FINAL
SCOPE OF WORK
SUB-SLAB VENTILATION SYSTEMS
EUGENE'S DRY CLEANERS
SITE NO. 1-52-157

WORK ASSIGNMENT NO. D004434-27

Prepared for:

New York State Department of Environmental Conservation
Albany, New York

Prepared by:

MACTEC Engineering and Consulting, Inc.
Portland, Maine

Project Number: 3612072087

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Principal Engineer

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulations
HVAC	heating, ventilation and air conditioning
MACTEC	MACTEC Engineering and Consulting, P.C.
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
PCE	tetrachloroethene
PID	photoionization detector
PPE	personal protective equipment
Site	Eugene's Dry Cleaners site
SOW	scope of work
SSV	sub-slab ventilation
TCE	trichloroethene
$\mu g/m^3$	microgram(s) per cubic meter
VOCs	volatile organic compounds
W.C.	water column

1.0 INTRODUCTION

MACTEC Engineering and Consulting, P.C. (MACTEC), under contract to the New York State Department of Environmental Conservation (NYSDEC), has prepared this Scope of Work (SOW) for active sub-slab ventilation (SSV) for the Eugene's Dry Cleaners site (Site) (Site # 1-52-157) in the Town of Babylon, Suffolk County (see Figure 1.1 for Site Location). This SOW was prepared in accordance with the NYSDEC requirements described in Work Assignment No. D004434-27, dated March 28, 2007, and with the April 2006 Superfund Standby Contract No. D004434 between the NYSDEC and MACTEC. The SOW was prepared in accordance with the New York State Department of Health (NYSDOH) "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (NYSDOH, 2006).

This SOW documents the basis of design for, and the requirements of, the installation, startup, and operation of SSV systems for two structures. The structures to receive SSV systems are located at 54 East Main Street (the Site), as well as 50 East Main Street (the Site) and at 72 East Main Street. Both buildings are masonry structures occupied by multiple businesses. For the purposes of this SOW, "54 East Main Street" includes the former dry cleaner, which is occupied by a nail salon and 50 East Main Street, which is occupied by a surf shop.

The Site is a former dry cleaning facility with known releases of certain volatile organic compounds (VOCs) known as chlorinated solvents. The Site building is currently utilized for non-industrial commercial businesses. The Site is bordered by light retail businesses along East Main Street and a residential neighborhood to the south of the Site.

1.1 BACKGROUND

Various investigations and remedial efforts have been completed at the Site due to known releases of chlorinated solvents, particularly tetrachloroethene (PCE). In February 2005, the Site was included on the List of Inactive Hazardous Waste Sites with Pre-2003 Remedial Decisions Where Disposal of Chlorinated Hydrocarbons Occurred. In April and May 2006, O'Brien & Gere performed a Soil Vapor Intrusion Evaluation for NYSDEC which identified PCE and trichloroethene (TCE) in the basement air and soil vapor at multiple locations outside the Site

building. Based on the results, the NYSDEC concluded that further characterization was necessary to evaluate the extent of impact and determine indoor air quality at nearby structures (NYSDEC 2007).

MACTEC, retained by the NYSDEC to conduct the additional investigations, performed a Vapor Investigation in December 2007 and January 2008 as described in the "Draft Vapor Investigation Report, Eugene's Dry Cleaners" (MACTEC, 2008). Sampling included sub-slab and indoor air samples from various commercial and municipal structures in the vicinity of the Site. Results pertinent to the two structures that will receive SSV systems are summarized in the following subsection.

1.2 INDOOR AIR AND SUB-SLAB VAPOR RESULTS

The NYSDOH has developed two matrices to use as tools in making remedial action decisions when soil vapor may be entering structures. The decision matrices are published in the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH, 2006). The number of volatile chemicals for which the matrices provide guidance has been amended to seven, as documented to the NYSDEC in a letter dated June 25, 2007 (NYSDOH, 2007). The seven VOCs are: TCE, PCE, 1,1,1-trichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, vinyl chloride, and carbon tetrachloride. The matrices were prepared for evaluating the soil vapor intrusion pathway when both the sub-slab vapor and indoor air concentrations are known.

Both sub-slab and indoor air samples were collected from the structure at 54 East Main Street on December 11 and December 12, 2007. Indoor air samples were collected at 72 East Main Street on January 15, 2008. Sub-slab samples were not collected at 72 East Main Street at the direction of the Owner. Comparison to the matrices indicates that PCE is the contaminant of concern relative to the vapor intrusion pathway.

At 54 East Main Street, PCE was detected at a concentration of 6,500 micrograms per cubic meter ($\mu g/m^3$) and 180 $\mu g/m^3$ in sub-slab vapor. PCE was also detected in first floor air at concentrations of 78 $\mu g/m^3$ and 39 $\mu g/m^3$. In accordance with the NYSDOH guidance, the concentration of PCE in sub slab vapor exceeds the threshold of 1,000 $\mu g/m^3$ for "MITIGATE".

At 72 East Main Street, PCE was reported in indoor air samples at a concentration of 9.8 µg/m^3. Results from nearby exterior soil vapor implants provide supplemental data which supports the potential for sub-slab vapor PCE concentrations which would trigger a recommendation for mitigation. Elevated levels of PCE were reported at soil vapor points, DP-03 (48,000 µg/m^3) and DP-07 (9,100 µg/m^3), which are located at the eastern edge of the Site structure and to the west of the 72 East Main Street. At soil vapor point (DP-02), located at the northeastern edge of the Site structure, PCE was reported at a concentration of 230 µg/m^3. PCE concentrations generally decrease rapidly with corresponding distance from the Site.

The NYSDEC, in consultation with NYSDOH, recommend that SSV systems be installed at 54 East Main Street and 72 East Main Street.

The SSV systems would reduce the potential for intrusion of PCE-contaminated soil vapor resulting from volatilization of PCE from soils on site and from groundwater migrating off site.

2.0 BASIS OF DESIGN

To address potential soil vapor intrusion, it is proposed that SSV systems be installed in structures located at 54 East Main Street and 72 East Main Street. The structure at 54 East Main Street has a poured concrete basement floor with concrete block wall exterior foundation and tar roofing. This structure shares a basement with an adjoining commercial business. The SSV system will be installed to influence conditions beneath the entire structure. The basement floor is in poor condition with multiple small holes and one hole measured at three feet by five feet. The basement also has an open sump. The sump is in a manhole type structure that is approximately three feet in diameter. A crawlspace beneath the northeast quadrant of the structure will not receive an SSV system. The wall between the basement and the crawlspace beneath the north end of 54 East Main Street is a concrete block wall. A section of this wall has been removed for utility pipe penetrations. The second story of this structure consists of residential apartments.

The structure east of the nail salon is a clothing store at 72 East Main Street. The foundation beneath the western portion of the structure consists of a crawlspace with poured concrete floor and concrete block foundation walls. 72 East Main Street is a one story building above grade with a brick wall exterior. The west side of the building is the clothing store; the remainder of the building consists of offices. See Appendix A for photographs.

It is assumed that the SSV systems can be constructed by installing extraction piping through the foundation slab to achieve sub-slab depressurization. The structure at 54 East Main Street will require significant repair of the basement floor and sealing of the entire basement area including covering and sealing of the sump and sealing of the crawlspace. The foundation slab and walls at 72 East Main Street is assumed to be in generally good condition and will require minimal caulking and sealing of cracks or openings in the walls or floor. The SSV system at 72 East Main Street will be installed to mitigate the western portion of the structure.

3.0 SUMMARY OF WORK

This SOW covers the requirements for the construction, start-up, and operation of SSV systems at the two structures located at 54 East Main Street, Babylon, New York and 72 East Main Street, Babylon, New York to provide depressurization of soil beneath the structures and thus to limit soil vapor from migrating into the above ground buildings. This action is intended as a mitigation measure for as long as the structures are occupied and soil vapor concentrations remain above NYSDOH soil vapor/indoor air guidance values.

The term "Contractor" shall refer to a mitigation Contractor that will be contracted by NYSDEC to implement the design as described in this document. The term Owner indicates the occupant and/or owner of the structure.

