.014
2	.023
3	.007
4	.014
5	.012
6	.014

East system vacuum gauge value –- 2.0 wci
West system vacuum gauge value –- 4.5 wci

4. SUB-SLAB DEPRESSURIZATION SYSTEM OPERATION

4.1. The fans should be kept in continuous operation. New York State Soil Vapor Intrusion Guidance (2006) specifies that operation, maintenance and monitoring of the SSD system should be included as part of site management.

4.2. Reset. Fans restart automatically in event of power loss.

4.3. In the event of unusual fan noise, failure to start, physical damage, or repeated circuit breaker trip, turn fan off and call for service. MITIGATION TECH – 800-637-9228

4.4. Regularly inspect system oil filled U-tube type manometers to verify that value, indicated by a mark on the gauge, has not changed significantly from the position of the mark. Gauge is inspected by observing the level of colored fluid.

4.5. Normal system operation requires unchanged structural conditions. Report any changes in structure, HVAC systems, slab conditions, etc., so that the change can be evaluated for impact on the SSD System. For service, call MITIGATION TECH at 800-637-9228

4.6. Ensure that a periodic inspection is performed

5. SSD SYSTEM PERFORMANCE MONITORING RECOMMENDATIONS

5.1. Monthly Monitoring

5.1.1. Inspect fan vacuum indicator to verify that value, indicated by a mark on the gauge, has not changed significantly from the position of the mark. Gauge is inspected by observing the level of colored fluid.

5.1.2. Record the observed measurement for each fan vacuum indicator on form labeled “SSD System Vacuum Gauge Record”. Store all forms in the facility maintenance office.

5.1.3. Inspect visible components of SSD system for degraded condition.

5.1.4. For reporting, call MITIGATION TECH at 800-637-9228

5.2. Annual Inspection

5.2.1. Conduct a visual inspection of the complete System (e.g., vent fans, piping, warning devices, labeling)

5.2.2. Inspect all components for condition and proper operation;

5.2.3. Identify and repair any leaks in accordance with Sections 4.3.1(a) and 4.3.4(a) of the NYS DOH VI Guidance (i.e.; with the systems running, use smoke sticks to check for leaks through concrete cracks, floor joints and at the suction points; any leaks will be resealed until smoke is no longer observed flowing through the opening).

5.2.4. Inspect the exhaust or discharge point of each exhaust fan to verify that no air intakes have been located within 10 feet

5.2.5. Conduct pressure field extension testing (to ensure that the system is maintaining a vacuum beneath the entire slab). Perform a differential pressure reading at least one vacuum test point.

5.2.6. Interview appropriate building occupants seeking comments and observations regarding the operation of the System

5.2.7. Check to see that the circuit breakers controlling the circuits on which the soil vapor vent fans operate are labeled "Soil Vapor System"

5.3. Annual Certification of Effectiveness

5.3.1. Upon completion of the tasks outlined in section 5.2 above, the installing contractor should submit a Certification of Effectiveness document, stating that the SSD system continues to perform to the purpose for which it was designed.

6. SUB-SLAB DEPRESSURIZATION SYSTEM MAINTENANCE

6.1. Routine Maintenance

6.1.1. Perform procedures as specified in sections 5.2 and 5.3

6.1.2. There are no routine component replacement procedures; Replace components upon findings of damage or failure

6.2. Non-Routine Maintenance

6.2.1. Non-routine maintenance may also be appropriate during the operation of the mitigation system. Examples of such situations include the following:

6.2.2. It is determined through inspection or notification by others that the vacuum gauge indicates the mitigation system is not operating properly

6.2.3. the mitigation system becomes damaged

6.2.4. the building has undergone renovations that may reduce the effectiveness of the mitigation system.

