ENERGYSOLUTIONS

SUB-SLAB DEPRESSURIZATION SYSTEM INSTALLATION WORK PLAN

Leica, Inc. Site
Eggert and Sugar Roads
Town of Cheektowaga, Erie County, New York
Site ID Number 915156

Prepared for

Leica, Inc., c/o Videojet Tech
1500 Mittell Boulevard
Wood Dale, Illinois 60191

And

New York State Department of Environmental Conservation, Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999

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ENERGYSOLUTIONS

CS-OP-PN-062

Sub-Slab Depressurization System Installation Work Plan for theFormer Leica Facility located at the Leica, Inc. Site Eggert and Sugar Roads Cheektowaga, New York NYSDEC Site ID 915156

Project No. 137015 **Revision 1**

Prepared for:

Leica, Inc., c/o Videojet Tech 1500 Mittell Boulevard Wood Dale, IL 60191	and	NYSDEC, Region 9 270 Michigan Avenue Buffalo, NY 14203-299

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- [ ] New Plan
- [ ] Title Change
- [X] Plan Revision
- [ ] Plan Rewrite

Effective Date 03-22-2112

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FIGURES

APPENDIX

ACRONYMS AND ABBREVIATIONS

AS/DVE	Air Sparging/Dual Vacuum Extraction
BGS	Below grade surface
COC	Contaminants of Concern
CRA	Conestoga-Rovers Associates
DCE	cis-1,2-Dichloroethene
DVE	Dual Vacuum Extraction
EPA	United States Environmental Protection Agency
HRC	Hydrogen Release Compound®
Leica	Leica, Inc.
NELAP	National Environmental Laboratory Accreditation Program
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PVC	Polyvinyl Chloride
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
Site	Leica, Inc. Site: NYSDEC Site ID Number 915156
SSD	Sub-Slab Depressurization
TCA	1,1,1-Trichloroethane
TCE	Tricholoroethene
µg/kg	microgram per kilogram
$\mu g/m^3$	microgram per cubic meter
VOC	Volatile Organic Compound

1.0 INTRODUCTION

On behalf of Leica, Inc., c/o Videojet Tech of Wood Dale, Illinois (Leica), Energy*Solutions*, LLC (Energy*Solutions*) has prepared this Sub-Slab Depressurization (SSD) System Installation Work Plan for the former Leica facility located on the Leica, Inc. site (Site) at Eggert and Sugar Roads, Cheektowaga, New York (NYSDEC Site ID Number 915156). A Site Location Map is included as Figure 1. A site map showing the building, site features, and monitoring well locations is included as Figure 2. This installation work plan is based on sub-slab and indoor air sample results collected from the Site on March 23, 2010, which were provided to the New York State Department of Environmental Conservation (NYSDEC) on September 3, 2010 (Ref. No. 1.2.1) and the field pilot study conducted during the weeks of May 9 and June 6, 2011.

Chlorinated volatile organic compounds (VOCs) were detected in sub-slab and indoor air samples collected from within the northeast portion of the facility during the March 2010 sampling event. Data was compared to the NYSDEC Soil Vapor/Indoor Air Matrices 1 and 2 as published in the New York State Department of Health (NYSDOH) "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (Ref. No 1.2.2). Data is compared to the Matrix guidelines in Table 1. The Matrix guidelines indicate that mitigation is required in several portions of the building. A detailed facility Map illustrating these sample locations is included as Figure 3.

As required by NYSDOH guidance (Ref. No. 1.2.2), a Vapor Mitigation Work Plan was prepared and submitted on November 23, 2010 (Ref. No. 1.2.3). The Work Plan describes the actions proposed to reduce or eliminate the chlorinated VOCs present in the sub-slab vapor and indoor air samples. In addition, the Work Plan also proposes additional investigation within the main warehouse portion of the building. Pursuant to NYSDEC's comments, the Vapor Mitigation Work Plan was revised on March 9, 2011 and submitted on March 15, 2011 (Ref. No. 1.2.4). The Vapor Mitigation Work Plan (Rev. 1) was subsequently approved by NYSDEC on March 24, 2011 (Ref. No. 1.2.5).

1.1 Purpose

The purpose of this Installation Work Plan is to present the results of the pilot study performed during the weeks of May 9 and June 6, 2011 and provide instruction and further detail for the installation of the SSD System for the Main Entryway/Loading Dock area located in the northeast portion of the former Leica facility (Figure 3) pursuant to the Vapor Mitigation Work Plan (Ref No. 1.2.4).

The additional investigation proposed in the Vapor Mitigation Work Plan will be presented under separate cover.

1.2 References

1.2.1 31129-077, "Indoor Air and Sub-Slab Soil Vapor Sampling Results, Leica, Inc. Site; Erie County, Cheektowaga, New York, Inactive Hazardous Waste Disposal Site 915156," September 3, 2010.

1.2.2 New York State Department of Environmental Conservation Soil Vapor/Indoor Air Matrices 1 and 2 as published in the New York State Department of Health "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," October 2006.

1.2.3 CS-OP-PN-051, Rev. 0, “Vapor Mitigation Work Plan, Leica, Inc. Site; Town of Cheektowaga, Erie County, New Your, Site ID Number 915156,” November 23, 2010.

1.2.4 CS-OP-PN-051, Rev 1, “Vapor Mitigation Work Plan, Leica, Inc. Site; Town of Cheektowaga, Erie County, New Your, Site ID Number 915156,” March 9, 2011.

1.2.5 New York State Department of Environmental Conservation, Approval of “Vapor Mitigation Work Plan, Leica, Inc. (Site #915156), Cheektowaga, New York,” March 24, 2011

1.2.6 Conestoga-Rovers Associates, “Remedial Investigation Report, Leica, Inc., Cheektowaga, New York, Site Code 915156,” October 1994.

1.2.7 Conestoga-Rovers Associates, “Remedial Pre-Design Work Plan, Leica, Inc., Cheektowaga, New York, Site Code 915156,” March 1996.

1.2.8 NES, Inc., “Feasibility Study Addendum Submittal, Leica Optical Site, Cheektowaga, New York,” February 3, 1997.

1.2.9 New York State Department of Environmental Conservation, Division of Environmental Remediation, “Record of Decision, Leica, Incorporated Site, Town of Cheektowaga, Erie County, Registry Number 915156,” March 1997.

1.2.10 Beacon Environmental Services, Inc., “Passive Soil-Gas Survey, Leica Site, Cheektowaga, New York,” prepared for SCIENTECH, Inc., July 19, 2005, Beacon Report No. EM1789.

1.2.11 31129-033, “Status Report (February 2006-April 2006), Leica, Inc. Site, Erie County, Cheektowaga, New York,” June 1, 2006.

1.2.12 31129-039, “Status Report (May 2006-December 2006), Leica, Inc. Site, Erie County, Cheektowaga, New York,” March 6, 2007.

1.2.13 Energy*Solutions*, “Supplemental Area B Soil Remediation Using Hydrogen Release Compound (HRC), Remedial Action Work Plan for the Leica, Inc. Site, Cheektowaga, New York,” May 2007.

1.2.14 New York State Department of Environmental Conservation, Approval of “HRC Injection Plan for Area B, Leica, Inc. (Site #915156), Cheektowaga, New York,” November 14, 2007.

1.2.15 31129-061, “Status Report Annual Reporting for 2008, Leica, Inc. Site, Erie County, Cheektowaga, New York, Inactive Hazardous Waste Disposal Site 915156,” July 8, 2009.

1.2.16 Occupational Health & Safety Administration (OSHA), “Permissible Exposure Limits (PELs) for Air Contaminants,” Code of Federal Regulations CFR 29 1910.1000, January 10, 1999.

1.2.17 United States Environmental Protection Agency, “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846,” February 2007 - EPA publication number EPA/530-SW-846.3-1

1.2.18 United States Environmental Protection Agency, “Radon Reduction Techniques for Existing Detached Houses,” October 1993 - EPA publication number EPA/625/R-93/011

1.3 Background

The building is currently owned and operated as a warehouse and distribution center by SamSon Distributing. Currently, there are no activities conducted within the building that use products containing VOCs, however, such products have been used in the past.

Leica, with NYSDEC approval, initiated a Remedial Investigation/Feasibility Study (RI/FS) in November 1993 to address the contamination at the Site. The RI was completed in October 1994 by Conestoga-Rovers and Associates (CRA) (Ref. No. 1.2.6). A Remedial Pre-Design Work Plan was submitted by CRA in May 1995 with subsequent revisions in July 1995 and March 1996 (Ref. No. 1.2.7). The final FS addendum was submitted by NES, Inc. (now Energy*Solutions*) in February 1997 (Ref. No. 1.2.8). Upon issuance of a Record of Decision (ROD) in 1997 (Ref. No. 1.2.9), NYSDEC authorized Leica to begin activities necessary to design and implement the chosen remedial alternative at the Site.

NES, Inc., (now Energy*Solutions*) was contracted in 1997 by Leica, to design, install and operate a remediation system at the Site. The system, which included a combination of air sparging and dual vacuum extraction (AS/DVE), was designed to remediate a shallow soil zone (0 – 4′) and an intermediate soil zone (8 – 13′) of contamination. The system was installed in 1999 and was designed to remediate soils in three specific areas of the site including: Area A, a former hazardous waste storage area located northeast of the main facility loading docks; Area B, a former dry well located immediately to the east of the main loading docks; and Area C, an area located beneath the main parking area in the southeastern portion of the property. A bedrock groundwater extraction system was also installed by NES, Inc. (now Energy*Solutions*) at the same time. The AS/DVE system was operated in Area A and Area B until July 2002 and in Area C until November 2002. The groundwater extraction system has operated continuously (excluding minor shutdown and maintenance periods) to the present. A Site Map showing the location of the remediation areas is included as Figure 2.

In order to determine the potential source of the elevated VOC concentrations in groundwater samples collected from monitoring wells MW-16R and MW-16A (Area B), SCIENTECH (now Energy*Solutions*) completed a soil gas survey of the area surrounding these wells in June 2005. The results of the study were provided to NYSDEC on July 19, 2005 (Ref. No. 1.2.10). Several contaminants of concern were detected in the soil gas survey including trichloroethene (TCE), 1,1,1 trichloroethane (TCA), 1,2 dichloroethene (DCE) and vinyl chloride. Based on the information collected during the soil gas survey, the source of the VOCs in the groundwater samples collected from monitoring wells MW-16R and MW-16A was confirmed to be located beneath the eastern side of the building and the loading dock. These results are consistent with the conceptual fate and transport model for the former dry well (Area B) located in the area.

Following completion of this soil gas survey, three supplemental investigations were completed. The first two investigations included soil sampling beneath the building floors in December 2005 and additional soil sampling surrounding the former drywell and monitoring wells MW-16R and MW-16A in March 2006. The results of the December 2005 and March 2006 studies were provided to NYSDEC in 2006 (Ref. No. 1.2.11). The third investigation was a soil vapor survey completed in December 2006. The data for this study was provided to NYSDEC in 2007 (Ref. No. 1.2.12).

Soil sampling completed beneath the building floors in December 2005 revealed areas of limited contamination. TCE was detected in all of the samples collected and was present at a maximum concentration of 4,700 micrograms per kilogram (µg/kg) beneath the basement area. TCA was detected in 12 of the 13 samples at a maximum concentration of 4,900 µg/kg, which was also beneath the basement area.

Soil samples collected in March 2006 (Ref. No. 1.2.11) indicated that the VOC concentrations in the vicinity of the former dry well were lower than those under the building. TCE was detected at a maximum concentration of 390 µg/kg, and TCA was detected at a maximum concentration of 450 µg/kg, which are below their respective Remedial Action Objectives (RAOs) for the Site (945 ug/kg (min.) and 1,140 ug/kg (min.), respectively). These soil sample results confirm that the DVE system, operated from 1999 through 2002, had successfully reduced the VOC concentrations in the soils in Area B, and the soils in this area were not the cause of the elevated VOC concentrations in MW-16R and MW-16A.

Sub-slab vapor and ambient indoor air sampling collected in December 2006 confirmed the presence of VOC vapors in the area (Ref. No. 1.2.12). TCE was detected at a maximum concentration of 380,000 micrograms per cubic meter (µg/m^3) in sub-slab vapors and at a maximum concentration of 16 ug/m^3 in the ambient air of the building. Both samples were collected in the main entry room located south of the loading docks.

Based on these supplemental investigations completed in Area B, it was determined that a source area of VOCs was not present in Area B or its immediate vicinity; however, VOC concentrations above the site RAOs were detected in the soils beneath the building. These soils below the building were most probably impacted by releases from the dry well formerly located in Area B, in the vicinity of monitoring wells MW-16R and MW-16A.

In consultation with NYSDEC, a work plan to inject Hydrogen Release Compound® (HRC) at select locations within the site was submitted by Energy*Solutions* on September 27, 2007 (Ref. No. 1.2.13), and subsequently approved by NYSDEC on November 14, 2007 (Ref. No. 1.2.14). HRC injection was used to reduce chlorinated VOC contaminant concentrations in groundwater in addition to a reduction of the VOC concentrations in the soils beneath the main building. Reduction of the VOC concentrations in the soil and groundwater was also expected to reduce VOC concentrations in the sub-slab and indoor air of the building.