The intent of this SOW is to provide sufficient and adequate definition of the project details, conditions and objectives to enable installation of the proposed systems. The Contractor agrees and represents that its bid includes all labor, materials (except those specified as being furnished by Others), all construction tools, equipment, engineering, all taxes including sales and use, fees, permits and other services including but not limited to water, light, power, and transportation as required and reasonably incidental to the proper completion of all work as called for in this SOW. The Contractor is responsible for knowing and understanding the nature and extent of the Contract Documents, work site, locality, and all local conditions including laws and regulations that in any manner may affect cost, progress, performance or furnishing of the work. The Contractor shall be licensed as required by law and be responsible for meeting the objectives and performance-based requirements identified in this SOW. As such, the technical design parameters presented shall be considered one option for completion of the work. If the Contractor wishes to provide alternate methods, configurations, or materials for the specified system, they may do so as part of their proposal and shall detail the modifications as part of the required Work Plan.

Work called for or implied on one document, but omitted on others, shall not be considered a valid basis for claim of omission by the Contractor in performing the work or for payment. Any such conflict is the responsibility of the Contractor alone to call to the attention of the NYSDEC.

The project objectives include:

a) reducing potential for migration of soil vapor containing VOCs to indoor air by reducing vapor pressure in the soil relative to the pressure in the building

b) installing a remedy that is both cost-effective and flexible, allowing for easy adjustment to function with future possible modifications

c) meeting the project schedule requirements

d) installing a system capable of long-term operation (i.e., greater than 10 years) if necessary.

The scope of services required of the Contractor, as outlined herein, includes:

- a building/visual inspection of the structures to determine conditions which may affect the design of the SSV systems and any future upgrades
- sealing or caulking of cracks or openings in the walls and floors as necessary
- pre-design communication testing
- installing appropriate SSV systems for each structure based upon results of the building/visual inspections and pre-design communication testing
- completing post-system installation (mitigation) testing and start up according to Subsection 4.3.1 of the NYSDOH Guidance (NYSDOH, 2006)
- updating and submitting to the NYSDEC design drawings/schematics to reflect "as-built" conditions, and preparing and submitting completion report detailing post-system installation testing results
- conducting annual inspection of each SSV system to ensure continued proper operation for the first year with the option to contract with the NYSDEC for future inspections.

The Contractor shall be prepared to perform the required work during non-business hours, including evenings and weekends as may be necessary to accommodate Owner schedules, at no additional cost. The Contractor shall make every effort to complete all installation work in a given building within one mobilization; exceptions include structures where evening work is required, where asbestos abatement is needed, or where electrical upgrades are necessary. The Contractor and any personnel working on this project shall at all times present a neat and professional appearance and shall be courteous and respectful to Owner at all times. Contractor personnel shall be prepared to display a picture ID at all times while working in any of the structures addressed hereunder.

3.1 BUILDING/VISUAL INSPECTION

In support of the Contractor's design and installation of each SSV system, the NYSDEC will coordinate with the Contractor to conduct a thorough visual inspection of the buildings to identify specific characteristics and configurations (e.g., large cracks in slabs, exposed earth in crawlspaces, open stairways to basements) and operational conditions (e.g., continuously running heating, ventilation and air conditioning (HVAC) systems or operational windows) that may affect the design, installation, and effectiveness of the SSV system.

Backdraft Testing. The Contractor shall perform the following diagnostic test to evaluate the existence of, or the potential for, backdrafting of natural draft combustion appliances:

1. Close all windows and doors, both external and internal.
2. Open all HVAC supply and return air duct vents/registers.
3. Close fireplace and wood stove dampers.
4. Turn on all exhaust and air distribution fans and combustion appliances EXCEPT the appliance being tested for backdrafting.
5. Wait 5 minutes.
6. Test to determine the indoor-outdoor pressure differential in the room where the appliance being tested is located. If the pressure differential is a negative 0.02 inches of water column (W.C.) or more, assume that a potential for backdrafting exists.
7. To begin a test for actual backflow of flue gases, turn on the appliance being tested. (If the appliance is a forced air furnace, ensure that the blower starts to run before proceeding.)
8. Wait 5 minutes.
9. Using either a smoke tube or a carbon dioxide gas analyzer, check for flue gas backflow near the vent hood.
10. Repeat steps 4 through 9 for each natural draft combustion appliance being tested. Seasonal and extreme weather conditions should be considered when evaluating pressure differentials and the potential for backdrafting.

If backdrafting issues are identified they shall be reported immediately to the NYSDEC. Backdrafting issues will be addressed by the Contractor prior to the installation of the SSV system.

As part of the building/visual inspection, the Contractor will document existing conditions, including providing sketches of the building foundation, the location of load-bearing walls, drain fixtures, cracks in the slab, HVAC systems, suspected or confirmed vapor entry points, results of

diagnostic testing, anticipated layout of any SSV system piping, and anticipated location of the fan and system monitoring devices for the proposed SSV systems.

3.2 PRE-DESIGN COMMUNICATION TESTING

Following completion of the building/visual inspection and with the approval of the Owner and the NYSDEC, the Contractor shall conduct communication testing as discussed in the following subsections.

3.2.1 Sealing Requirements

3.2.1.1 54 East Main Street

As described in Section 2.0, the basement of 54 East Main Street is in poor physical condition. Areas thoughout the basement have varying degrees of pitting and holes. At one area a three feet by five feet area of sub-slab base material is exposed. The basement also has a sump that will require a cover along with sealing of the cover. A section of foundation wall between the crawlspace at the north end of the structure and the basement has been removed for pipe penetrations and will require sealing. The crawlspace area is unfinished. Due to the current conditions of the basement and crawlspace, it is anticipated that communication testing will not be able to produce the necessary vacuum as required. Therefore, the Contractor shall repair and seal the basement area prior to performing communication testing.

Prior to repairing and sealing the basement walls and floors, the basement will need to be cleaned and cleared for work. Areas of the concrete floor that have pitting or holes shall be repaired to match exisiting conditons. The Contractor shall include in their bid an approach for covering and sealing the sump and for sealing the crawlspace area for review and approval by the NYSDEC.

Sealing requirements will also apply to openings around suction point piping penetrations in the slab and foundation wall, accessible openings around utility penetrations of the foundation walls and slab, and other openings using methods and materials that are permanent and durable. Sealing the joint between the foundation wall and slab may be appropriate. If the joint is greater than ½ ″ thick , a foam backer or rod shall be inserted into the joint prior to applying a sealant. All sealing

requirements shall be in conformance with American Society for Testing and Materials (ASTM) E2121 03 Section 7.3.4 (ASTM 2003). All sealant materials are to be approved by NYSDEC prior to use.

3.2.1.2 72 East Main Street

The structure at 72 East Main Street requires general sealing. The requirements include the sealing of openings around suction point piping penetrations in the slab and foundation wall, accessible openings around utility penetrations of the foundation walls and slab, and other openings using methods and materials that are permanent and durable. Sealing the joint between the foundation wall and slab may be appropriate. If the joint is greater than ½ ″ thick , a foam backer or rod shall be inserted into the joint prior to applying a sealant. All sealing requirements shall be in conformance with ASTM E2121 03 Section 7.3.4 (ASTM 2003). All sealant materials are to be approved by NYSDEC prior to use.

3.2.2 Sub-slab Communication Testing

The communication test will consist of applying suction on a hole drilled through the concrete slab at the proposed sub slab vapor extraction point and simultaneously monitoring the pressure change at strategically located points to determine the vacuum radius of influence. The suction source for this project will be a six horsepower commercial shop vacuum provided by the Contractor and ducted to the exterior of the building. A smoke stick and micro-manometer (capable of measuring vacuum down to 0.001 W.C.) will be used to test sub-slab communication. A minimum of three test holes will be installed to evaluate the vacuum influence beneath the slab. One of the test holes shall be the permanent post-mitigation test point. The remaining temporary points shall be located between the vacuum point and the permanent point. Readings from the existing permanent point should also be obtained. The distance between the suction hole and the test holes will be maximized as far as practical. During the application of sub-slab suction, a micro-manometer will be used to obtain differential pressure readings. A second indicator of sub-slab communication will be the positive movement of smoke down into the test holes during the application of suction. After the completion of communication tests, all holes generated will be grouted and the basement space will be cleaned and returned to conditions existing before entry onto the premises by the Contractor.