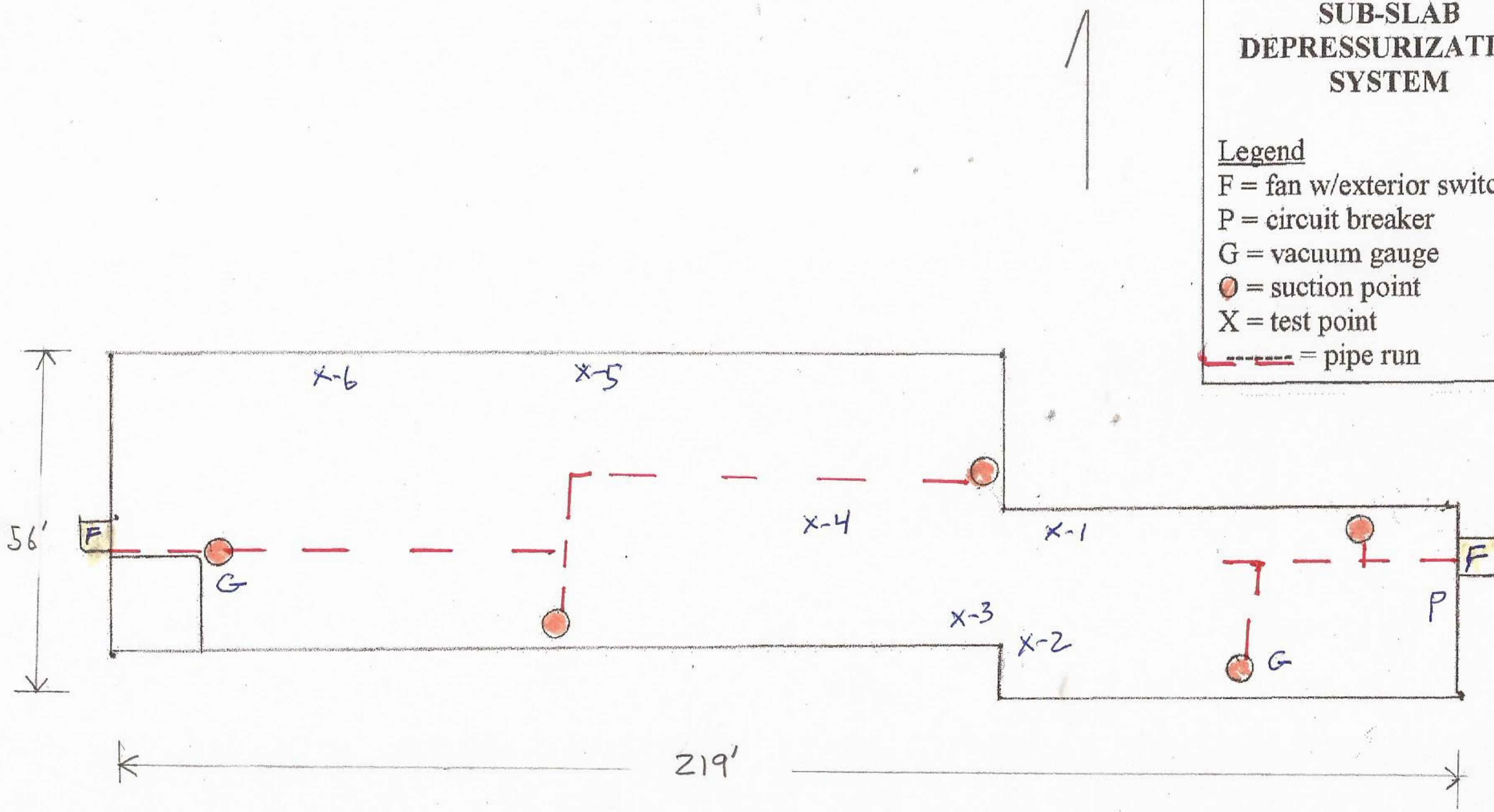
Certification

I hereby certify that the SSD Systems at this location are installed properly and are effective in achieving the above stated objective.