In May 2008, Energy*Solutions* completed the implementation of the HRC injection plan, including the injection of approximately 4,000 pounds of HRC into 74 injection points in Areas B and C. A summary of these activities was included in Energy*Solutions*' "Status Report Annual Reporting for 2008, Leica, Inc. Site, Erie County, Cheektowaga, New York, Inactive Hazardous Waste Disposal Site 915156" in 2009 (Ref. No. 1.2.15).

In order to assess the success of the HRC injection, the plan also included subsequent air sampling in the loading dock area. The first two rounds of air samples were collected 1 month and 6 months following the HRC injection. The results of this study were provided to NYSDEC in 2009 (Ref. No. 1.2.15). Sub-slab and indoor air samples were collected in the east entryway into the building, basement area, warehouse area, and the loading dock area. In addition, an ambient background outdoor air sample was collected upwind of the site, across the parking lot to the east and north of the loading dock. In general, the data indicated that VOC concentrations in sub-slab vapor and indoor air within the facility had declined significantly following the HRC injection program. Subsequent groundwater sampling indicated that VOC concentrations in groundwater had also been reduced in Area B. Also, a corresponding rise in the TCE degradation products

DCE and vinyl chloride, and changes in additional monitoring parameters iron, chloride, and sulfide, indicated that HRC was working at the injection locations and was decreasing the chlorinated VOC plumes in these areas. All indoor ambient air concentrations were below the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs) in every case (Ref. No. 1.2.16).

The most recent indoor air and sub-slab vapor sampling event was conducted at the facility on March 23, 2010 (Ref. No. 1.2.1). Samples were once again collected from four locations inside the building at the Main Warehouse area, Loading Dock, Basement, and Main Entry areas. In addition, one ambient air sample was collected at a background location east of the building. One or more chlorinated VOCs were detected at concentrations above their NYSDOH minimum indoor air action threshold (Ref. No. 1.2.2); however, most of the VOC concentrations had decreased since the December 2008 sampling event.

As required by NYSDOH guidance (Ref. No. 1.2.2), a Vapor Mitigation Work Plan was prepared and submitted on November 23, 2010 (Ref. No. 1.2.3). Following NYSDEC's comments, the Vapor Mitigation Work Plan was revised on March 9, 2011, to incorporate NYSDEC's comments and submitted on March 15, 2011 (Ref. No. 1.2.4). The Vapor Mitigation Work Plan (Rev. 1) was subsequently approved by NYSDEC on March 24, 2011 (Ref. No. 1.2.5).

In accordance with the NYSDEC approved Vapor Mitigation Work Plan, Energy*Solutions* conducted a pilot test during the weeks of May 9 and June 6, 2011. The purpose of the pilot test was to evaluate the air flow at various locations beneath the floor slab and determine the air flow and applied vacuum necessary to achieve the desired depressurization to reduce the VOC concentrations in the sub-slab vapors and building indoor air. The findings from the pilot study and installation instructions for the proposed SSD system are provided in Section 2, below.

2.0 SUB-SLAB DEPRESSURIZATION SYSTEM PILOT STUDY

Using Section 3 – Pre-Mitigation Diagnostic Test Procedures for Sub-Slab Depressurization Systems of EPA's Guidance Document, "Radon Reduction Techniques for Existing Detached Houses" (Ref. No. 1.2.18), during the weeks of May 9 and June 6, 2011, Energy*Solutions* conducted a pilot study for the Sub-slab Depressurization System.

The purpose of the pilot test was to evaluate the air flow at various locations beneath the floor slab, and determine the air flow and applied vacuum necessary to achieve the desired depressurization. Test extraction points were created by coring a hole through the slab to allow the temporary installation of vacuum testing system, which consisted of a shop vacuum, an air flow meter, vacuum gauges, and various valves and tubing. Vacuum monitoring points were installed by drilling small diameter holes through the slab and installing pressure gauges. The vacuum monitoring points were drilled radially around the extraction points at distances from approximately 10 to 50 feet. Actual field sketches of the extraction well and monitoring point locations are included in Appendix A.

Energy*Solutions* vacuumed air from beneath the slab at various flow rates from two potential extraction locations during the week of May 9, 2011 and an alternate potential extraction location during the week of June 6, 2011. At each of the extraction locations, Energy*Solutions* adjusted the air flow to five different flow rates, ranging from 70 cubic feet per minute (cfm) to 365 cfm. Vacuum readings were measured and recorded near the extraction point and at the vacuum monitoring points for each of the five different air flow rates. The data collected is provided in Appendix A.

The extraction points were selected based on the location of elevated contaminants of concern (COC) concentrations in the sub-slab vapors and the existence of foundation walls within the interior of the building, where the building was subsequently extended. Data from various monitoring points provided the information needed to assess the impact of these foundation walls on the flow of air from the one area to another beneath the floor slab.

The pilot study demonstrated that pressure differentials can be created beneath the existing concrete slab and there is communication within the annular space beneath the slab at distances as far as 20 feet from the extraction point. The proposed system will use the existing concrete slab and the 6-inch to 12-inch thick aggregate base beneath the concrete slab for its vapor migration.

Using the data collected, the capabilities of several blowers, and the head loss through the proposed piping, EnergySolutions has selected inline fans, associated piping and appurtenances for the SSD System. A detailed description of the SSD system and installation instructions are provided in Section 3.0, below.

3.0 SUB-SLAB DEPRESSURIZATION (SSD) SYSTEM INSTALLATION INSTRUCTIONS

Using Section 4 – Design and Installation of Active Sub-Slab Depressurization Systems of EPA's Guidance Document, "Radon Reduction Techniques for Existing Detached Houses" (Ref. No. 1.2.18), Energy*Solutions* is providing the following installation instructions for the proposed SSD System.

The Main Entryway and adjacent loading dock Area are adjoining rooms located on the east side of the building. The Main Entryway is a small room which has the highest concentrations of VOCs in both sub-slab and indoor air samples. Based on the current conceptual model, the elevated VOC concentrations in the groundwater are believed to be the result of contamination migrating to the southwest in and on the surface of the groundwater from the original dry well location at MW-16R and MW-16A. It is believed that the building design (foundation wall) is trapping the vapors from the groundwater contamination in this area. The Pilot study conducted in May and June 2011, demonstrated that when air is removed from an area south of the wall, air movement north of the foundation wall is substantially reduced. The data indicated a foundation wall is present between the two areas; therefore, the draw points were placed on both the north and south sides of the wall.

3.1 Installation Instructions

Pursuant to the pilot study conducted in May and June 2011, Energy*Solutions* proposes to install two inline fans at the locations shown on Figure 3 as an active sub-slab depressurization (SSD) system to mitigate the risk of exposure to TCE and related VOCs within these areas of the building. Using the data collected from the Pilot Study, the capabilities of several blowers, the head losses through the system, and including a safety factor to account for any unforeseen additional elbows and restrictions, Energy*Solutions* has selected the "AMG Force" Extract Fan to be used at both locations using 4 inch diameter Schedule 40 PVC that will exit and exhaust out the building. The Air flow versus Vacuum Tables and Charts used to select the extraction fan are provided in Appendix B. Also, cut sheets for the extraction fan and the other appurtenances selected (e.g., pipe hangers) are provided in Appendix C.

As shown in Figure 3, one vapor extraction well is located in the entryway and the other vapor extraction well in the Loading Dock area. These two vapor extraction well locations have been selected in order to ensure that vapors from areas both north and south of the foundation wall beneath the northern wall of the entryway area will be captured by the mitigation system. The vapor extraction well in the Entryway will be installed against the northern portion of the west wall in the middle of the room. The vapor extraction well in the Loading Dock area will be installed against a building column near the northern-side of the area. These proposed well locations adjacent to a wall/column were chosen to minimize the potential of becoming damaged by facility activity and eliminate the need for trenching the facility floor.

As demonstrated in Appendix B, the operating conditions for each blower will be approximately 120 cubic feet per minute (cfm) at approximately 3.3 inches of water column (including system operating vacuum and head losses). As demonstrated in the pilot study (appendix A), at that flow rate, air movement beneath the slab was observed at distances approximately 40 and 50 feet from the extraction points in the main entryway and loading dock areas, respectively. The projected zones of influence for these systems are illustrated on Figure 3.

At each vapor extraction well location, a gas vacuum sump will be installed into the concrete slab. A detail drawing of the gas collection sump is included as Figure 4. As shown, the sumps will consist of a 12 to 24 inch deep hole in the aggregate and soil beneath the concrete floor. A slotted polyvinyl chloride (PVC) vent pipe will be installed into the sump and the annular space around the pipe will be filled with coarse (3/4" stone) aggregate. Two (2) beads of rubberized caulk will be applied to the concrete slab, around the sump, beneath the steel or PVC cover. A steel or PVC cover will be installed over the sumps and around the vent pipe and anchored with concrete nails or bolts. As an alternative to the cover describe above, non-shrinking grout may be used in lieu of the soil and cover (as shown on Figure 4).

The vent piping selected is solvent-welded 4 inch diameter Schedule 40 PVC pipe. As shown on Figures 4 and 5, vent piping will be installed from the northern extraction well to the adjacent interior column and vent piping will be installed from the southern extraction well to the adjacent interior wall. Both vent pipes will then continue vertically to a height approximately 10 feet above the slab. A manometer (also as shown on Figure 4) will be installed in accordance with manufacturer's instructions on the side of the piping at approximately 5 feet above the floor slab for quick visual observations to determine if the system has stopped operating correctly. The pipes will then traverse horizontally through the building approximately 10 feet above the floor as shown on Figure 5. The piping from the main entryway extraction point will travel in an eastern direction (affixed to the cross beams that connect the ceiling trusses), and exit the eastern exterior wall of the building. The piping from the loading dock system continues around the column and then horizontally in an eastern direction (affixed to the cross beams that connect the ceiling trusses), and exits the eastern exterior wall of the building. After the vent pipes exit the eastern exterior wall, each pipe enters into an AMG Force Extract Fan and continues upward into a "Y" fitting (as shown on Figure 6), which is used to trap and remove moisture from the system. After the "Y" fitting, the vent pipe continues upward, around any roof overhang and extends approximately three feet above the roof line. A rain cap will be placed on the ends of both pipes (as shown on Figure 5). Following is a list of other requirements for the system installation.

- The piping will be anchored to the wall using support brackets designed for the size pipe at intervals recommended by the manufacturer.

- The horizontal piping will be sloped back toward the extraction well at a pitch of approximately 2% to prevent condensate from collecting within the extraction system. If a continuous slope back to the extraction well is not feasible, a ½ inch diameter tube fitting will be inserted (and plugged) at the low points of the pipe for periodic removal of its condensate.
- Efforts will be made to minimize the number of fittings and use smoother transition fittings (e.g., 45 degree fittings in lieu of 90 degree fittings).

All penetrations of the concrete slab will be sealed with rubberized caulk and covers or non-shrinking grout to prevent short-circuiting and control vapor migration into the occupied spaces of the building. Also, all penetrations through building walls will be constructed using a sleeve sized to allow the vent pipe to pass through. The outside of the sleeve will be sealed with similar material that was removed (e.g., concrete) to maintain the integrity of the wall.