3.3 SYSTEM INSTALLATION

Following completion of the building/visual inspection, pre-design communication testing, and approval of proposed system layouts, the Contractor shall design and install each of the SSV systems. The design shall be submitted to the NYSDEC in the form of a Work Plan for approval prior to construction.

3.3.1 Worker Health and Safety

The Contractor shall comply with all Occupational Safety and Health Administration (OSHA) state and local standards or regulations relating to worker safety and occupational exposure. The Contractor shall advise workers and the Owner of the hazards of exposure to organic vapors and the need to apply protective measures when working in areas of elevated concentrations. The Contractor shall have a worker protection plan on file that is available to all employees and Owner. Contractor shall submit a copy of the worker protection plan which shall include a response action plan, including VOC monitoring (See Section 4.6), with the bid proposal for review by NYSDEC. All Contractor employees conducting on-site work shall be 40-hour HAZWOPER trained and have completed the 8-hour refresher within the past 12 months in accordance with the Code of Federal Regulations (CFR), Title 40, Part 1920. When the work requires the use of sealants, adhesives, paints, or other substances that may be hazardous to health, the Contractor shall provide employees and the Owner with the applicable Material Safety Data Sheets and explain the required safety and monitoring procedures (See Section 4.6).

3.3.2 Compliance with Applicable Codes, Standards, and Regulations

All components of the SSV systems shall be in compliance with the applicable mechanical, electrical, building, plumbing, energy and fire prevention codes, standards, and regulations of the local jurisdiction. The Contractor shall be responsible for confirming that an inspection of the system by a regulatory agency is not required or for obtaining all required licenses and permits, and for displaying required permits in the work areas as required by local ordinances. The Contractor shall supply a licensed electrician to complete the corresponding components of this work.

The Contractor shall clean-up and restore all basements, crawl spaces, and other areas that they have entered during the performance of this work to conditions equal to or better than existed prior to their first entry onto the property.

3.3.3 Sub-slab Ventilation System Components

The SSV system shall be constructed as specified under Subsection 4.2.2.a (Sealing) and 4.2.2.c (Depressurization Systems) of the NYSDOH Guidance (NYSDOH, 2006), and as further specified under applicable sections of Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings (ASTM E 2121 03). The point of discharge of the SSV system shall be in compliance with Subsection 4.2.2.c.6 of the NYSDOH Guidance.

All materials installation methods shall meet the requirements of ASTM E 2121 03 section 7.3.2, except that system piping shall be constructed of 4-inch schedule 40 polyvinyl chloride to minimize noise. All sealants and adhesives shall be compatible with piping materials as specified by the piping manufacturer. The SSV system piping shall be installed such as to allow condensate to drain back to the sub-slab. Figure 3.1 and Figure 3.2 provide the proposed SSV system details and plan for 54 East Main Street. Figure 3.3 and Figure 3.4 provide the proposed SSV system details and plan for 72 East Main Street.

The vent fans shall have a weatherproof design, be mounted on the outside of the structures, and be appropriately sized to provide the pressure difference and air flow characteristics necessary to achieve the vapor reduction goals for the project as described in Section 3.3.4. The vent fan shall be equipped with a fan guard which drains condensate back to the sub-slab. The default fan requirements shall be a minimum of 100 cubic feet per minute at a pressure of 1.0 inches of water (USEPA, 2001) unless the Contractor can demonstrate that a smaller fan is sufficient. Acceptable models include the Fantech HP220, or an approved equivalent. The Contractor shall submit information on proposed fan, including manufacturer, model, and operating performance along with bid proposal for approval by NYSDEC.

SSV systems shall include a monitoring device consisting of a manometer pressure gauge indicating proper operation of the system, in accordance with Subsection 4.2.2.c.9 of the NYSDOH

Guidance. The Contractor shall submit information on proposed monitoring devices along with bid proposal for approval by the NYSDEC.

3.3.4 Post-Mitigation Testing

After installation of the SSV system, the Contractor shall be responsible for the following testing and inspection of the system in accordance with Subsections 4.3.1 of the NYSDOH Guidance:

- identification and mitigation of any leaks in the piping or vents of the SSV systems and in the floors and walls of the basement
- communication testing to identify whether adequate sub-slab depressurization is occurring
- backdraft testing of any natural draft combustion appliances
- confirmation that the SSV system monitoring devices are operating properly.

Communication Testing. A smoke stick and micro-manometer will be used to test sub-slab communication. The communication test will consist of operating the SSV system and simultaneously observing the movement of smoke downward into small holes (e.g., 3/8-inch) drilled in the concrete floor slab as well as the existing and proposed permanent post-mitigation test points and measuring with a micro-manometer. A successful communication test will be one which demonstrates that a minimum vacuum of 0.025 inches of water is being created beneath the entire slab where the system is proposed to be installed. After the completion of communication test, all holes generated will be grouted and the basement space will be cleaned and returned to conditions existing before entry onto the premises by the Contractor.

Backdraft Testing. Backdraft testing of any natural draft combustion appliances shall be completed to determine whether the SSV system installation has resulted in any backdraft issues. The test shall be conducted according to the method presented in Subsection 3.1 above.

If backflow is confirmed from any natural draft combustion appliance, the NYSDEC shall be advised of the backdrafting condition along with the approach and an estimated cost to rectify the condition for the SSV system installation. The NYSDEC will advise the Owner that the condition must be rectified prior to proceeding with system startup.

3.4 FINAL DOCUMENTATION

The Contractor shall be responsible for submitting final documentation for each SSV system to the NYSDEC following completion of installation, including drawings/schematics reflecting "as-built" conditions, "as-built" photographs documenting results of post-mitigation testing, manometer pressure gauge reading at start-up, copies of all product warranties, and a narrative describing the building/visual inspection and the SSV system installation, components, and post-mitigation testing results.

"As-built" photographs shall document the location of (1) the fan, (2) electrical connection and power control switch, (3) the system exhaust, (4) the extraction pipe floor penetration, and (5) all monitoring and metering devices associated with the SSV systems.

3.5 ANNUAL INSPECTIONS

The Contractor shall be responsible for an annual inspection of each of the two SSV systems to ensure continued proper operation with the option to contract with the NYSDEC for future inspections. The annual inspections shall include documentation of the proper operation of the SSV system, including the power control switch, all monitoring devices, and the fan, and inspect the fan and all piping and components for any leaks using a smoke stick. The Contractor shall also record the manometer pressure gauge reading, visually inspect the system exhaust for any obstructions (e.g., bird's nests), and record from the sample port volatile organics readings with a photoionization detector (PID) and pressure readings with a micro-manometer. A letter documenting the annual inspections shall be submitted to NYSDEC.

The Contractor shall be responsible for meeting the objectives and performance-based requirements identified in this SOW. As such, the technical design parameters presented shall be considered one option for completion of the work. If the Contractor wishes to provide alternate methods, configurations, or materials for the specified system, they may do so as part of their proposal and shall detail the modifications as part of the required Work Plan.

4.0 GENERAL REQUIREMENTS

The following general requirements shall apply to the proposed mitigation work:

- All work shall be performed in compliance with applicable federal, state, and local regulatory requirements, codes, and recommended industry practices, including, but not limited to, the following:
    - American National Standards Institute
    - ASTM
    - National Electric Code
    - National Fire Protection Association
    - OSHA
    - Petroleum Equipment Institute
    - State and local zoning and building codes
    - Underwriters Laboratories, Inc.
- Obtain all necessary licenses, permits, and inspections and perform any required regulatory notifications.
- Perform all work in accordance with contract requirements, and this SOW.
- Install all materials and equipment in accordance with the manufacturer's installation instructions.
- Measurement and Payment (see Appendix B – Bid Form).