End of Report

Thank you

Nicholas E. Mouganis EPA listing # 15415-I; NEHA ID# 100722



SUB-SLAB DEPRESSURIZATION SYSTEM

Legend
F = fan w/exterior switch
P = circuit breaker
G = vacuum gauge
⊘ = suction point
X = test point
--- = pipe run

Building #9 - SSDS

SUB-SLAB DEPRESSURIZATION SYSTEM DIAGRAM
Jamestown Container Companies – 65 South Dow St., Falconer, NY 14733
Installed by: Mitigation Tech, 55 Shumway Rd., Brockport, NY 14420
Date of Completion: March 27, 2017 Phone: 1-800-637-9228

mitigation tech *vapor intrusion specialists*

October 12, 2017

Mr. Cody Martin
Project Manager
C & S Companies
141 Elm Street, Suite 100
Buffalo, NY 14203
Via email: Cody Martin <cmartin@cscos.com>

Re: Jamestown Container Companies – 65 South Dow St., Falconer, NY 14733
Construction Completion Report for SSD System - Building 5 & 6

CONSTRUCTION COMPLETION REPORT

1. OVERVIEW

This document presents a construction report, performance evaluation, O&M advice and certification of effectiveness for the Sub-Slab Depressurization (SSDS) and Crawlspace Ventilation System (CVS) installed by *Mitigation Tech* at 65 South Dow St., Falconer, NY 14733, Buildings 5 & 6, as commissioned August 4, 2017.

Following a Design/Build SSD construction plan (dated April 4, 2017) and modified based on continuing assessments performed during construction, five single suction point SSD Systems were installed using principles and equipment typically used for soil vapor intrusion mitigation in buildings. The primary objective of implementing this preemptive measure was to mitigate potential intrusion of soil vapors. This would be achieved by maintaining a negative pressure of at least .002 water column inches (wci) below the slab relative to the air pressure above the slab, specifically in the sub-slab compartments in the southernmost sections of the buildings. All work is in compliance with the NYS DOH document, "Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006".

2. BUILDING ASSESSMENT AND SYSTEM CONSTRUCTION

Extensive sub-slab air communication testing and building assessment was performed at job start to refine data obtained from the preliminary building assessment. Both building #5 and #6 are characterized by systems of sub-slab structural arches and grade beams crisscrossing in a north to south and east to west pattern. The sub-slab spaces are either inaccessible or difficult to access.

In the case of Building #5, extensive backfilling has occurred over time, mostly via concrete patch, so that soil is present immediately below the surface in the central and northernmost portions of the foundation. The southernmost section is an open crawlspace with a dirt floor, wet in many sections. Four east to west grade beams define five compartments. We determined that active ventilation of southernmost sub-slab compartment bounded by Buildings # 4 and #6A would constitute a zone of defense to intercept soil vapor migrating from the south. This would also create some limited depressurization north of the first grade beam. In the case of Building #6, the sub-space of is in essence a crawlspace and ventilation is the most appropriate strategy to divert vapors from the building interior.

It was determined that five independent fan systems were necessary and practicable for creating sufficient air flow and exchange. Work continued with an analysis of appropriate locations for fans, suction cavities and other SSD system components. Both for physical protection and minimum impact on active use areas, riser pipes were surface mounted on exterior walls. Work was coordinated with client to minimize disturbance of work areas, relocate obstacles and control dust. Vacuum and air flow measurements were performed continuously during construction to ensure integrity of design. Various fans were evaluated in place and in combination to determine the most effective configuration. At commissioning, all components inspected for condition and proper operation. Premises left in clean condition.

Key on site personnel were Aaron Hurysz and Robert Beck, both highly experienced soil vapor intrusion technicians. Weather conditions were favorable. Daily tailgate meetings were held to review the daily work objectives and relevant aspects of the Health & Safety Plan. No accidents or incidents occurred during the construction.

3. SUB-SLAB DEPRESSURIZATION SYSTEM GENERAL DESCRIPTION

3.1. Introduction. The SSDS/CVS is maintaining sub-slab vacuum at all subject areas. The system consists of (5) sidewall mounted fans connected to vapor extraction points. The system was constructed using principles and equipment typically used for radon mitigation in buildings as detailed in the United States Environmental Protection Agency (EPA) EPA 402-K-03-007 (May 2006), and the final NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006). The SSDS was installed as a permanent, integral addition to the structure. The key components of the SSDS are described below and are shown on an as-built diagram labeled "Sub-Slab System Diagram."