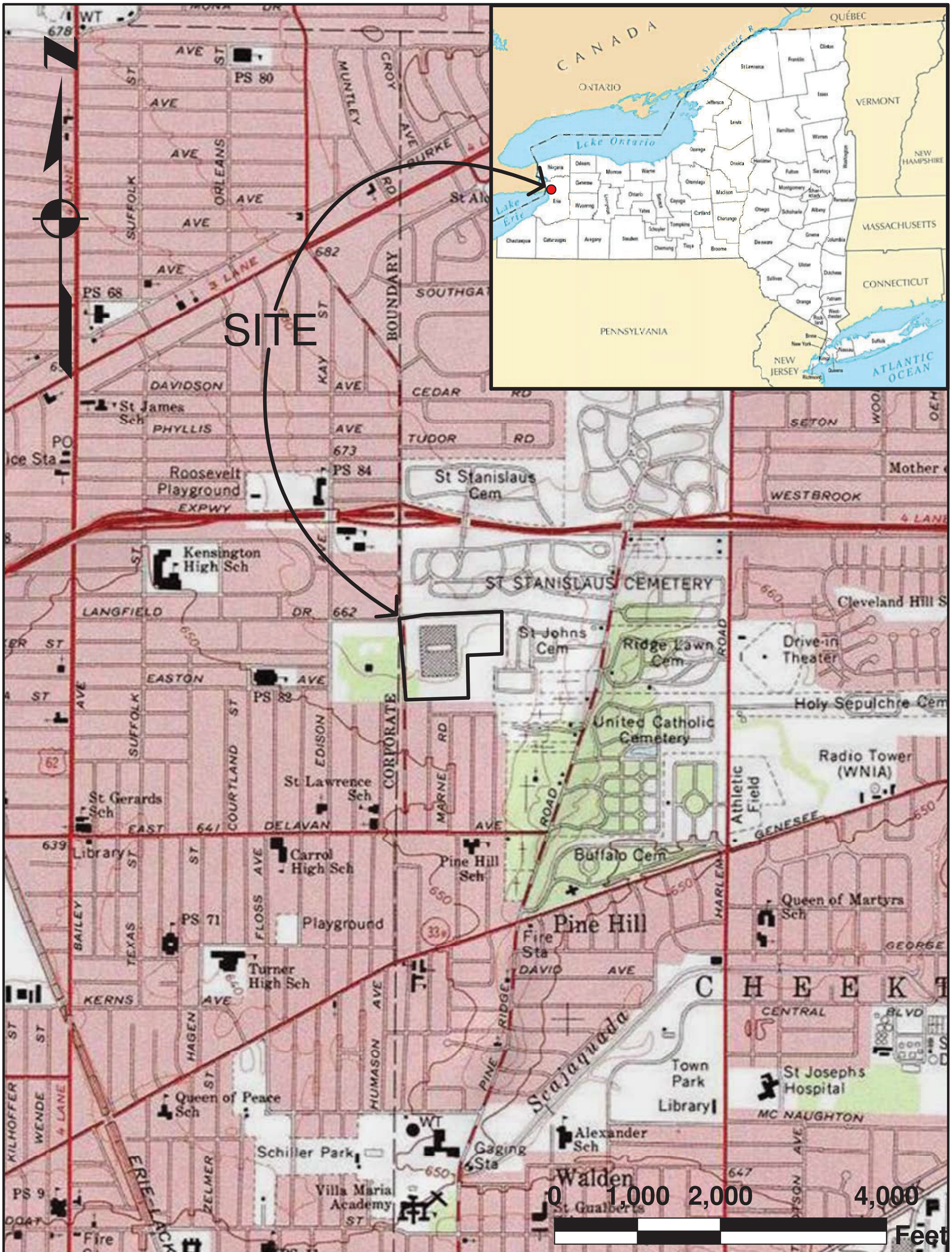
3.2 Operational Instructions

Active sub-slab depressurization (SSD) systems are virtually maintenance-free. The only items that are needed are 1) to visually check the manometer to verify that the system is operating; 2) observe if any portion of the piping system has been compromised; and 3) periodically remove condensate trapped within the system. Energy*Solutions* representatives visit the site regularly to assess the operations of all Site Engineering Controls, which will include this SSD System. If the manometer indicates that the system is not operating correctly or if a section of pipe has been compromised, Energy*Solutions* will assessment the problem, remove any condensate and/or make the necessary repairs (e.g., fan/pipe repair or replacement).

3.3 Continued Vapor Monitoring

Continued Vapor Monitoring will be conducted in accordance with the Vapor Mitigation Work Plan submitted on March 15, 2011 (Ref. No. 1.2.4).

FIGURE 1
SITE LOCATION MAP

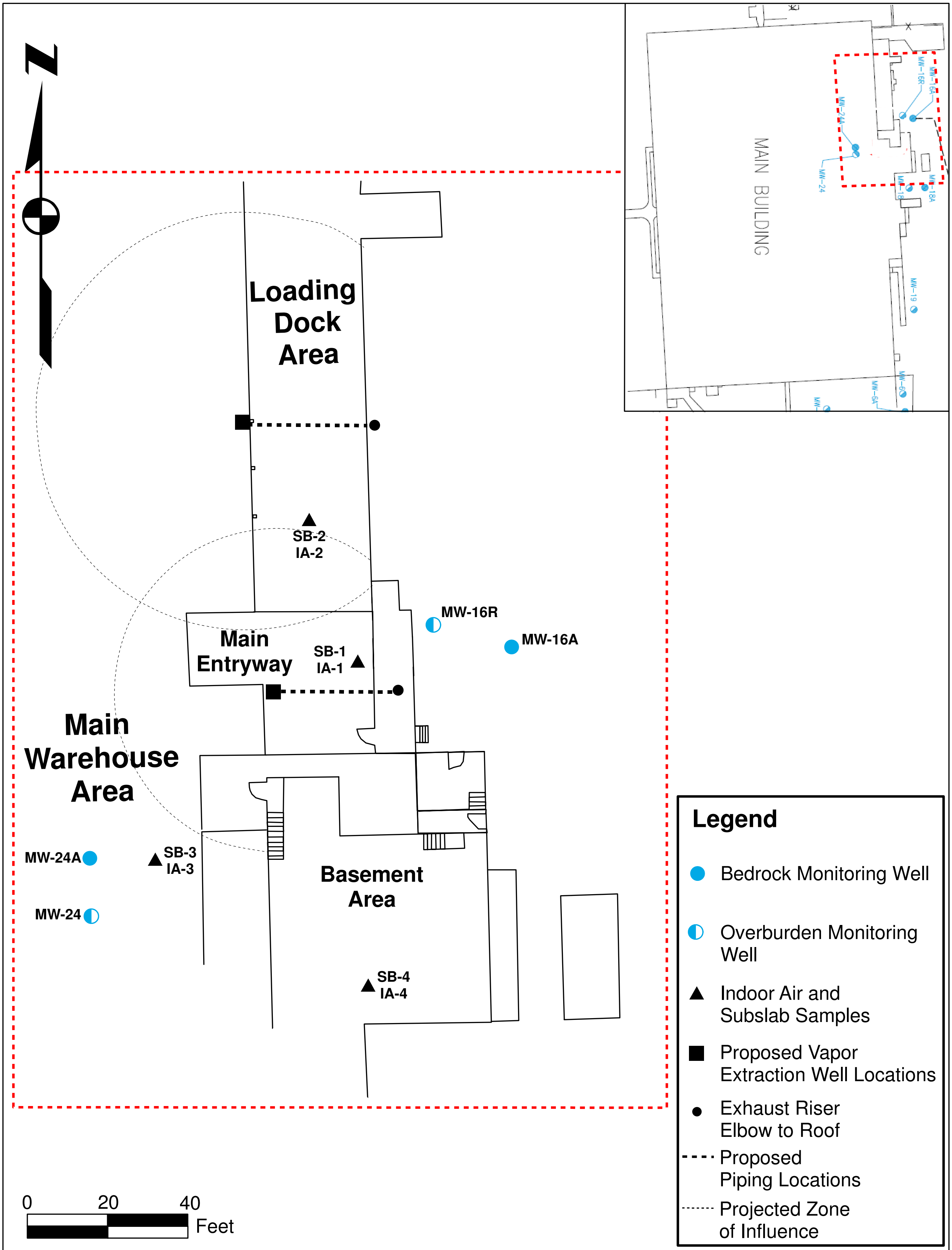


DOCUMENT CONTROL NO.	PROJECT	LEICA MICROSYSTEMS INC. 203 EGGERT ROAD CHEEKTOWAGA, NY	ENERGYSOLUTIONS 100 Mill Plain Road Danbury, CT 06811 203-797-8301	PROJECT # 137015	
				FILENAME:	
REVISION NO.	DRAWING	SITE LOCATION MAP		SCALE: SEE SCALEBAR	DATE: 12/23/09
				BY: MT	CK:
				FIGURE # 1	

FIGURE 2
SITE MAP

DOCUMENT CONTROL NO.	PROJECT	LEICA MICROSYSTEMS INC. 203 EGGERT ROAD CHEEKTOWAGA, NY	ENERGYSOLUTIONS 100 Mill Plain Road Danbury, CT 06811 203-797-8301	PROJECT # 137015	
				FILENAME:	
REVISION NO.	DRAWING	SITE MAP		SCALE: SEE SCALEBAR	DATE: 10/21/10
				BY: MT	CK: PM
				FIGURE # 2	

FIGURE 3
VAPOR MITIGATION AREAS



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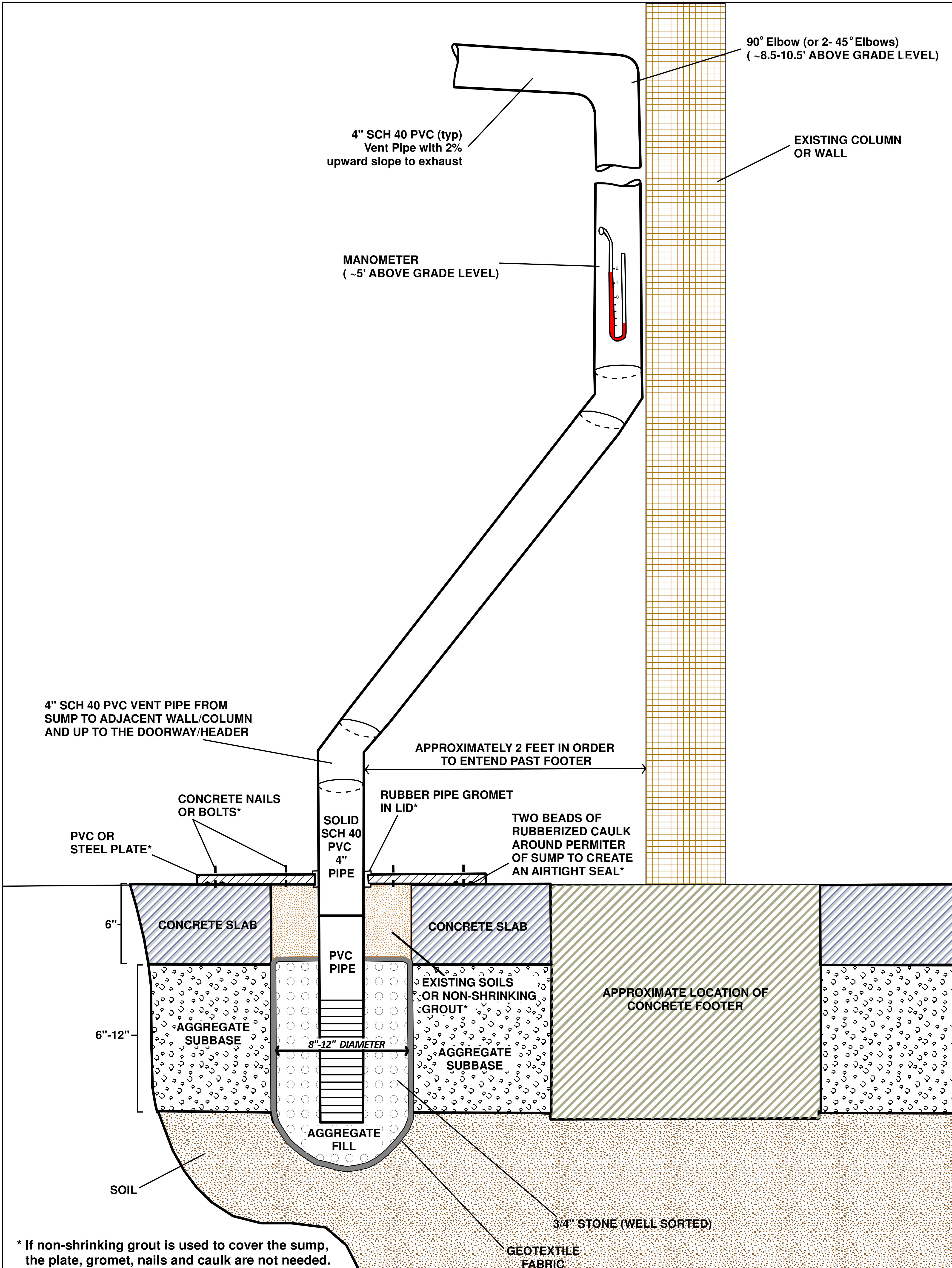
				FILENAME:	
				SCALE: SEE SCALEBAR	DATE: 3/20/12
REVISION NO.	DRAWING	Vapor Mitigation Area		BY: MT	CK:
				FIGURE # 3	