4.1 MEASUREMENT AND PAYMENT

Work covered under this SOW will be conducted on a lump sum basis, with additional items scheduled for payment on a unit price basis. Prior to initiation of any change in scope, pricing for the work shall be negotiated between the Contractor and the NYSDEC. No work shall be performed without a written Change Order issued by the NYSDEC. Additional work that is based on time and materials shall incorporate equipment and labor rates defined in the contract. For time and material change orders, labor, construction equipment, permanent materials and equipment, quantities and hours will be agreed upon at the beginning and end of each day between the NYSDEC and the Contractor.

All costs for incidental items of work, not specifically mentioned as included in a particular payment item, shall be included in the listed item most closely associated with the work involved.

The Contractor shall consider the following during bidding for this work: The lump sum prices and payments made shall constitute full compensation for performance of all work required for which separate payment is not otherwise provided and for 1) all work associated with the tasks identified on the bid sheet and 2) all work in accordance with this document and all other contract documents. Payment items for the work in this contract for which contract payments will be made are as follows:

- Item No. 1 "Building/ Visual Inspection, Backdraft Testing and Pre-Design Communication Testing"
    - Payment will be made for costs associated with conducting a visual inspection of the building as described in Subsections 3.1 and 3.2. This item also includes costs associated with Sealing Requirements and Pre-Design Communication Testing as described in Sections 3.2.1 and 3.2.2.
    - Unit of measure: lump sum.
- Item No. 2 "Sub-slab Ventilation System Mobilization, Installation, and Startup"
    - Payment will be made for costs associated with the mobilization, installation and system startup. Mobilization items include equipment and supplies for installation of piping, and other equipment, and set up of temporary construction facilities. Installation items include costs associated with but not limited to, the supply and installation of below-ground and above-ground piping, the fan, electrical supply, equipment, and all appurtenances for implementation of the SSV system, and handling and disposal of construction derived wastes, including concrete and other debris generated during installation. Installation also includes, but is not limited to, furnishing labor, equipment, tools, materials, and supplies necessary for completion of the work, as defined in the SOW. Startup procedure items include Post-Mitigation Testing of the SSV system. This item also includes, but is not limited to, furnishing labor, equipment, tools, materials, and supplies necessary for Post-Mitigation Testing. The Contractor shall be responsible for testing and inspection of the system as described in Section 3.3.4.
    - Unit of measure: lump sum.
- Item No. 3 "Final Documentation"
    - Payment will be made for costs associated with submitting final documentation to the NYSDEC following completion of installation as described in Section 3.4 for each SSV system.
    - Unit of measure: lump sum.
- Item No. 4 "Annual Inspections"
    - Payment will be made for an annual inspection of the SSV system to ensure continued proper operation. Payment will be full compensation for costs associated with but not limited to furnishing all materials, labor, equipment, and all other incidentals necessary to perform these inspections
    - Unit of measure: lump sum.

- Item No. 5 "Additional Payment Items"
    - Payment will be made for additional work conducted at the direction of the NYSDEC. Payment will be full compensation for costs associated with but not limited to furnishing all materials, labor, equipment, and all other incidentals necessary to complete the additional work, including, but not limited to:
    - Removal and segregation of "large" debris and/or other materials requiring special handling;
    - Installation of additional structures, piping, off-site backfill, etc.
    - Unit of measure: established unit rates.

As part of the proposal, the Contractor shall submit unit rates for equipment and labor (for Personal Protective Equipment [PPE] Levels D, C, and B) that may be used during the completion of additional work, and shall provide the mark-up percentage on the costs associated with materials and Subcontractors used during completion of the work. Unit rates will include costs for decontamination and disposal of contaminated waste materials.

4.2 SUBMITTALS

The Contractor shall provide copies of submittals as required by NYSDEC. Electronic copies shall consist of PDF files of the entire submittal in one file and may also be accompanied by native file format if electronic edits/comments in the native format are desired by the Contractor. All submittals shall be accompanied by a submittal sheet to be provided by the NYSDEC.

The following items shall be submitted for review and approval by the NYSDEC with exception of the Site specific Health and Safety Plan which shall be reviewed only (no approval) and commented on by the NYSDEC. The Contractor is responsible for the health and safety of its own employees, vendors and Contractors and that of others as required under the contract documents. The Contractor shall resubmit if required by the NYSDEC, until the submittal is approved.

Description	Due	Action
Completed Bid Form (see Appendix B)	With bid proposal	For NYSDEC review
Preliminary Work Plan and Schedule	With bid proposal	For NYSDEC approval
Health and Safety Plan	Prior to Start of Work	For NYSDEC review
Final Work Plan and Schedule	In accordance with NYSDEC Contract Documents	For NYSDEC approval

Description	Due	Action
Final Documentation	Within 30 days following completion of installation	For NYSDEC review
Annual Inspection Report	Within 30 days following inspection	For NYSDEC review

4.3 WORK PLAN

A Preliminary Work Plan shall be submitted with the Completed Bid Form and shall include the proposed construction methodology and work sequencing, site layout, an estimated project schedule, materials management procedures, the proposed system installation including any deviations or alterations anticipated from the SOW, manufacturer's specifications for monitoring devices and proposed vent fan, supporting calculations, and a quality assurance/ quality control plan.

A Final Work Plan shall be submitted in accordance with NYSDEC Contract Documents. The Final Work Plan shall include all the items of the Preliminary Work Plan in addition to shop drawings, vendor cut sheets, product samples, and/or technical data providing information on the materials proposed for during the installation. The Final Work Plan shall reflect a proposed system installation incorporating the findings of the Building Visual Inspections, Backdraft Testing, and the Pre-Design Communication Testing.

4.4 PROJECT SCHEDULE AND COORDINATION

Work at the Site shall be initiated in accordance with NYSDEC Contract Documents. Scheduling of the project shall be the responsibility of the Contractor. The Contractor shall submit a schedule for approval by the NYSDEC.

To ensure coordination between the Contractor, the NYSDEC, and the Owner, the Contractor shall be responsible for the following items:

- Submit notifications and acquire required permits from the State of New York and the Town of Babylon, including but not limited to general construction permits. Copies of all permits shall be provided to the Owner and the NYSDEC.
- Conduct a pre-construction meeting at the Site prior to commencing work. The Contractor shall notify the NYSDEC at least 5 working days in advance of the proposed meeting date.

- Identify equipment and material staging areas within the limits of work, for approval by the NYSDEC. All materials shall be stored neatly and in such a way to prevent damage to the materials or existing facilities.
- Obtain all utility clearances for the work area, as required by the Site Owner, the State of New York, and the Town of Babylon.
- Notify the Town of Babylon, Police and emergency agency coordination, the Owner and/or the NYSDEC, and others, as necessary.
- Mobilize the necessary equipment, materials, supplies, and personnel to the Site as required for the timely execution of the work.
- Provide the necessary temporary facilities, including sanitary facilities, and refuse management at the Site that are not currently available on site.
- Maintain the project Site in a neat condition.

The NYSDEC shall review the Contractor's proposed schedule with the Owner for the Owner's approval.

4.5 HEALTH AND SAFETY AND PERSONNEL PROTECTION

Work at the Site shall be conducted such that the potential risks associated with chemical hazards at the Site are minimized. The Site-specific Contractor Health and Safety Plan shall establish, in detail, the protocols necessary for the anticipation, recognition, evaluation, and control of hazards associated with each task performed. To assist the Contractor with preparation of this plan, the NYSDEC will supply the Contractor that is awarded the work with an approved Health and Safety Plan for the Site, which contains background information regarding the current contaminant types and distributions.

Work shall comply with applicable Federal, state, and local safety and occupational health laws and regulations. This includes, but is not limited to, OSHA standards, 29 CFR 1910, especially Section .120, "Hazardous Waste site Operations and Emergency Response" and 29 CFR 1926, for hazardous waste site operations (Section .65). Site personnel shall be trained, as required by the laws and regulations, for completion of the work; all operators shall be appropriately trained in the safe operation of the equipment they will operate. The Contractor's bid shall assume that Level D PPE will be required.