3.2. Suction Points. The suction points consists of a 10" core boring into the slab directly to crawlspace voids. Mechanically suspended 8" SCH 40 PVC pipe has been inserted into the boring and sealed with urethane sealant.

3.3. Riser Piping. The riser piping consists of 8" SCH 40 PVC pipe that follows a route from the extraction point to the exterior mounted vacuum fan. Weatherproof flashing or sealant has been applied to all penetrations. Vent pipes were installed at a pitch that ensures that any rainwater or condensation within the pipes drains downward into the ground beneath the slab. Piping is independently supported, and not supported from existing building mechanical systems. Piping is labeled at each level as "Sub-Slab Vent". Piping is connected using manufacturer's approved methods.

3.4. Exhaust Fans. Exhaust fans has been field selected for specific performance properties. Model: RADONAWAY RP-380 producing 5.0 wci at 350 CFM, at 140 watts. Fans have an exterior disconnect switch. Fans are mounted with rubber Fernco couplings, for simplified replacement.

3.5. Instrumentation and Control. There is no centralized instrumentation or control for the SSDS. The fans can be switched either from the adjacent positioned disconnect or at the marked breakers on the panel box centrally located. (Labeled "P" on schematic) The exhaust fan systems are equipped with a vacuum indicator mounted in a visible location near the riser pipe per the attached schematic. The indicator consists of a dial style manometer, Dwyer Model 5001 or oil filled U-tube. The indicator can be inspected by observing the position of the dial needle or oil level. (Labeled "G" on schematic) The indicator is designed primarily to give a simple visual check that vacuum is present in the riser pipe. Indicator is marked at level observed on August 4, 2017.

3.6 Sealing measures. Polyurethane sealants have been applied to control joints, floor cracks and slab penetrations to enhance the barrier between sub-slab and ambient air and improve the efficiency of the SSD System.

Smoke testing has been employed to guide sealing operations. Materials used include Sika Sikaflex 1c-SLself-leveling joint sealant and Sika1a Sealant.

3.7 Monitoring Points. Monitoring Points are indicated on the system diagram. These consist of ¾" drill points through the slab into which a digital micromanometer probe can be inserted. They are semi-permanently closed with backer and urethane sealant. These were established to aid in original system design and confirmatory testing, and in some cases are difficult to access. The primary future use would be in recertification of system effectiveness.

3.8 System Configuration (see attached schematic for component locations)

<u>Furnish and Install:</u>

- <u>Building 5</u> - east to west space defined by south perimeter wall and southernmost east to west interior footer - (2) RADONAWAY RP-380 high air flow blowers, sidewall mount, to provide sub-slab ventilation via 8" schedule 40 PVC; to conduct soil vapor from riser pipes to exhaust fan roof exhaust, with rubber connector fittings
- <u>Building 6</u> - (includes influence at Building #5 sump room) - (3) RADONAWAY RP-380 high air flow blowers, sidewall mount, to provide sub-slab ventilation via 8" schedule 40 PVC; to conduct soil vapor from riser pipes to exhaust fan roof exhaust, with rubber connector fittings
- Evaluate and repair as necessary, foundation vents and openings (some left open to allow for controlled through ventilation)
- Continuous building assessment and sub-slab vacuum measurement to optimize design
- Pre-construction consultation to obtain approval for component placements
- All interior pipe SCH 40 PVC with appropriate metal hangers, riser clamps, and additional accessories to properly attach components directly to structural members; sloped as required; routing to avoid interference with other building systems
- Exterior switch and *Sealtight* and/or MC conduit from fan housing to nearest electrical panel; extra cost if panel has insufficient capacity; final panel hookup by others at other's expense
- (5) Magnahelic Series 5001 vacuum indicators
- Urethane sealant at slab joints, accessible cracks and penetrations; backer where necessary
- At completion, perform backdraft testing, label components and provide system description and operating instructions
- At completion, confirm pressure differentials
- Consult with client representatives to develop operation, maintenance and periodic inspection plan
- Two year warranty; labor, installed components and sub-slab depressurization to objective (or greater)

3.9 PERFORMANCE EVALUATION

Measurement date – August 7, 2017 - In order to verify system effectiveness and as a performance evaluation, test points were established at various distances from the suction cavities suitable to verify that the sub-slab of the subject area was being depressurized at least to the objective. See schematic for point locations. (Labeled "TP" on schematic) Downward movement of test smoke was observed at each location and in addition, negative pressure values of -.004 or better were observed.