FIGURE 4
GAS COLLECTION SUMP DESIGN



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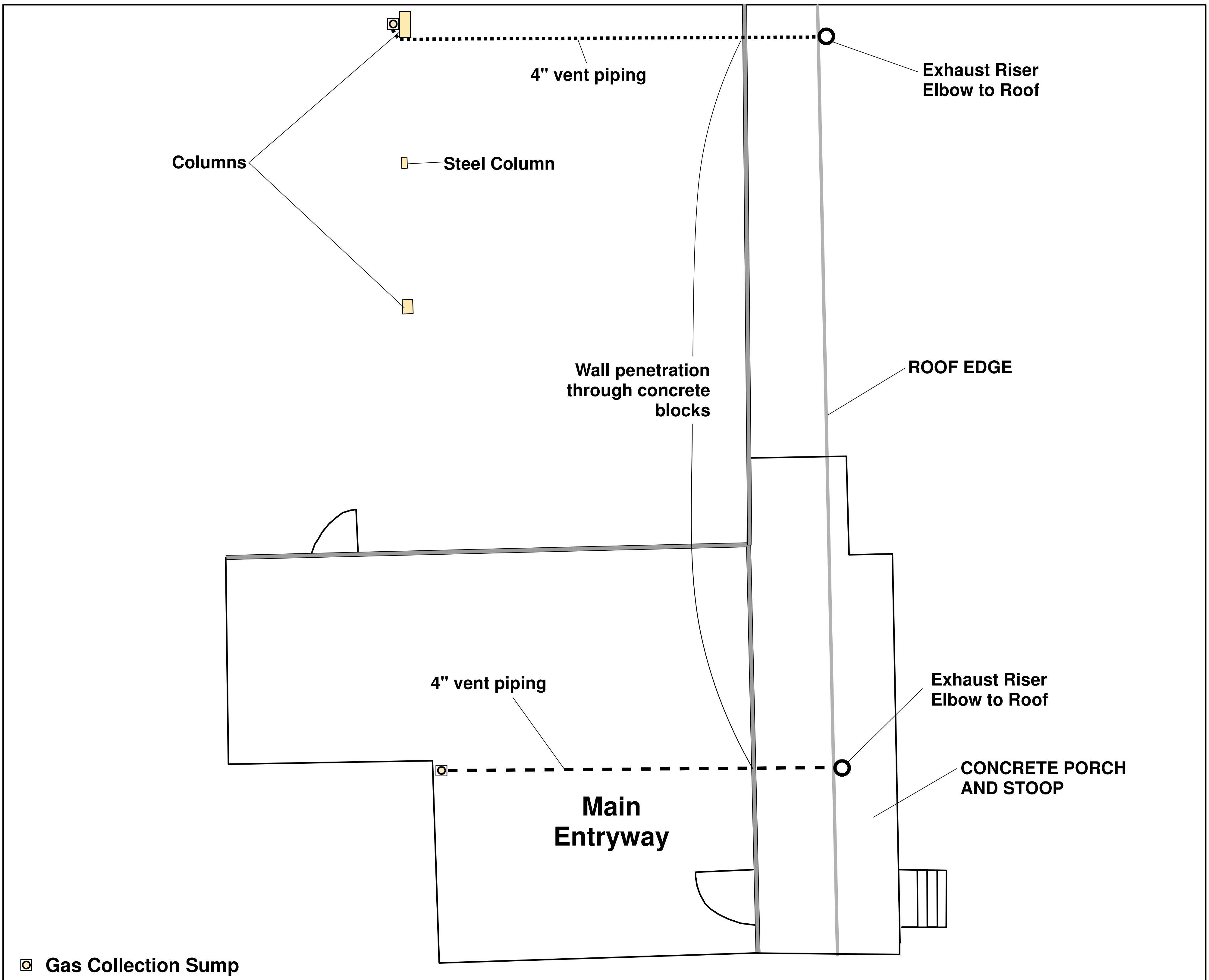
REVISION NO.	DRAWING	Gas Collection Sump Detail		BY: MT / CK: FIGURE # 4

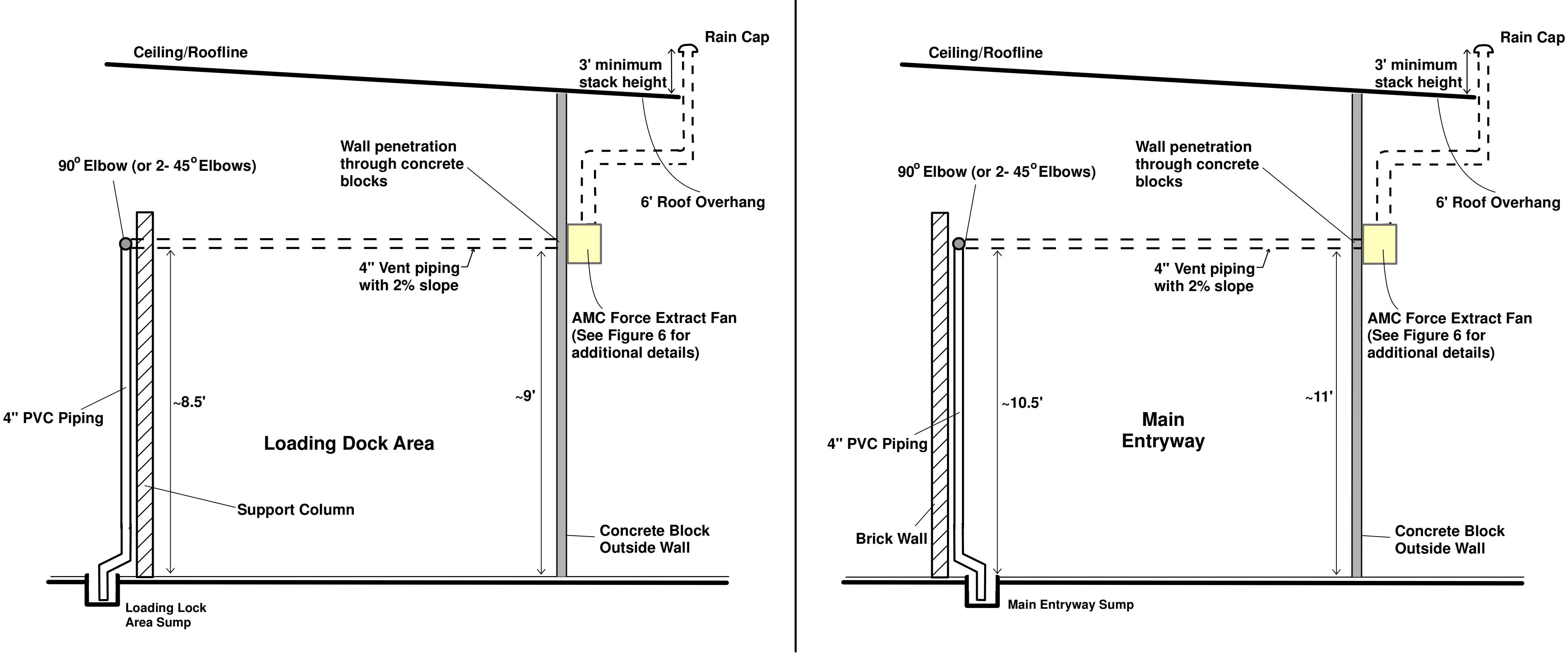
FIGURE 5
PIPING LAYOUT DIAGRAM



Gas Collection Sump

✱ Estimated location of piping shall be 8.5-11' above slab based on existing piping and ductwork

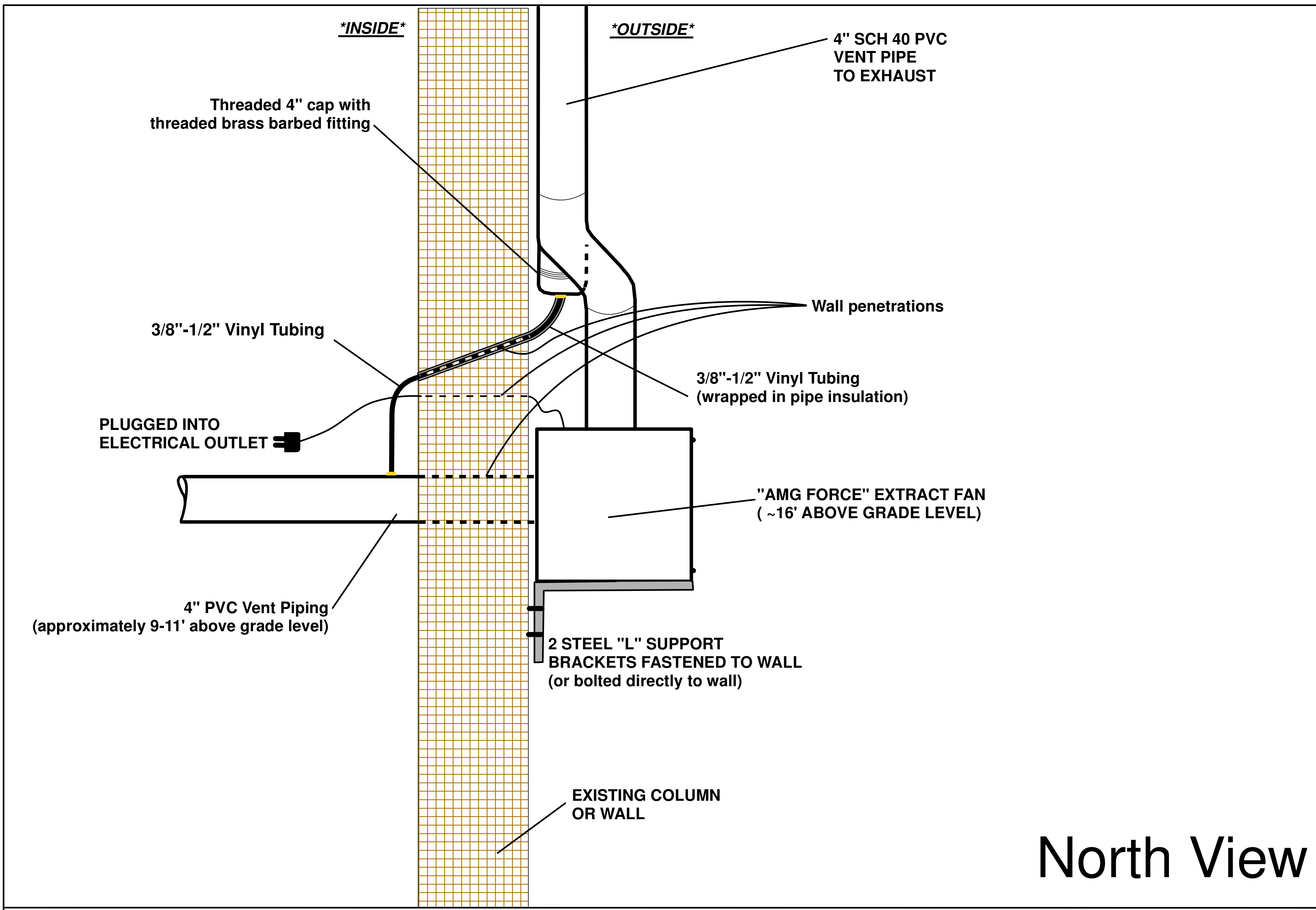
PLAN VIEW

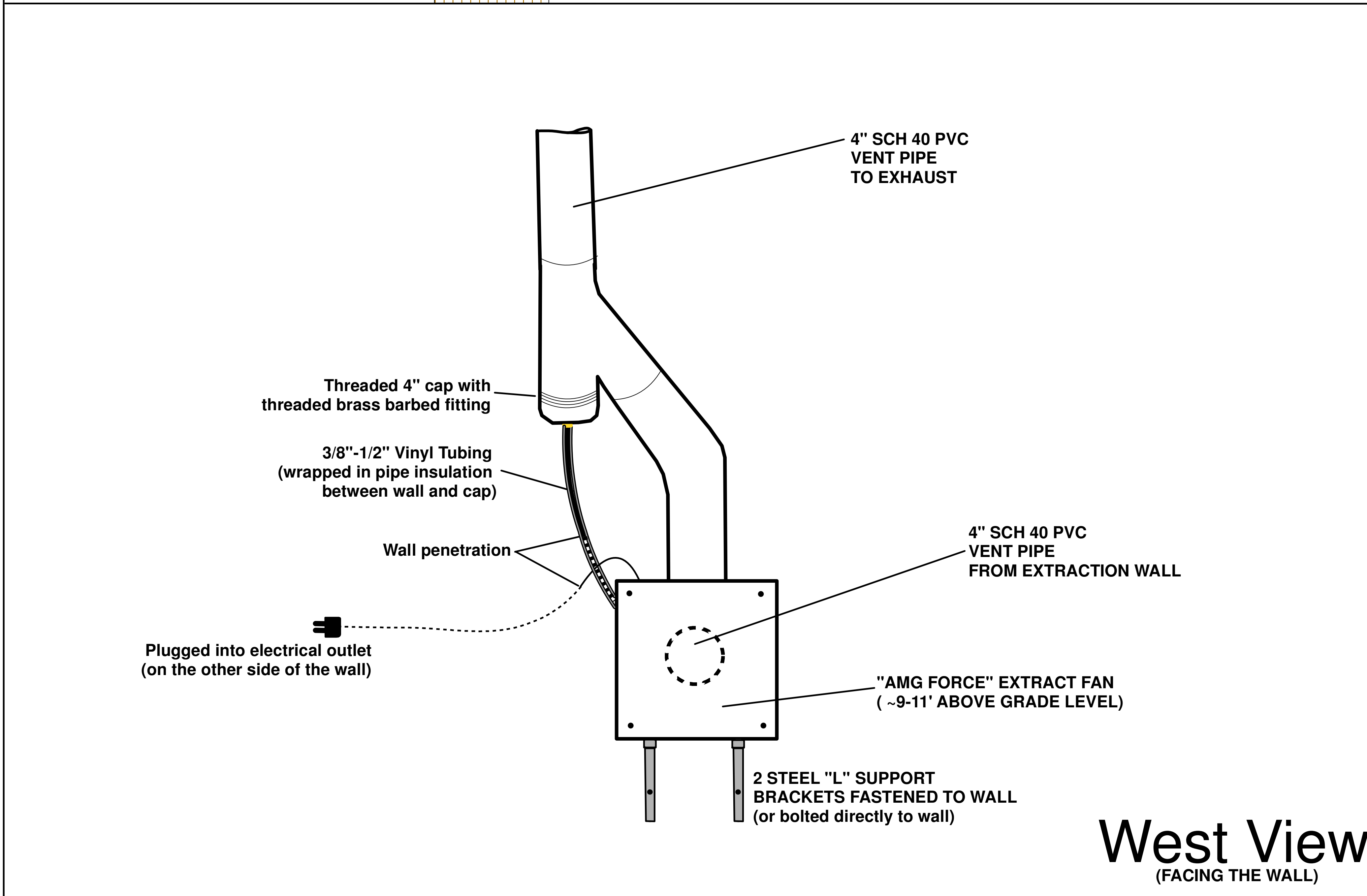


PROFILE VIEWS

DOCUMENT CONTROL NO.	PROJECT	LEICA MICROSYSTEMS INC. 203 EGGERT ROAD CHEEKTOWAGA, NY	ENERGYSOLUTIONS 100 Mill Plain Road Danbury, CT 06811 203-797-8301	PROJECT # 137015 FILENAME: SCALE: *NTS* / DATE: 3/22/12
REVISION NO.	DRAWING	Piping Layout Diagram		BY: MT / CK: FIGURE # 5