The Contractor shall also be responsible for the following:

- Conduct Initial Health and Safety Training briefing for all personnel working on site prior to site assignment. Personnel will become familiar with the Site as well as any site-specific safety issues. They will become familiar with how emergency situations shall be handled as well as procedures regarding an individual's specific job responsibilities and tasks.
- Conduct a pre-construction meeting, to be attended by the Contractor, the NYSDEC, and other pertinent personnel, to review work procedures, the Contractor's schedule, and site-specific health and safety requirements.
- Conduct and document daily tail-gate meetings prior to the start of work to review at a minimum the plan for the day; roles and responsibilities; health and safety; and possible issues/concerns.
- Provide appropriate PPE, decontamination equipment and supplies, monitoring equipment, and other safety equipment necessary to execute the work in accordance with the project Health and Safety Plans.
- Provide additional training as determined by the NYSDEC. Such training may include additional refreshers about PPE, instrumentation, cardio-pulmonary resuscitation, first aid, or any other pertinent health or safety related subject.
- Oversee Subcontractors working on site to ensure they are following the NYSDEC and Contractor established health and safety requirements.

4.6 EXISTING SUBSURFACE CONDITIONS

Contamination at the Site is primarily located at depths below the proposed extent of work in this SOW; however, it is possible that VOCs in soil vapor may be encountered. The Contractor shall monitor for VOCs in the breathing zone using a PID immediately following drilling or coring of the concrete floor slab for both permanent and temporary communication test points and vacuum extraction location(s). In the event that elevated (higher than background) PID readings are detected, the Contractor shall advise all employees and the Owner to vacate the immediate vicinity of the floor penetration. The Contractor shall continue to periodically monitor the penetration location with a PID until VOC levels return to background, at which time work may recommence. The Contractor shall coordinate with the Owner to provide ample ventilation of the work area (e.g., open window or door).

Prior to the initiation of on-site activities, the Contractor shall coordinate with the NYSDEC and the Owner regarding the locations of existing underground utilities and structures. The Contractor shall be responsible for the damage of and the location of all underground utilities and structures. The Contractor shall also be responsible for damage to existing known utilities both above and

below ground caused by the Contractor and or its Subcontractors. The Contractor shall contact the NYSDEC as soon as any damage to utilities is discovered. The NYSDEC and the Owner shall make the determination as to whether repairs are necessary and the materials and methods that will be used.

4.7 CONTRACTOR QUALITY CONTROL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system, covering all on-site and off-site construction operations, including work by its Subcontractors, fabricators, and suppliers. As part of the Work Plan, the Contractor shall identify the quality control program for the project. The Contractor shall identify personnel, procedures, control, instructions, tests, records, and forms to be used during quality control testing. The quality control program shall be capable of tracking acceptance and deficiencies of materials and work conducted at the Site.

Work at the Site shall be subject to the observation of the NYSDEC or its designated representative, at all times. Observation or non-observation by the NYSDEC shall not relieve the Contractor from the contractual obligation to furnish work and material as required and properly complete the work in accordance with this SOW, drawings and the Contract Documents. If the NYSDEC considers the work not properly accomplished, any part or all of the materials or equipment incorporated in it may be rejected. If rejected, the Contractor shall bear all expenses for removal and proper replacement of such material, equipment, or work, including the replacement of work done by others that is adversely affected by removal and proper replacement of improper work done by the Contractor.

Defective or substandard work or materials furnished by the Contractor that is discovered before the final acceptance of the work shall be removed immediately by the Contractor, even if initially overlooked by the NYSDEC and recommended for payment. Defective materials shall be removed from the project Site and satisfactory work or materials shall be substituted by the Contractor for those rejected.

The Contractor shall be responsible for the following prior to the initiation of the SSV system installation:

- review of this SOW
- Building Inspection/Backdraft Testing and Pre-Design Communication Testing with the NYSDEC and Owner
- submission of a Final Work Plan
- review of the appropriate activity hazard analysis to assure safety requirements are met
- location of all underground utilities and structures.

The Contractor shall be responsible for the following during construction activities:

- Daily checks of the work to ensure that it is in full compliance with the requirements of this SOW and the drawings.
- Verify adequacy of controls to ensure full compliance with the requirements of this SOW and the drawings.
- Daily safety checks to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker, as applicable.
- If deficiencies are identified, they shall be documented and corrected prior to continuation of the work.

5.0 FINAL DOCUMENTATION AND COMPLETION REQUIREMENTS

The Contractor shall be responsible for the following with respect to project documentation and project completion:

- Complete general site clean up, housekeeping, general refuse disposal, and final sweeping.
- Complete necessary wall repair or replacement, repair of site rutting, and/or other damages.
- Accompany the Owner and/or NYSDEC on a Substantial Completion Inspection and document Punch List items, as necessary.
- Rectify identified Punch List items and provide written resolution for each item.
- Submit a Final Completion Report, including, but not limited to field notes, logs, daily summary reports, and photographs.
- The Contractor shall also provide the Owner with a brief written description detailing how the system operates and will include information on who to contact in the event of system malfunction.

As part of the Final Completion Report, record drawings of the SSV system and two red-line drawings or legible hand sketches ("as-built" drawings) shall be submitted, documenting

- the location, relative elevation, and alignment of the constructed system, including vacuum monitoring wells, piping and appurtenances
- changes or modifications from the drawings, this SOW, or the approved Work Plan
- the option selected for construction when the drawings or this SOW present an option.

The contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. The records shall include the following information:

- Contractor/Subcontractor and their area of responsibility
- Daily summary reports
- Quantity of materials received at the Site with statement as to acceptability
- Submittals and deliverables reviewed
- Job safety evaluation stating what was checked, results, and corrective actions
- Contractor's verification statement

The Contractor shall provide a one-year overall warranty of construction and equipment from the date of start-up. The Contractor shall provide a list for each warranted item, equipment, or system, indicating:

- name of item
- model and serial numbers
- location where installed
- name and phone numbers of manufacturers or suppliers
- names, addresses and telephone numbers of sources of spare parts
- warranties and terms of warranty - items that have extended warranties shall be indicated with separate warranty expiration dates
- cross reference to warranty certificates as applicable
- starting point and duration of warranty period
- summary of maintenance procedures required to continue the warranty
- organization, names and phone numbers of persons to call for warranty services
- typical response time and repair time expected for warranted equipment.

The Contractor shall provide a listing and status of delivery of all Certificates of Warranty for extended warranty items.

6.0 REFERENCES

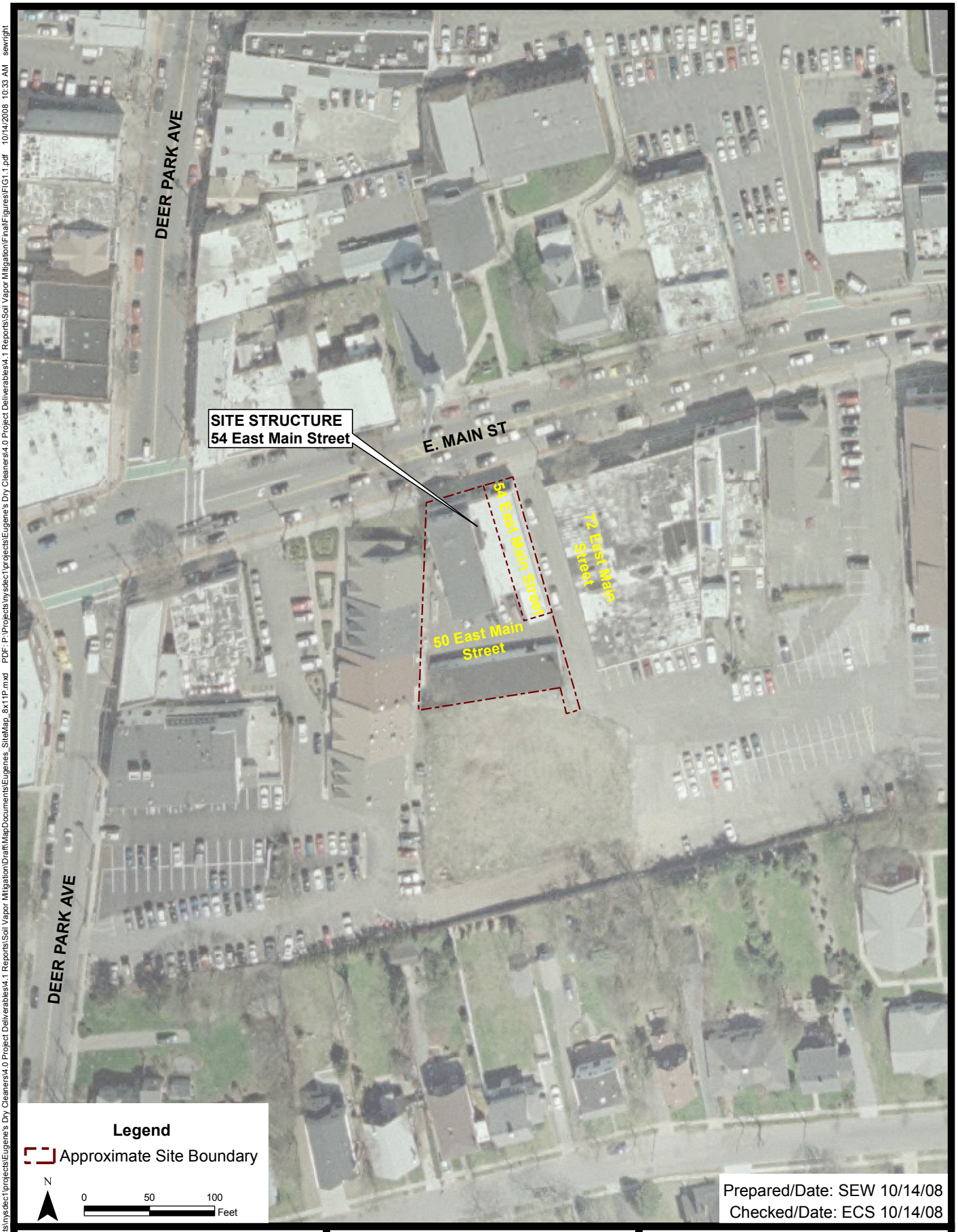
American Society for Testing and Materials (ASTM), 2003. Standard Practice for Installing Radon Mitigation Systems in Low-Rise Existing Residential Buildings, Designation E2121 -03, February 2003.