4. SUB-SLAB DEPRESSURIZATION SYSTEM OPERATION

4.1. The fans should be kept in continuous operation. New York State Soil Vapor Intrusion Guidance (2006) specifies that operation, maintenance and monitoring of the SSD system should be included as part of site management.

4.2. Reset. Fans restart automatically in event of power loss.

4.3. In the event of unusual fan noise, failure to start, physical damage, or repeated circuit breaker trip, turn fan off and call for service. MITIGATION TECH – 800-637-9228

4.4. Regularly inspect system dial manometers to verify that value, indicated by a mark on the gauge, has not changed significantly from the position of the mark.

4.5. Normal system operation requires unchanged structural conditions. Report any changes in structure, HVAC systems, slab conditions, etc., so that the change can be evaluated for impact on the SSD System. For service, call MITIGATION TECH at 800-637-9228

4.6. Ensure that a periodic inspection is performed

5. SSD SYSTEM PERFORMANCE MONITORING RECOMMENDATIONS

5.1. Monthly Monitoring

5.1.1. Inspect fan vacuum indicator to verify that value, indicated by a mark on the gauge, has not changed significantly from the position of the mark.

5.1.2. Record the observed measurement for each fan vacuum indicator on form labeled "SSD System Vacuum Gauge Record". Store all forms in the facility maintenance office.

5.1.3. Inspect visible components of SSD system for degraded condition.

5.1.4. For reporting, call MITIGATION TECH at 800-637-9228

5.2. Annual Inspection

5.2.1. Conduct a visual inspection of the complete System (e.g., vent fans, piping, warning devices, labeling)

5.2.2. Inspect all components for condition and proper operation;

5.2.3. Identify and repair any leaks in accordance with Sections 4.3.1(a) and 4.3.4(a) of the NYS DOH VI Guidance (i.e.; with the systems running, use smoke sticks to check for leaks through concrete cracks, floor joints and at the suction points; any leaks will be resealed until smoke is no longer observed flowing through the opening).

5.2.4. Inspect the exhaust or discharge point of each exhaust fan to verify that no air intakes have been located within 10 feet

5.2.5. Conduct pressure field extension testing (to ensure that the system is maintaining a vacuum beneath the entire slab). Perform a differential pressure reading at least one vacuum test point.

5.2.6. Interview appropriate building occupants seeking comments and observations regarding the operation of the System

5.2.7. Check to see that the circuit breakers controlling the circuits on which the soil vapor vent fans operate are labeled "Soil Vapor System"

5.3. Annual Certification of Effectiveness

5.3.1. Upon completion of the tasks outlined in section 5.2 above, the installing contractor should submit a Certification of Effectiveness document, stating that the SSD system continues to perform to the purpose for which it was designed.

6. SUB-SLAB DEPRESSURIZATION SYSTEM MAINTENANCE

6.1. Routine Maintenance

6.1.1. Perform procedures as specified in sections 5.2 and 5.3

6.1.2. There are no routine component replacement procedures; Replace components upon findings of damage or failure

6.2. Non-Routine Maintenance

6.2.1. Non-routine maintenance may also be appropriate during the operation of the mitigation system. Examples of such situations include the following:

6.2.2. It is determined through inspection or notification by others that the vacuum gauge indicates the mitigation system is not operating properly

6.2.3. the mitigation system becomes damaged

6.2.4. the building has undergone renovations that may reduce the effectiveness of the mitigation system.

Certification

I hereby certify that the SSD Systems at this location are installed properly and are effective in achieving the above stated objective.