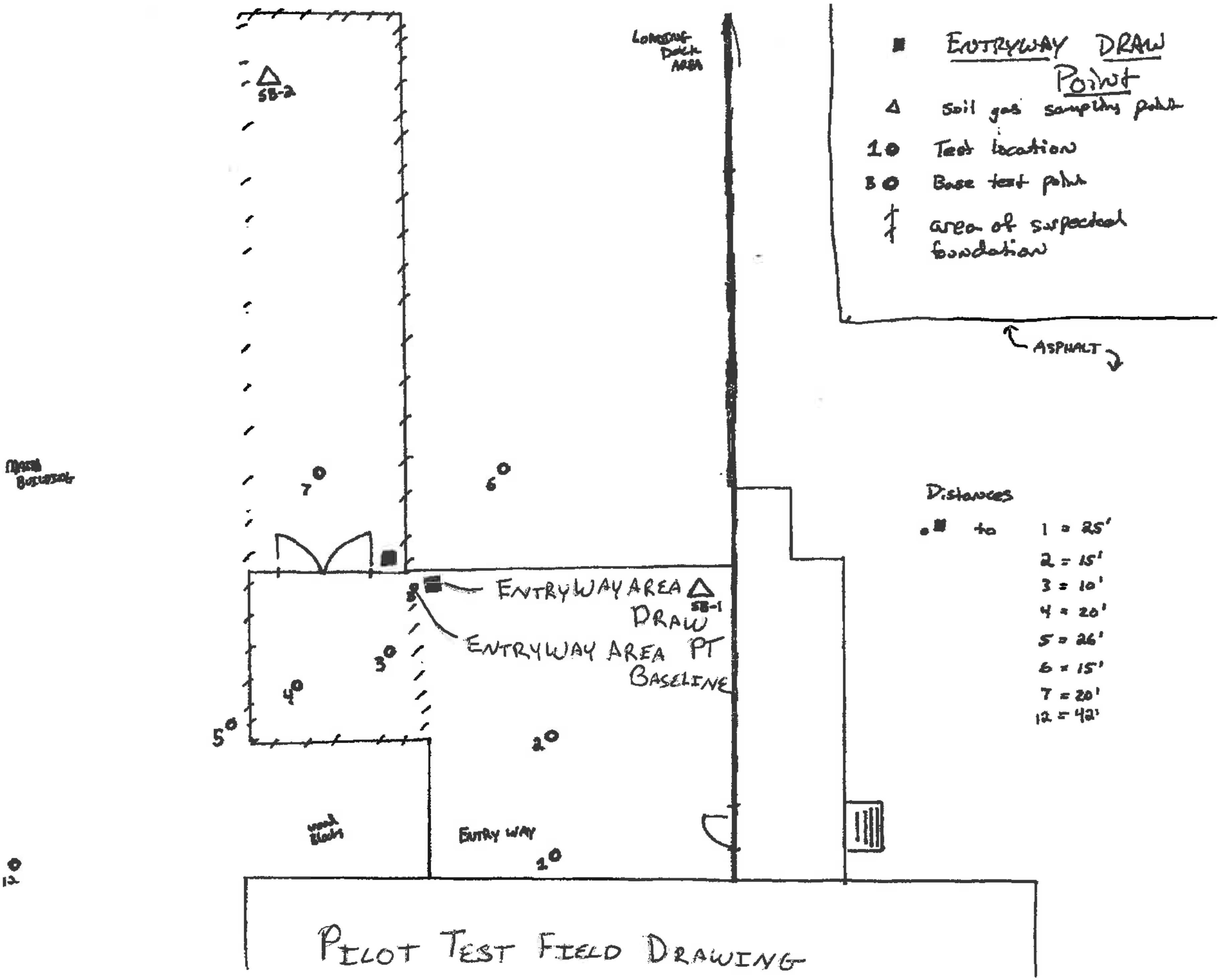
FIGURE 6
Y-FITTING (MOISTURE TRAP) DETAIL





DOCUMENT CONTROL NO.	PROJECT	LEICA MICROSYSTEMS INC. 203 EGGERT ROAD CHEEKTOWAGA, NY	ENERGYSOLUTIONS 100 Mill Plain Road Danbury, CT 06811 203-797-8301	PROJECT # 137015	
				FILENAME:	
				SCALE: *NTS*	DATE: 3/22/12
REVISION NO.	DRAWING	Y-Fitting (Moisture Trap) Detail		BY: MT	CK:
				FIGURE # 6	

APPENDIX A
PILOT STUDY DATA

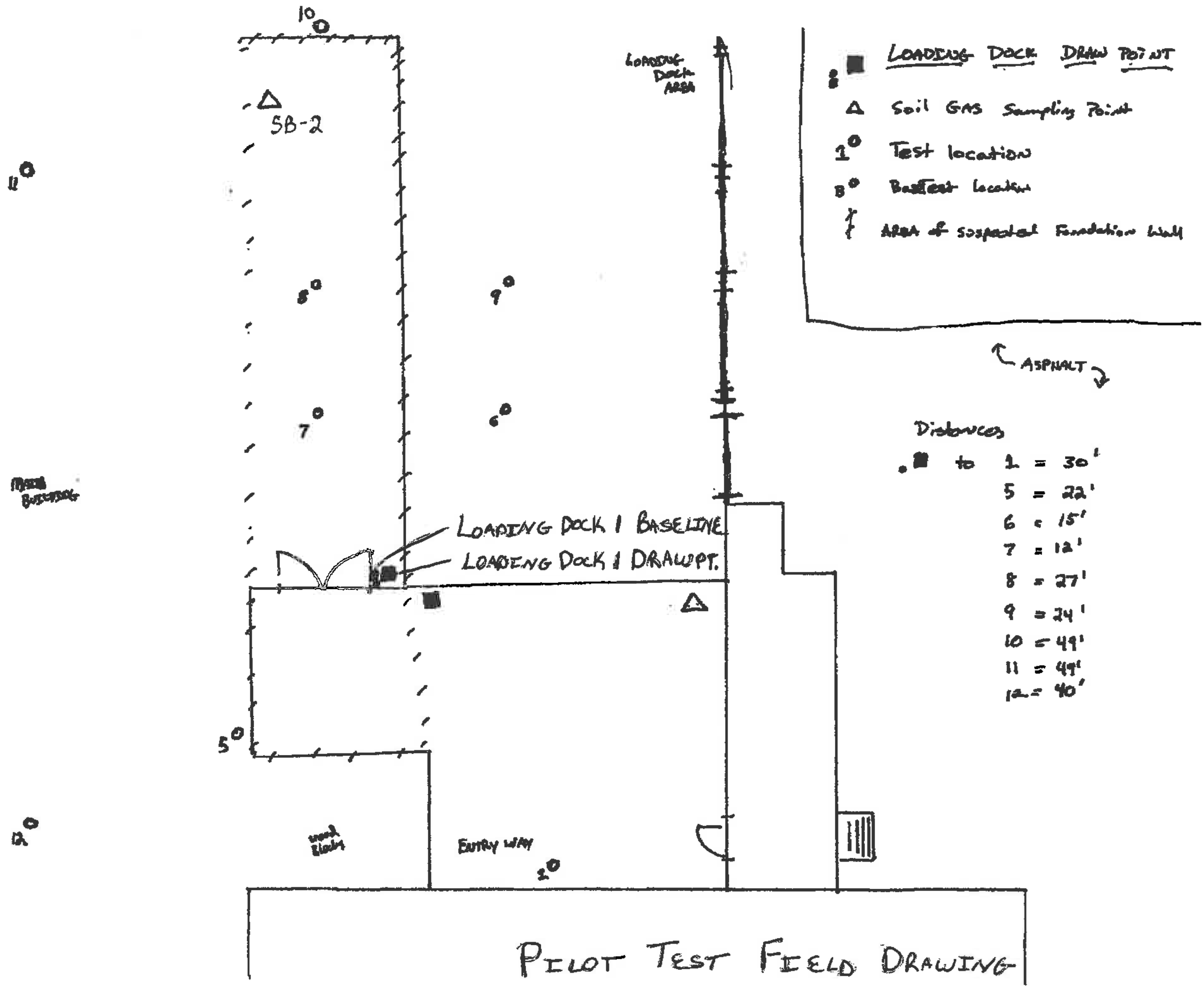

Loading Dock Area
Entryway Draw Point
Soil gas sampling point
1 Test location
B Base test point
area of suspected foundation
ASPHALT
SB-2
Main Building
Distances
■ to
1 = 25'
2 = 15'
3 = 10'
4 = 20'
5 = 26'
6 = 15'
7 = 20'
12 = 42'
Entryway Area Draw
SB-1
Entryway Area PT Baseline
wood block
Entry way
Pilot Test Field Drawing

ENTRYWAY AREA

test point location	~ CFM	distance from baseline	Baseline vaccum in piping above floor ("H2O)	Velocity (fps)	test point vaccum "H2O (beneath slab)	PID Readings @ hole after drilling	COMMENTS
ENTRYWAY AREA							
Entryway Baseline	82.4223	12"	2.25	6701	1.5	0ppm	Valve Open
3	82.4223	10'		6701	0.0015	0ppm	
2	82.4223	15'		6701	0.02	0ppm	
6	82.4223	15'		6701	0.006	6ppm	
4	82.4223	20'		6701	0.0018	0ppm	
7	82.4223	20'		6701	0.005	0ppm	
1	82.4223	25'		6701	0.002	0ppm	
5	82.4223	26'		6701	0.001	0ppm	
12	82.4223	42'		6701	0.001	0ppm	
Entryway Baseline	101.721	12"	4.5	8270	2	0ppm	
3	101.721	10'		8270	0.002	0ppm	
2	101.721	15'		8270	0.035	0ppm	
6	101.721	15'		8270	0.005	6ppm	
4	101.721	20'		8270	0.002	0ppm	
7	101.721	20'		8270	0.007	0ppm	
1	101.721	25'		8270	0.004	0ppm	
5	101.721	26'		8270	0.005	0ppm	
12	101.721	42'		8270	0.003		
Entryway Baseline	155.9886	12"	8.5	12682	3	0ppm	
3	155.9886	10'		12682	0.0037	0ppm	
2	155.9886	15'		12682	0.098	0ppm	
6	155.9886	15'		12682	0.007	6ppm	
4	155.9886	20'		12682	0.004	0ppm	
7	155.9886	20'		12682	0.01	0ppm	
1	155.9886	25'		12682	0.007	0ppm	
5	155.9886	26'		12682	0.009	0ppm	
12	155.9886	42'		12682	0.0045	0ppm	
Entryway Baseline	200.1579	12"	15	16273	3.5	0ppm	
3	200.1579	10'		16273	0.008	0ppm	
2	200.1579	15'		16273	0.17	0ppm	
6	200.1579	15'		16273	0.008	6ppm	
4	200.1579	20'		16273	0.011	0ppm	
7	200.1579	20'		16273	0.003	0ppm	
1	200.1579	25'		16273	0.009	0ppm	
5	200.1579	26'		16273	0.009	0ppm	
12	200.1579	42'		16273	0.003	0ppm	
Entryway Baseline	364.8426	12"	30+	29662	7	0ppm	Valve closed
3	364.8426	10'		29662	0.02	0ppm	
2	364.8426	15'		29662	0.42	0ppm	
6	364.8426	15'		29662	0.2	6ppm	
4	364.8426	20'		29662	0.001	0ppm	
7	364.8426	20'		29662	0.005	0ppm	Fluctuating rapidly
1	364.8426	25'		29662	0.02	0ppm	
5	364.8426	26'		29662	0.002	0ppm	
12	364.8426	42'		29662	0.001	0ppm	

1. Entryway baseline is a reading from a test point 12" away from the vacuum draw point
2. Baseline vacuum value is generated by taking vacuum readings directly from the vacuum manifold 2 feet above the floor.
3. Velocity readings and approximate CFM readings are generated from a flow meter inserted into the vacuum manifold 8in below the bleed valve on the vacuum.
4. Flow values are as close as reasonably achievable using the bleed valve on the manifold
5. CFM values are calculated by multiplying 0.0123 by the flow reading.