MACTEC Engineering and Consulting, P.C., (MACTEC), 2008. *Draft Vapor Investigation Report, Eugene's Dry Cleaners; Site No. 1-52-157*. Prepared for New York State Department of Environmental Conservation, Albany, New York. July 2008.

New York State Department of Health (NYSDOH), 2006 and 2007. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. October 2006, as amended June 25, 2007.

United States Environmental Protection Agency (USEPA), 2001. Building Radon Out - A Step by Step Guide on How to Build Radon-Resistant Homes. EPA 402-K-01-002. April 2001.

FIGURES

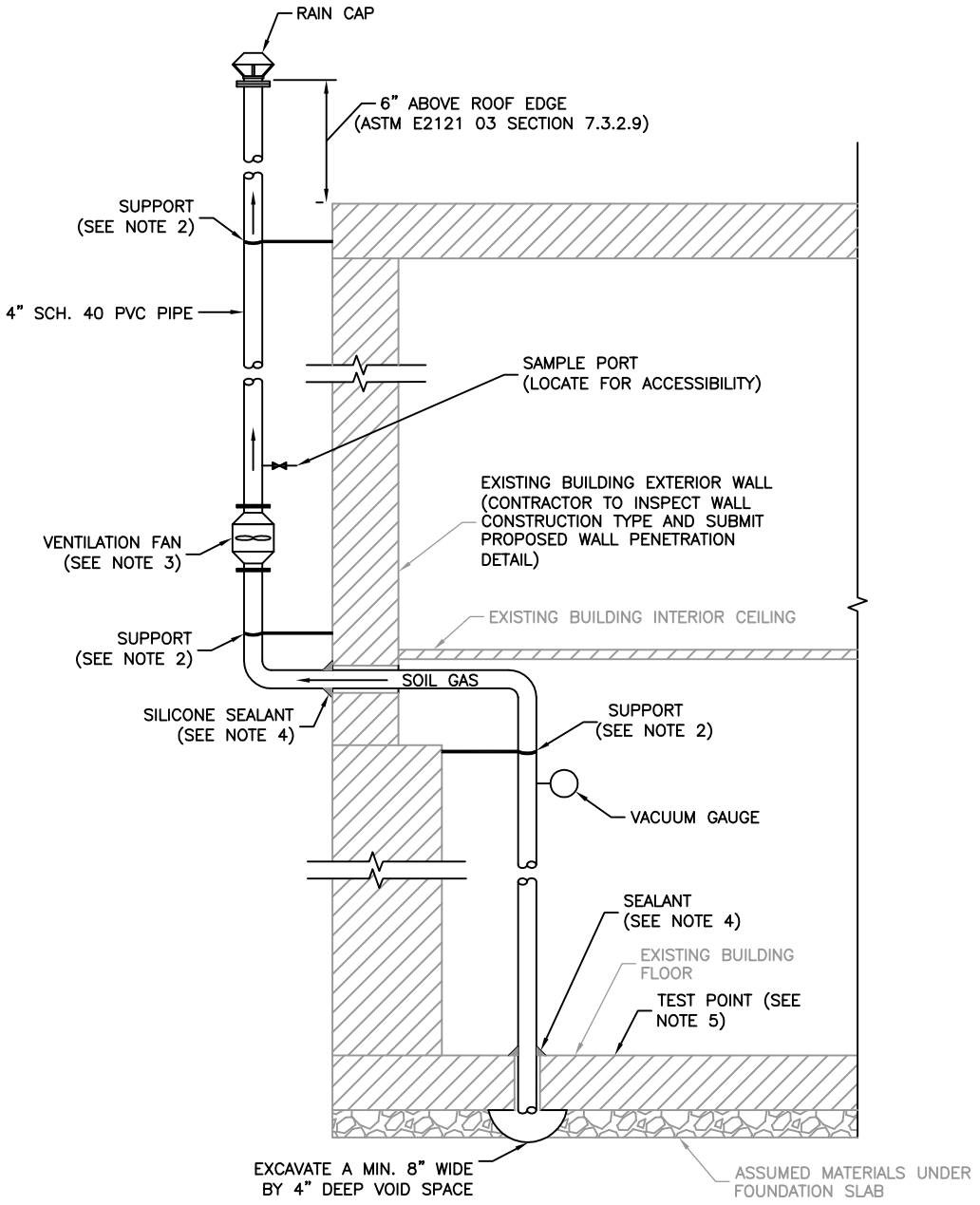


Prepared/Date: SEW 10/14/08
Checked/Date: ECS 10/14/08

SOW SSV SYSTEMS
EUGENE'S DRY CLEANERS
BABYLON, NEW YORK

MACTEC

SITE LOCATION
Project 3612-07-2087
Figure 1.1



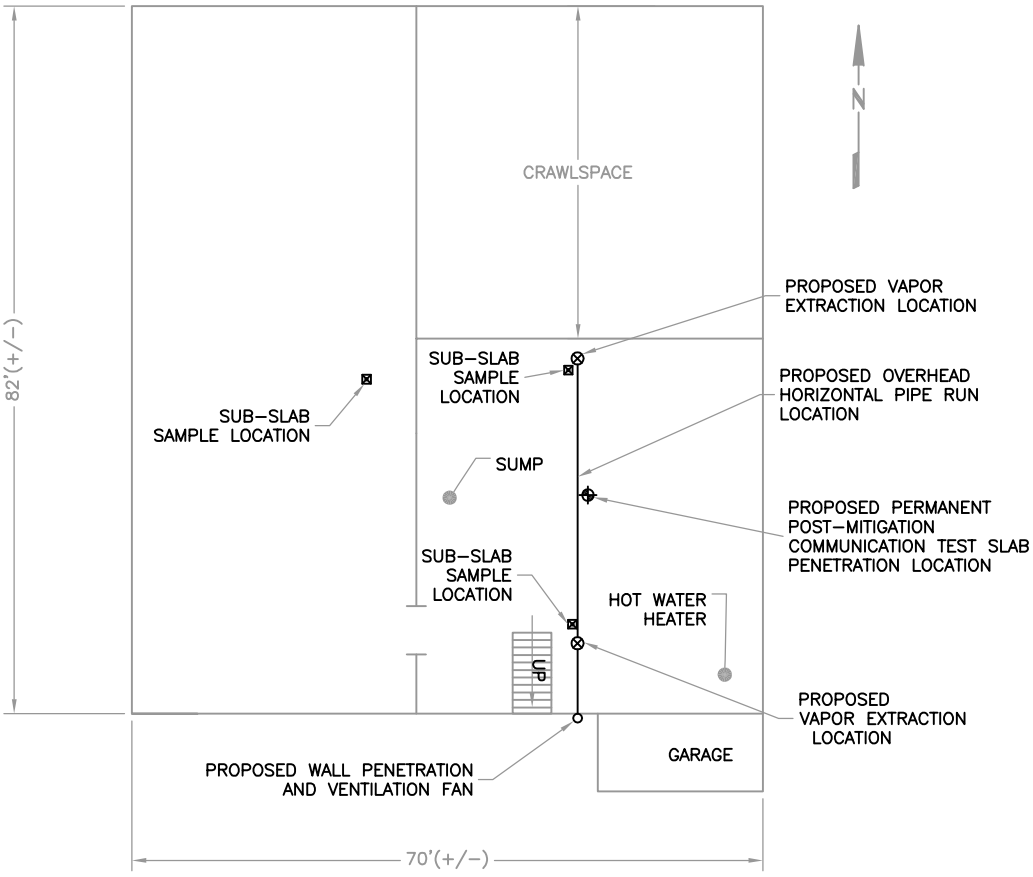
NOTES:

1. REFER TO SUBSECTION 3.3.3 OF THE SOW FOR SSV SYSTEM COMPONENTS AND INSTALLATION METHODS.
2. SUPPORTS SHALL BE INSTALLED AT LEAST EVERY 6 FEET ON HORIZONTAL RUNS. VERTICAL RUNS SHALL BE SECURED EITHER ABOVE OR BELOW THE POINTS OF PENETRATION THROUGH FLOORS, CEILINGS AND ROOFS, OR AT LEAST EVERY 8 FEET ON RUNS THAT DO NOT PENETRATE FLOORS, CEILINGS OR ROOFS (ASTM E2121 03 SECTION 7.3.2.5).
3. THE VENTILATION FAN SHALL BE A FANTECH HP220 OR AN APPROVED EQUIVALENT. THE FAN SHALL BE CONNECTED ABOVE AND BELOW TO THE VENT PIPE WITH FLEXIBLE CONNECTORS AND CLAMPED IN PLACE.
4. OPENINGS AROUND THE SUCTION POINT PIPE SHALL BE SEALED USING METHODS AND MATERIALS THAT ARE DURABLE AND PERMANENT. (ASTM E2121 03 SECTION 7.3.4.1). SEALANTS AND ADHESIVES SHALL BE COMPATIBLE WITH PIPING MATERIALS AS SPECIFIED BY THE PIPING MANUFACTURER. ALL SEALANTS SHALL BE APPROVED BY NYSDEC PRIOR TO CONSTRUCTION.
5. SEE FIGURE 3.2 FOR PROPOSED PERMANENT POST-MITIGATION COMMUNICATION TEST PENETRATION LOCATIONS.
6. LOCATIONS AND LAYOUT OF SYSTEM ARE APPROXIMATE AND ARE FOR PRE-DESIGN PURPOSES ONLY. ALTERATIONS TO THE PROPOSED DESIGN AS A RESULT OF THE BUILDING/VISUAL INSPECTION AND PRE-DESIGN COMMUNICATION TESTING SHALL BE SUBMITTED AS A FINAL DESIGN BY THE CONTRACTOR AS PART OF THEIR WORK PLAN AND APPROVED BY NYSDEC (SOW SECTION 3.3).

NOT TO SCALE

Prepared/Date: SEW 08-05-08
Checked/Date: MJS 08-15-08

SOW SSV SYSTEMS EUGENE'S DRY CLEANERS BABYLON, NEW YORK	MACTEC	SSV SYSTEM DETAILS 54 EAST MAIN STREET Project 3612-07-2087 Figure 3.1



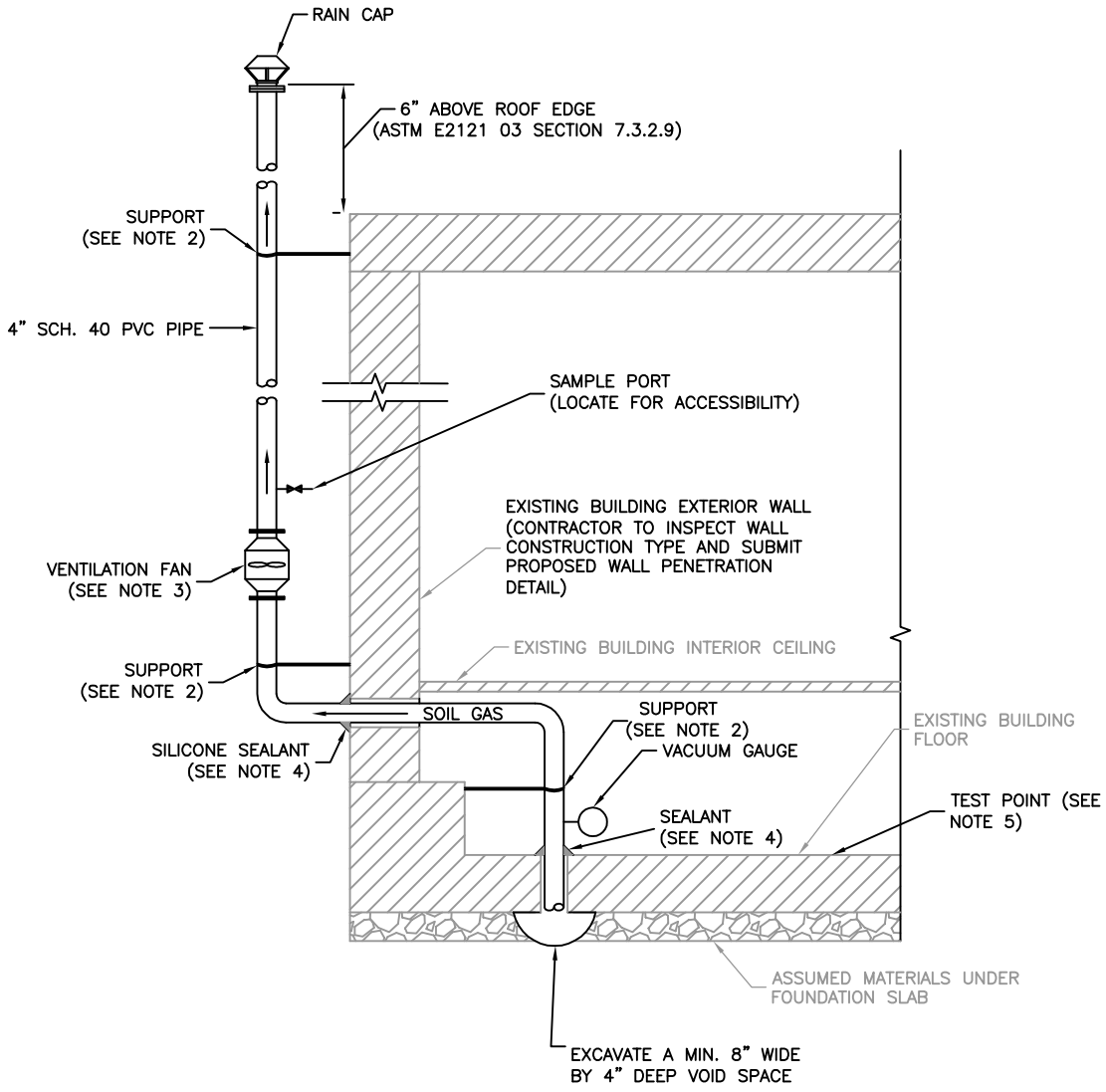
NOTES:
1. ALL DIMENSIONS ARE APPROXIMATE. DIMENSIONS TO BE FIELD VERIFIED.
2. REFER TO SUBSECTION 3.3.3 OF THE SOW FOR SSV SYSTEM COMPONENTS AND INSTALLATION METHODS.