Thank you

Nicholas E. Mouganis EPA listing # 15415-I; NEHA ID# 100722

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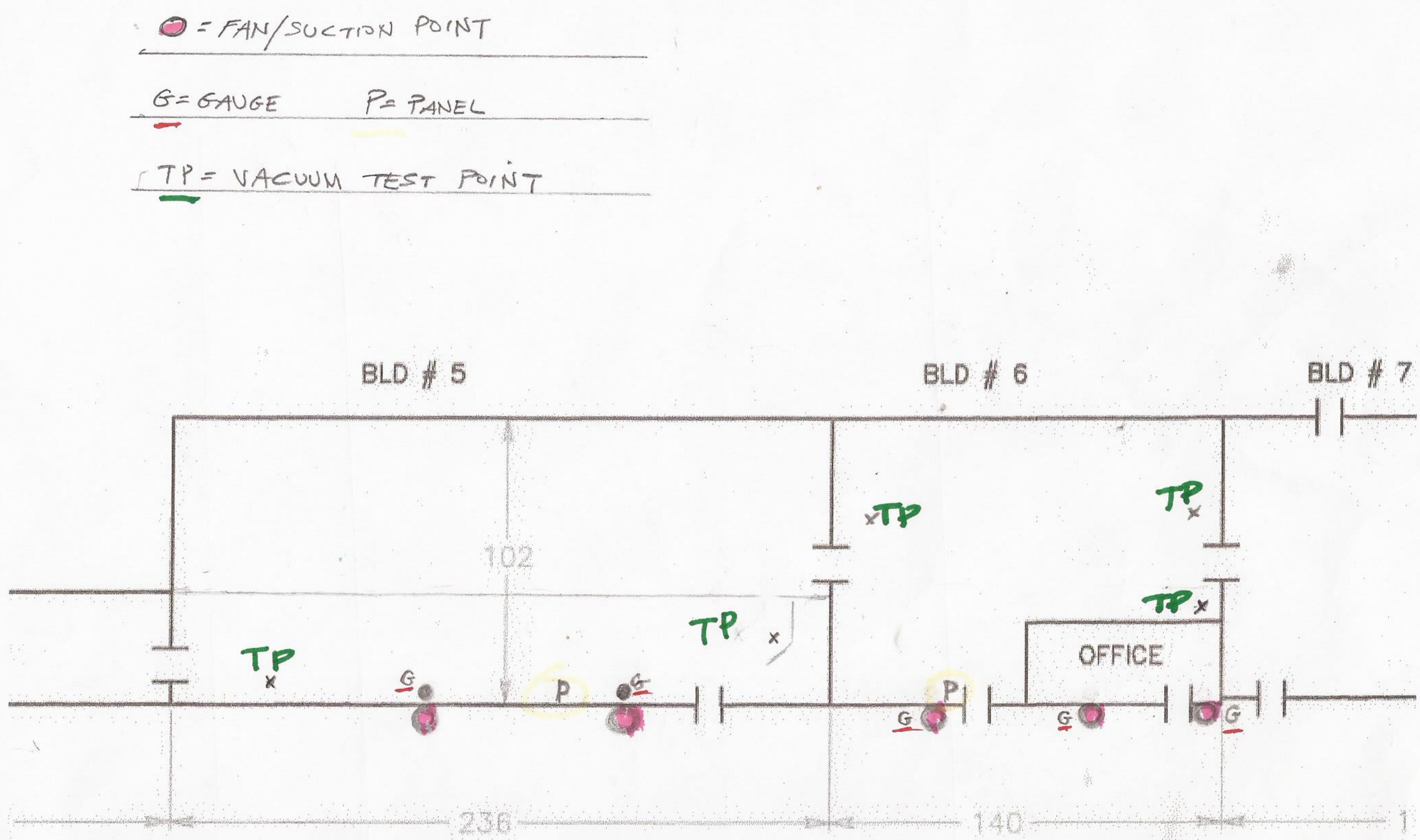

SUB-SLAB DEPRESSURIZATION/VENTILATION SYSTEM DIAGRAM
Jamestown Container Companies – 65 South Dow St., Falconer, NY 14733
Buildings #5 & #6

Installed by: Mitigation Tech, 55 Shumway Rd., Brockport, NY 14420
Date of Completion: August 4, 2017