6. PID @ Entryway vacuum point without vacuum running was 0.0ppm



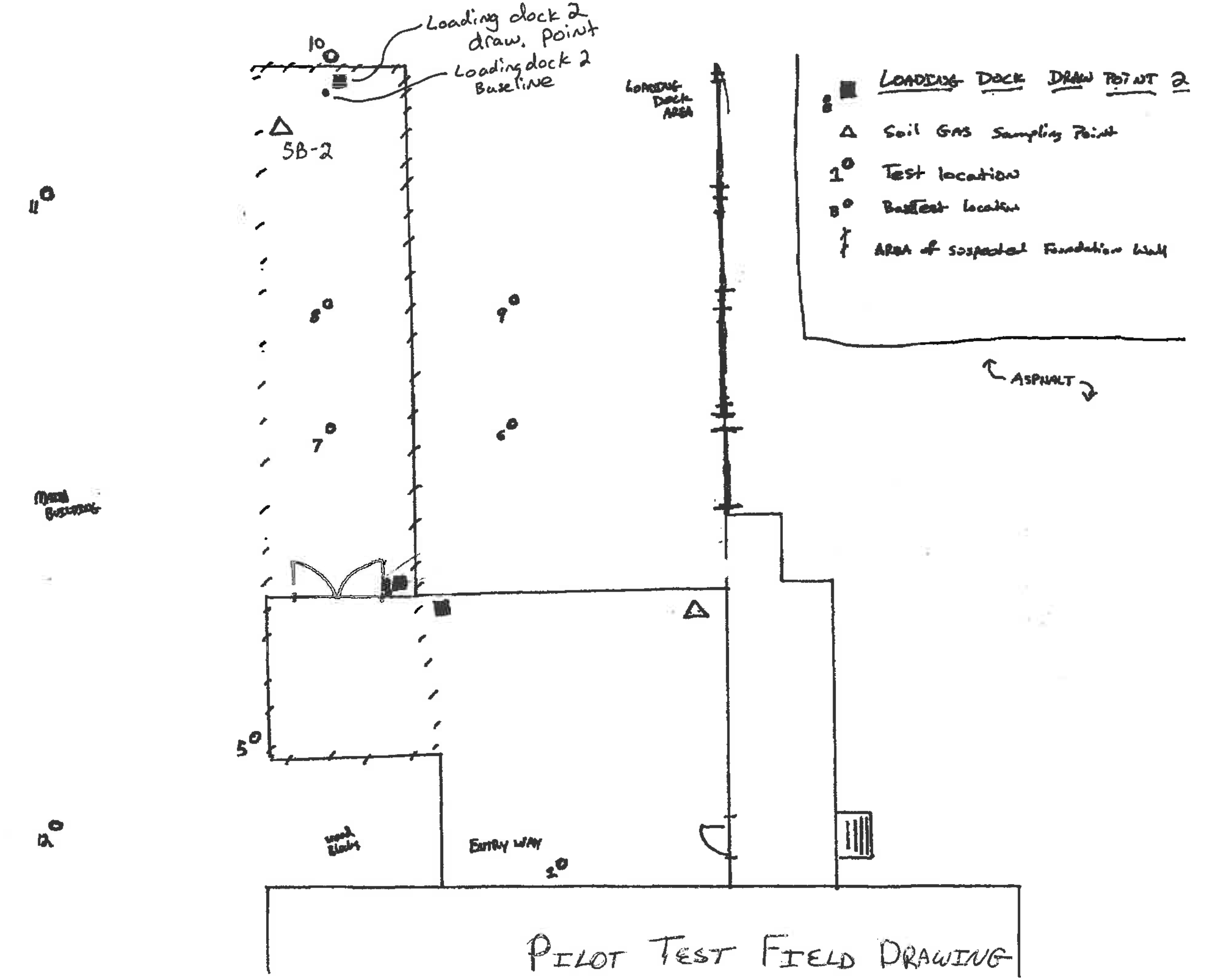
10
SB-2
11
8
9
7
6
5
12
2
ENTRY WAY
LOADING DOCK AREA
LOADING DOCK 1 BASELINE
LOADING DOCK 1 DRAWPT.
LOADING DOCK DRAW POINT
Soil Gas Sampling Point
1 Test location
Test location
AREA of suspected Foundation Wall
ASPHALT
Distances
■ to 1 = 30'
5 = 22'
6 = 15'
7 = 12'
8 = 27'
9 = 24'
10 = 49'
11 = 49'
12 = 40'
PILOT TEST FIELD DRAWING

LOADING DOCK AREA

test point location	~ CFM	distance from baseline	Baseline vaccum in piping above floor ("H2O)	Velocity (fps)	test point vaccum "H2O (beneath slab)	PID Readings @ hole after drilling	COMMENTS
LOADING DOCK AREA							
Loading Dock Baseline	72.7914	12"	2.25	5918	1	0ppm	Valve Open
7	72.7914	12'		5918	0.002	0ppm	
6	72.7914	15'		5918	0.003	6ppm	
5	72.7914	22'		5918	0.003	0ppm	
9	72.7914	24'		5918	0.0015	0ppm	
8	72.7914	27'		5918	0.01	0ppm	
1	72.7914	30'		5918	0.003	0ppm	
12	72.7914	40'		5918	0.001	0ppm	
10	72.7914	49'		5918	0.0025	9ppm	
11	72.7914	49'		5918	0.002	0ppm	
Loading Dock Baseline	101.0937	12"	4.5	8219	1.75	0ppm	
7	101.0937	12'		8219	0.012	0ppm	
6	101.0937	15'		8219	0.003	6ppm	
5	101.0937	22'		8219	0.002	0ppm	
9	101.0937	24'		8219	0.002	0ppm	
8	101.0937	27'		8219	0.015	0ppm	
1	101.0937	30'		8219	0.003	0ppm	
12	101.0937	40'		8219	0.004	0ppm	
10	101.0937	49'		8219	0.003	9ppm	
11	101.0937	49'		8219	0.004	0ppm	
Loading Dock Baseline	150.7734	12"	8.5	12258	2.75	0ppm	
7	150.7734	12'		12258	0.019	0ppm	
6	150.7734	15'		12258	0.004	6ppm	
5	150.7734	22'		12258	0.004	0ppm	
9	150.7734	24'		12258	0.005	0ppm	
8	150.7734	27'		12258	0.037	0ppm	
1	150.7734	30'		12258	0.0015	0ppm	
12	150.7734	40'		12258	0.004	0ppm	
10	150.7734	49'		12258	0.008	9ppm	
11	150.7734	49'		12258	0.002	0ppm	
Loading Dock Baseline	198.522	12"	15	16140	4.5	0ppm	
7	198.522	12'		16140	0.034	0ppm	
6	198.522	15'		16140	0.008	6ppm	
5	198.522	22'		16140	0.009	0ppm	
9	198.522	24'		16140	0.002	0ppm	
8	198.522	27'		16140	0.052	0ppm	
1	198.522	30'		16140	0.001	0ppm	
12	198.522	40'		16140	0.002	0ppm	
10	198.522	49'		16140	0.012	9ppm	
11	198.522	49'		16140	0.001	0ppm	
Loading Dock Baseline	285.3108	12"	30+	23196	7	0ppm	Valve closed
7	285.3108	12'		23196	0.066	0ppm	
6	285.3108	15'		23196	0.015	6ppm	
5	285.3108	22'		23196	0.01	0ppm	
8	285.3108	27'		23196	0.09	0ppm	
9	285.3108	29'		23196	0.002	0ppm	
1	285.3108	30'		23196	0.006	0ppm	
12	285.3108	40'		23196	0.001	0ppm	
10	285.3108	49'		23196	0.02	9ppm	
11	285.3108	49'		23196	0.005	0ppm	

1. Entryway baseline is a reading from a test point 12" away from the vacuum draw point
2. Baseline vacuum value is generated by taking vacuum readings directly from the vacuum manifold 2 feet above the floor.
3. Velocity readings and approximate CFM readings are generated from a flow meter inserted into the vacuum manifold 8in below the bleed valve on the vacuum.
4. Flow values are as close as reasonably achievable using the bleed valve on the manifold
5. CFM values are calculated by multiplying 0.0123 by the flow reading.

6. PID @ Entryway vacuum point without vacuum running was 0.0ppm



Loading dock 2 draw. point
Loading dock 2 Baseline
10
SB-2
11
8
9
7
6
Main Building
5
12
Wood Blocks
Entry Way
2
Loading Dock Area
Loading Dock Draw Point 2
Soil Gas Sampling Point
1 Test location
B Baseline Test location
Area of suspected Foundation Wall
Asphalt
Pilot Test Field Drawing

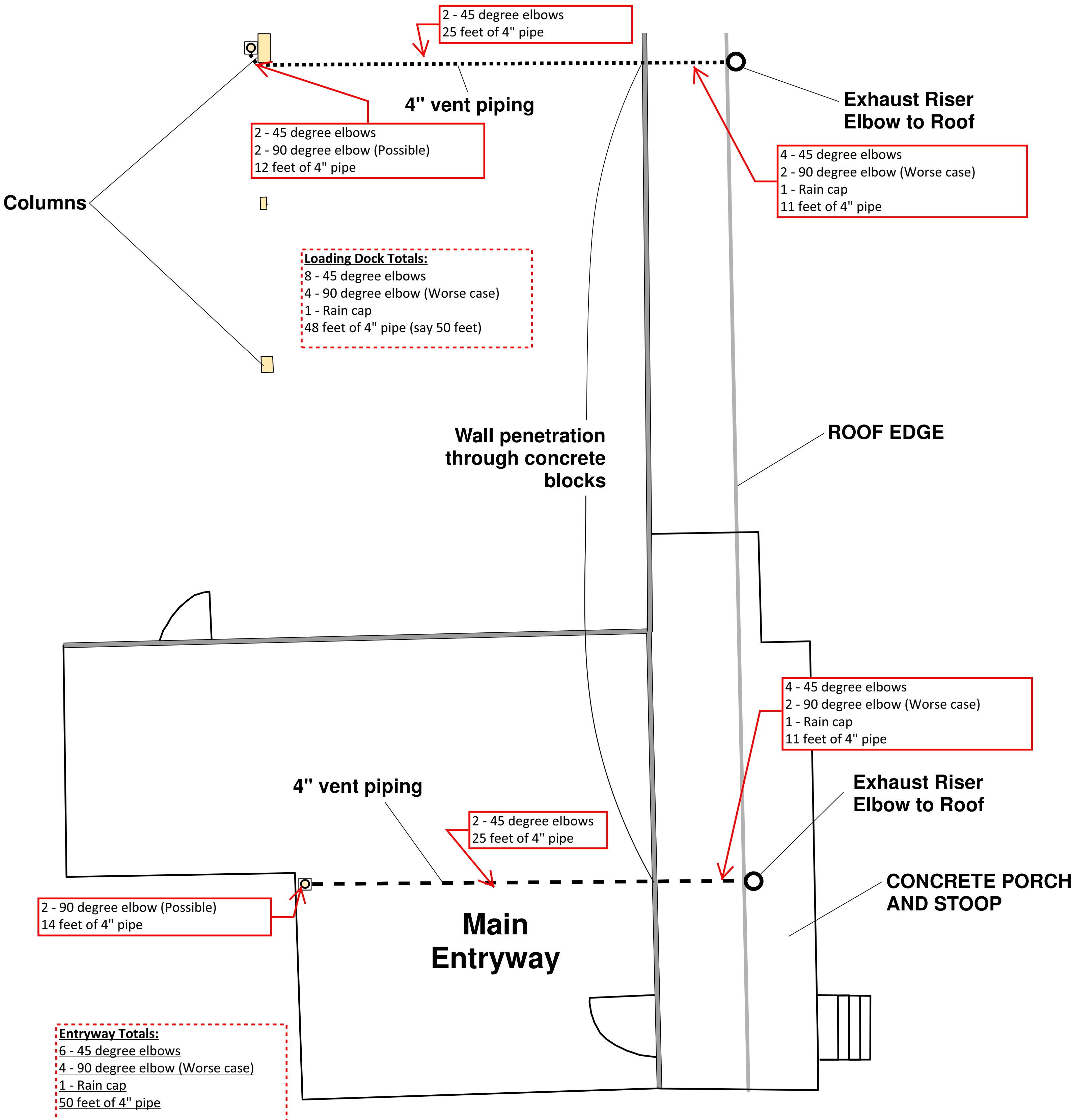
LOADING DOCK AREA 2

test point location	~ CFM	distance from baseline	Baseline vaccum in piping above floor ("H2O)	Velocity (fps)	test point vaccum "H2O (beneath slab)	PID Readings @ hole after drilling	COMMENTS
LOADING DOCK AREA 2							
Loading Dock Baseline						0ppm	Valve Open
10			2	na	0.07	0ppm	
11			2	na	0.001	0ppm	
9			2	na	0.005	0ppm	
8			2	na	0.002	0ppm	
7			2	na	0.009	0ppm	
6			2	na	0.001	0ppm	
Loading Dock Baseline						0ppm	
10			2.75	na	0.17	0ppm	
11				na	0.009	0ppm	
9				na	0.006	0ppm	
8				na	0.002	0ppm	
7				na	0.013	0ppm	
6				na	0.001	0ppm	
Loading Dock Baseline						0ppm	
10			3.5	na	0.57	0ppm	
11				na	0.011	0ppm	
9				na	0.013	0ppm	
8				na	0.004	0ppm	
7				na	0.04	0ppm	
6				na	0.001	0ppm	
Loading Dock Baseline						0ppm	
10			4.5	na	0.97	0ppm	
11				na	0.014	0ppm	
9				na	0.025	0ppm	
8				na	0.009	0ppm	
7				na	0.07	0ppm	
6				na	0.001	0ppm	
Loading Dock Baseline						0ppm	Valve closed
10			5	na	1.26	0ppm	
11				na	0.015	0ppm	
9				na	0.03	0ppm	
8				na	0.01	0ppm	
7				na	0.08	0ppm	
6				na	0.001	0ppm	

1. Entryway baseline is a reading from a test point 12" away from the vacuum draw point
2. Baseline vacuum value is generated by taking vacuum readings directly from the vacuum manifold 2 feet above the floor.
3. Velocity readings and approximate CFM readings are generated from a flow meter inserted into the vacuum manifold 8in below the bleed valve on the vacuum.
4. Flow values are as close as reasonably achievable using the bleed valve on the manifold
5. CFM values are calculated by multiplying 0.0123 by the flow reading.