54 EAST MAIN STREET SSV SYSTEM
BASEMENT

NTS

Prepared/Date: SEW 08-05-08 Revised/Date: SEW 10-02-08
Checked/Date: MJS 08-15-08 Checked/Date: MJS 10-14-08

SOW SSV SYSTEMS EUGENE'S DRY CLEANERS BABYLON, NEW YORK	MACTEC	SSV SYSTEM PLAN 54 EAST MAIN STREET Project 3612-07-2087 Figure 3.2



NOTES:

1. REFER TO SUBSECTION 3.3.3 OF THE SOW FOR SSV SYSTEM COMPONENTS AND INSTALLATION METHODS.
2. SUPPORTS SHALL BE INSTALLED AT LEAST EVERY 6 FEET ON HORIZONTAL RUNS. VERTICAL RUNS SHALL BE SECURED EITHER ABOVE OR BELOW THE POINTS OF PENETRATION THROUGH FLOORS, CEILINGS AND ROOFS, OR AT LEAST EVERY 8 FEET ON RUNS THAT DO NOT PENETRATE FLOORS, CEILINGS OR ROOFS (ASTM E2121 03 SECTION 7.3.2.5).
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5. SEE FIGURE 3.4 FOR PROPOSED PERMANENT POST-MITIGATION COMMUNICATION TEST PENETRATION LOCATIONS.
6. LOCATIONS AND LAYOUT OF SYSTEM ARE APPROXIMATE AND ARE FOR PRE-DESIGN PURPOSES ONLY. ALTERATIONS TO THE PROPOSED DESIGN AS A RESULT OF THE BUILDING/VISUAL INSPECTION AND PRE-DESIGN COMMUNICATION TESTING SHALL BE SUBMITTED AS A FINAL DESIGN BY THE CONTRACTOR AS PART OF THEIR WORK PLAN AND APPROVED BY NYSDEC (SOW SECTION 3.3).

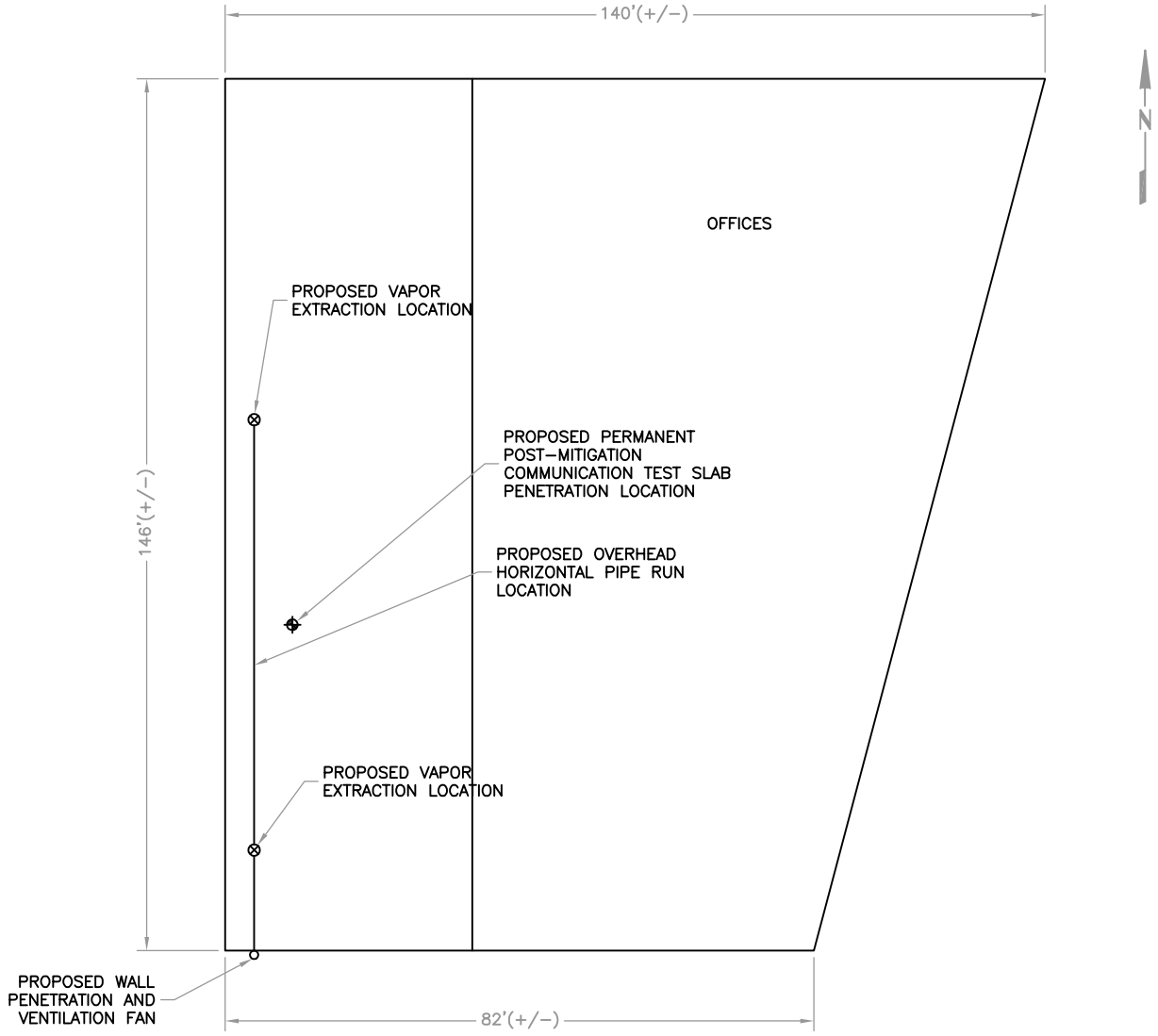
NOT TO SCALE

Prepared/Date: SEW 08-05-08
Checked/Date: MJS 08-15-08

SOW SSV SYSTEMS
EUGENE'S DRY CLEANERS
BABYLON, NEW YORK

MACTEC

SSV SYSTEM DETAILS
72 EAST MAIN STREET
Project 3612-07-2087
Figure 3.3



NOTES:
1. ALL DIMENSIONS ARE APPROXIMATE. DIMENSIONS TO BE FIELD VERIFIED.
2. REFER TO SUBSECTION 3.3.3 OF THE SOW FOR SSV SYSTEM COMPONENTS AND INSTALLATION METHODS.

72 EAST MAIN STREET SSV SYSTEM
CRAWLSPACE

NTS

Prepared/Date: SEW 08-05-08 Revised/Date: SEW 10-02-08
Checked/Date: MJS 08-15-08 Checked/Date: MJS 10-14-08

SOW SSV SYSTEMS EUGENE'S DRY CLEANERS BABYLON, NEW YORK	MACTEC	SSV SYSTEM PLAN 72 EAST MAIN STREET Project 3612-07-2087 Figure 3.4

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APPENDIX A

PHOTOGRAPHS

APPENDIX A: PHOTOGRAPHS

54 East Main Street, Babylon, New York

Basement Sump

Basement Sump view to the North

3' x 5' Pitted Area

Wall between Crawlspace & Basement

East Wall View to the North

72 East Main Street, Babylon, New York

Crawlspace

Crawlspace

APPENDIX B

BID FORM

BID FORM

NYSDEC EUGENE'S DRY CLEANERS SUB-SLAB VENTILATION SYSTEMS

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNITS	UNIT PRICE	BID PRICE
1.	Building/ Visual Inspection, Backdraft Testing and Pre-Design Communication Testing	2	LS	$_____	$_____
1a.	Basement Repair and Sealing for 54 East Main Street	1	LS	$_____	$_____
2.	Sub-slab Ventilation Systems Mobilization, Installation and Startup	2	LS	$_____	$_____
3.	Final Documentation	2	LS	$_____	$_____
4.	Annual Inspections	2	LS	$_____	$_____

TOTAL BASE BID PRICE $ _____ $ _____

Written Out

Company Name and State of Incorporation: _____

By: _____

(*Signature – attach evidence of authority to sign*)

Name (typed or printed): _____

Title: _____