6. PID @ Entryway vacuum point without vacuum running was 0.0ppm

APPENDIX B
AIR FLOW VERSUS VACUUM TABLES AND CHARTS


2 - 45 degree elbows
25 feet of 4" pipe
4" vent piping
Exhaust Riser
Elbow to Roof
2 - 45 degree elbows
2 - 90 degree elbow (Possible)
12 feet of 4" pipe
4 - 45 degree elbows
2 - 90 degree elbow (Worse case)
1 - Rain cap
11 feet of 4" pipe
Columns
Loading Dock Totals:
8 - 45 degree elbows
4 - 90 degree elbow (Worse case)
1 - Rain cap
48 feet of 4" pipe (say 50 feet)
Wall penetration
through concrete
blocks
ROOF EDGE
4 - 45 degree elbows
2 - 90 degree elbow (Worse case)
1 - Rain cap
11 feet of 4" pipe
Exhaust Riser
Elbow to Roof
4" vent piping
2 - 45 degree elbows
25 feet of 4" pipe
CONCRETE PORCH
AND STOOP
2 - 90 degree elbow (Possible)
14 feet of 4" pipe
Main
Entryway
Entryway Totals:
6 - 45 degree elbows
4 - 90 degree elbow (Worse case)
1 - Rain cap
50 feet of 4" pipe

PLAN VIEW

Pressure Drop from System Piping

Soil depressurization is induced by airflow out of the soil. Airflow is created by a fan which is working against the resistance to airflow of both the sub-slab material and the piping. In many cases the piping and fittings are the greater resistance. Total system resistance is the airflow resistance of the pipe and all of the elbows. The resistance to airflow in each elbow is typically determined in equivalent straight feet of piping. In other words a sweep 90 degree elbow might have the same resistance to airflow as six feet of straight pipe. If you know the typical equivalent straight pipe footage of each elbow you can add up each type of fitting in a system and multiple the quantity by the equivalent footage for that fitting and add that footage to the straight footage of piping. The approximate equivalent footage of different size fittings is given in first Table below. This gives the total equivalent straight footage of pipe for a system. If the system has only one suction hole the resistance of all the piping and fittings can be determined by the graphs below. The pressure drop is displayed in the graphs below for 100 equivalent feet of piping. The total equivalent footage (straight pipe footage and all of the equivalent footage of fittings) is divided by 100 and then multiplied by the pressure drop of the piping size and airflow rates of the graph below.

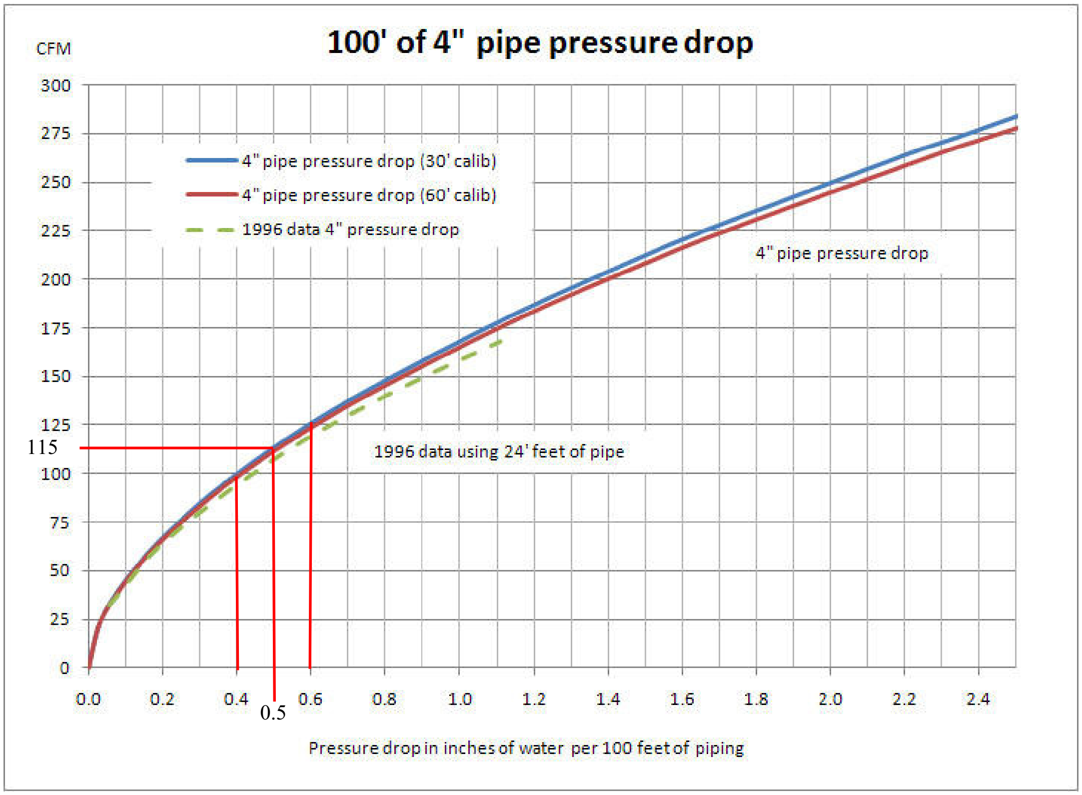
Note:

1) You need to know the speed of the airflow (CFM) to make this calculation.
2) Pressure drop increases with airflow
3) Pressure drop decreases if pipe size increases but airflow stays the same
4) As pipe size increases the equivalent footage of pipe fittings increases
5) Elbows with hard edge turns have more than double the pressure drop of sweep turns.

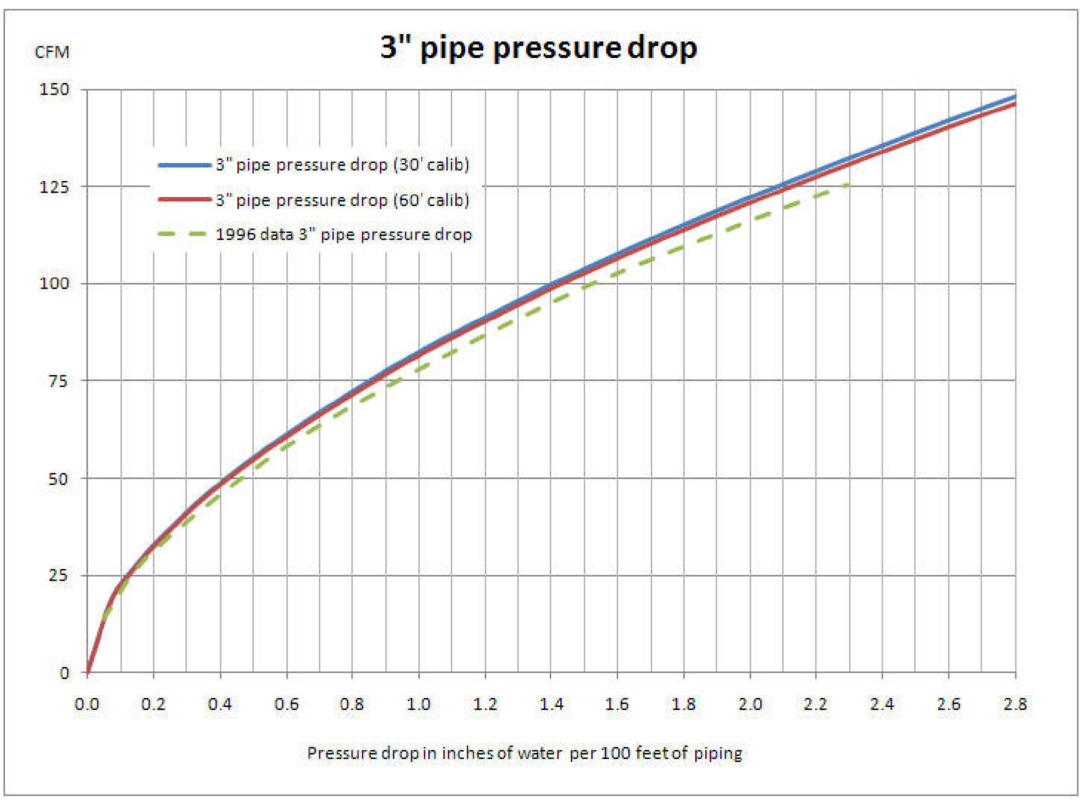
Every PVC fitting has an airflow resistance that is approximately equal to the footage given in the table below. For example each 4" 90 degree sweep elbow adds the equivalent of 6 feet of straight pipe resistance while a 4" 90 degree sharp edged elbow adds 15 feet of equivalent straight pipe resistance

Pipe Size	90° Sweep	90° Sharp	45 Sweep	45° Sharp	Reducer	Open End
3"	3'	11'	2'	5'	19'	17'
4"	6'	15'	3'	6'	30'	20'
6"	15'	20'	8'		85'	42'

Pressure Drop Table for 100 feet of 1.5" to 6" piping at different airflows



Pressure Drop Table for 100 feet of 3" piping at different airflows



Loading dock area to "Exit"	qty	factor (4" pipe)	feet added	[actual]
90 degree	4	15	60	
45 degree	8	6	48	
open end (Rain Cap)	1	20	20	
Length of run	50		50	65
Total Equivalent Piping			**178**	

Total piping lenth 4" =	178	feet	Headloss (" H2O)
0.4	" H2O pressure drop per 100ft @100 CFM		0.712
0.5	" H2O pressure drop per 100ft @115 CFM		0.89
0.6	" H2O pressure drop per 100ft @125 CFM		1.068

Entryway area to Exit (4")	qty	factor (4" pipe)	feet added	
90 degree	4	15	60	
45 degree	6	6	36	
open end (Rain Cap)	1	20	20	
Length of run	50		50	41
Total Equivalent Piping			**166**	

Total piping lenth 4" =	166	feet	Headloss (" H2O)
0.4	" H2O pressure drop per 100ft @ 100 CFM		0.664
0.5	" H2O pressure drop per 100ft @115 CFM		0.83
0.6	" H2O pressure drop per 100ft @125 CFM		0.996

	CFM		
	100	115	125
Total head loss (" water) from Loading Dock	0.712	0.89	1.068
Total head loss (" water) from Entryway	0.664	0.83	0.996

Pilot Study Summary Data		
Operating System Vacuum	Loading Dock	Entryway Area
(inches WC)	(CFM)	(CFM)
1	73	70
1.5		82
1.75	101	
2		102
2.5		
2.75	151	
3		156
3.5		200
4		
4.5	199	
7	285	365

AMG Extract Fan Operating Curve Data		
Operating System Vacuum	AMG Force Extraction Fan	
(inches WC)	(CFM)	
1	207	
1.5	191	
1.75	182.5	
2	174	
2.5	155	
2.75	144	
3	133	
3.2	~123	From Chart
3.3	~118	From Chart
3.5	110	
4	83	

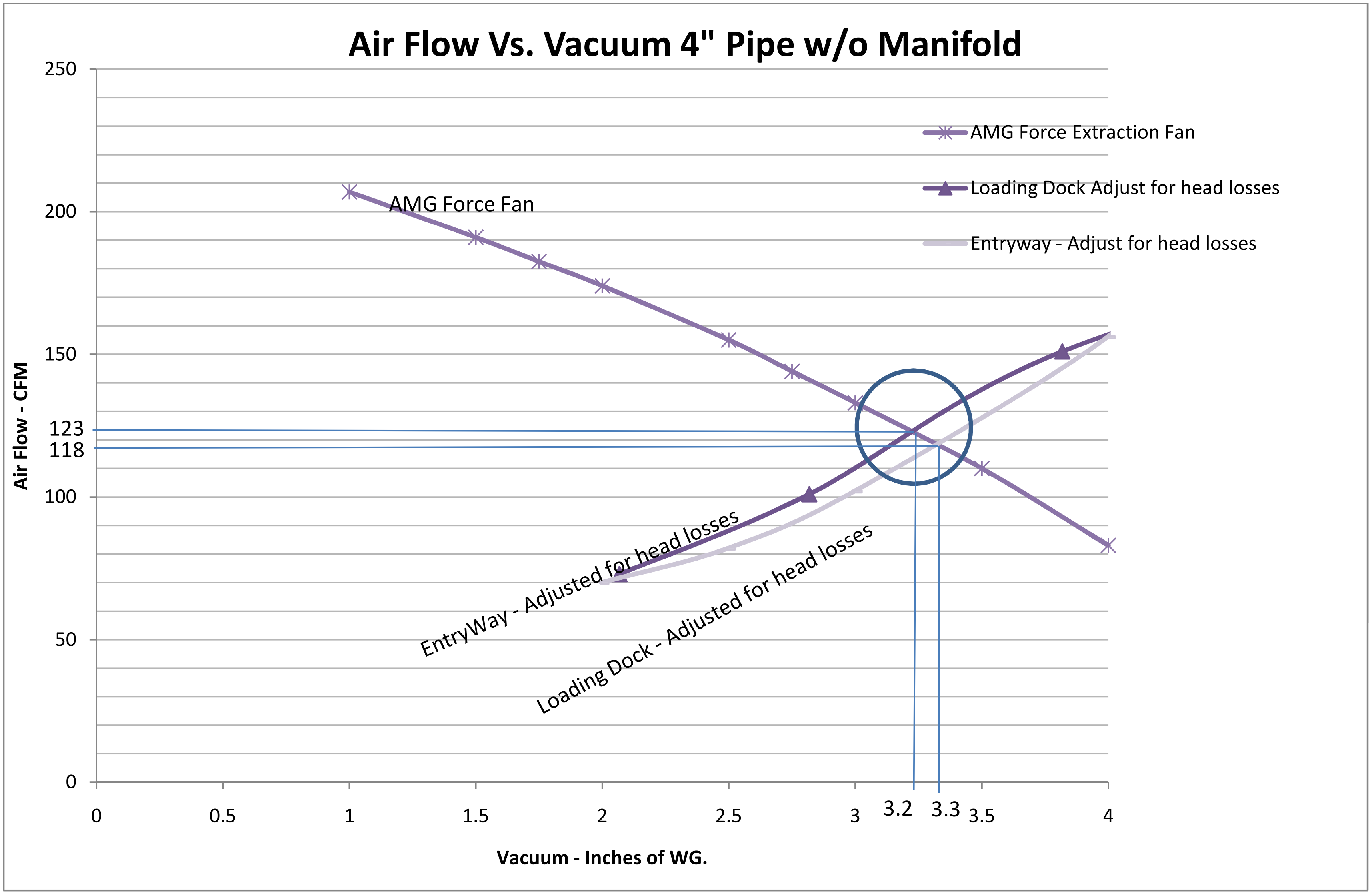
Calculated Head loss assuming 125 CFM Air Flow through 4" Pipe		
Total head loss (" water) from Loading Dock	1.068	(See calculation page)
Total head loss (" water) from Entryway	0.996	(See calculation page)

Operating System Vacuum including Calculated Head Losses

Operating System Vacuum	Loading Dock Area		Entryway Area	
	Adjusted Operating System Vacuum*	Air Flow	Adjusted Operating System Vacuum*	Air Flow
(inches WC)	(inches WC)	(CFM)	(inches WC)	(CFM)
1	2.068	73	1.996	70
1.5	2.568		2.496	82
1.75	2.818	101	2.746	
2	3.068		2.996	102
From Chart	3.3	~118	3.2	~123
2.5	3.568		3.496	
2.75	3.818	151	3.746	
3	4.068		3.996	156
3.5	4.568		4.496	200
4	5.068		4.996	
4.5	5.568	199	5.496	
7	8.068	285	7.996	365

* - Adjusted Operating System Vacuum = the Operating System Vacuum plus its calculated head loss

Assumed Flow Rate - 125 vs. Calculated Flow Rate of 123 & 118; hence no assumed flow adjustment and recalculation is required



Air Flow Vs. Vacuum 4" Pipe w/o Manifold
AMG Force Extraction Fan
Loading Dock Adjust for head losses
Entryway - Adjust for head losses
AMG Force Fan
EntryWay - Adjusted for head losses
Loading Dock - Adjusted for head losses
Air Flow - CFM
250
200
150
123
118
100
50
0
0
0.5
1
1.5
2
2.5
3
3.2
3.3
3.5
4
Vacuum - Inches of WG.

APPENDIX C
CUT SHEETS FOR THE
EXTRACTION FAN AND OTHER APPURTENANCES

Festa Manufacturing Enterprises, LLC.

Festa International Radon Supply Technologies, Co.

Bringing Honesty, Integrity and Ethics to America's Radon Industry

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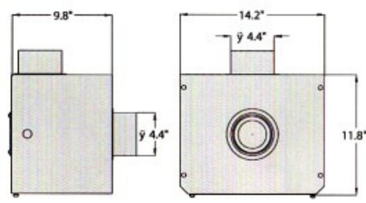
AMG Force



AMG Force, Radon Extract Fan Performance Figures

				CFM at STATIC PRESSURE in. w.g.											
Model	*Volts*	*Watts*	*Max. Amps*	*0"*	*0.5"*	*1.0"*	*1.5"*	*2.0"*	*2.5"*	*3.0"*	*3.5"*	*4.0"*	*4.5"*	*5"*	*5.512*
AMG Force	120V 60Hz	302	2.48	240	223	207	191	174	155	133	110	83	55	28	0
Weight: 30.6lbs Fan Speed: 3100 rpm															

Performance shown is for installation type D - Ducted inlet, Ducted outlet. Speed (rpm) shown is nominal. Performance is based on actual speed of test. Performance ratings do not include the effects of appurtenances in the airstream. The performance figures shown have been corrected to standard air density.

Festa Fans Photo Gallery

Print Order Form ... (Call one of the numbers below for current pricing.)

47A Progress Avenue, Cranberry Twp., PA 16066 1 (800) 806-7866 1 (877) 264-3267

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1 (800) 806-7866 1 (877) 264-3267
47A Progress Avenue, Cranberry Twp., PA 16066


This is a component of a
Subslab Ventilation System
DO NOT ALTER OR DISCONNECT
Subslab Ve
Syste
For Service:
Contact
Date Installed:
2
1
0
1

ANVIL Clevis Hanger, Adjustable, Pipe Sz 4 In

Clevis Hanger, Light Duty, Adjustable, Pipe Size 4 In, Rod Size 3/8 In, Max Load 400 Lb, Material of Construction Galvanized Steel, Length 7 25/32 In, For Suspension Of Stationary Pipe Or Conduit, Standards WW-H-171E (Type 12)

Grainger Item #	4HXV6
Price (ea.)	**$5.36**
Brand	ANVIL
Mfr. Model #	0560299943

Item	Clevis Hanger
Type	Light Duty, Adjustable
Pipe Size (In.)	4
Rod Size	3/8"
Max. Load (Lb.)	400
Material of Construction	Galvanized Steel
Length (In.)	7-25/32
Description/Special Features	For Suspension Of Stationary Pipe Or Conduit
Standards	WW-H-171E (Type 12)
Package Quantity	1

GRAINGER
FOR THE ONES WHO GET IT DONE

CADDY Swivel Loop Hanger, Size 4 In

Plumbing > Pipe and Tubing > Pipe Hangers and Clamps

Loop Hanger, Swivel, Adjustable Band, Pipe Size 4 In, Rod Size 3/8 In, Max Load 650 Lb, Material of Construction Electro-Galvanized Steel, Length 7 9/16 In, Width 1 In, Recommended For Suspension Of Stationary Non Insulated Pipe Lines, Standards UL And cUL Listed, FM Approved, Federal Specification WW-H-171 (Type 10), Manufacturers Standardization Society (MSS) SP-58 And SP-69 (Type 10)

Grainger Item #	1RUX9
Brand	CADDY
Mfr. Model #	1150400EG
Ship Qty.	1
Sell Qty. (Will-Call)	1
Ship Weight (lbs.)	0.4

Tech Specs | Additional Information | Compliance & Restrictions | MSDS | Required Accessories | Optional Accessories | Alternate Products | Repair Parts

Item	Loop Hanger
Type	Swivel, Adjustable Band
Pipe Size (In.)	4
Rod Size	3/8"
Max. Load (Lb.)	650
Material of Construction	Electro-Galvanized Steel
Length (In.)	7-9/16
Width (In.)	1
Description/Special Features	Recommended For Suspension Of Stationary Non Insulated Pipe Lines
Standards	UL And cUL Listed, FM Approved, Federal Specification WW-H-171 (Type 10), Manufacturers StAndardization Society (MSS) SP-58 And SP-69 (Type 10)
Package Quantity	1

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SEARCH

ROOF RAIN CAP (4 INCH) (GCT 4)

Roof Rain Cap (4 Inch) (GCT 4)

SKU: **GCT 4**

March 26, 2012
Ref. No. 31129-100

Mr. William Plarr
SamSon Distribution
203 Eggert Road
Buffalo, NY 14215

Subject: Sub-Slab Depressurization System Installation at SamSon Facility

Dear Bill,

We have reviewed the letter concerning the Sub-Slab Depressurization System installation at the SamSon facility prepared by Mr. D. Rolf Hill of Hill Consulting. Mr. Hill posed a number of questions in this letter. As per your request in your email dated February 7, 2012, we have reviewed Mr. Hill's letter and his comments and questions. We are providing our responses as follows:

In response to the request concerning additional sampling data: **"Please provide this data. Referring to the 2008 and 2010 air sampling data not included in this plan."** Please see the attached Air Sampling Data Table.

In response to the question concerning sampling methods: **"Were the samples collected in December 2006, 2008, and 2010 "grab samples " or were they "time weighted average" (TWA) samples?",** Samples collected in 2006, 2008 and 2010 for use in comparison to the NYSDOH guidance levels were all "Time Weighted Average" samples. All of these samples were collected over a 24 hour period.

In response to the question concerning inspection of the facility floors: **"Has the concrete floor been inspected for exposure pathways from the 380,000 ug/m^3 samples collected beneath the slab to the worker breathing space?",** Energy*Solutions* has inspected the areas around each sampling point for the presence of cracks and other potential exposure pathways. The surface of the working floor is cracked and or fractured in several of the sampling areas, and these conditions were considered when preparing the mitigation approach. It is not clear though if these cracks are present throughout the entire slab thickness. Based on available groundwater, soil, sub-slab and indoor air data, we believe that the proposed system will alleviate the sub-slab concentrations relatively quickly and therefore believe that the value added by sealing of potential exposure routes would be limited.

In response to the question regarding floor sealing: **"Has Energy*Solutions* considered a floor sealant to 1) limit exposure to employees and 2) ensure that Energy*Solutions* are not extracting the air that Sam-Son has already paid to cool or heat?"**, Energy*Solutions* has considered the use of a floor sealant. We concluded that the floor sealant would not be necessary based on indoor air sampling data and the expectation that the SSDS will be successful in a relatively short period of time. We felt that mitigation measures which eliminate the source are preferred over measures which merely interrupt the migration path. However, if for some unforeseen reason the elimination of the source does not provide satisfactory results, we will reassess the situation and consider alternate or supplemental mitigation approaches which may include some type of sealing measures. Moreover, we believe that the limited value added by sealing would not outweigh the inconvenience to facility operations that would be realized if sealers were used in heavy traffic areas. Weight bearing floor sealant needed due to the high fork lift traffic in these areas would require an extended curing time, and we felt it would not be practical to have these areas inaccessible for extended periods of time.

"2)" The mitigation system will be installed in the loading dock area. Loading dock doors are opened constantly during the day providing a high percentage of fresh outdoor air to the area at all times. For this reason, we did not view the draw from the SSD system to be a significant influence on the heating of this area in the winter, and the facility does not utilize air conditioning equipment in the summer.

In response to the question concerning the air movement during the pilot test: **"Please explain what method was used to identify "air movement beneath the slab"**, the method used to determine air movement in the sub-slab annulus is described in section 2.0 of the Sub-Slab Depressurization System Installation Work Plan, which has been approved by NYSDOH. In summary, a draw point hole was cored through the floor slab, and then a hose was installed through the hole into the sub-slab. The sub-slab was then put under vacuum by attaching the hose to an industrial shop vacuum. Then, several points radiating out from the draw point were tested for pressure differential to determine the presence and quantity of vacuum at varying distances and directions from the draw point. These pressure differential readings and the accompanying test point location maps, are also included in the Installation Work Plan as part of the pilot test tables. This approach follows the methods described in the EPA Document "Radon Reduction Techniques for Existing Detached Houses" "Section 3.5.1 Sub-Slab Flows", which includes both the "Simple sub-slab flow measurement" (presence or absence) method, and the "More extensive sub-slab flow measurements" (observing flow and recording pressure readings at each test point) method.

In response to questions concerning criteria used to confirm system influence: **"why pressure differentials were used to determine the influence in one location and "air movement" was used in another."** The preferred objective of the pilot testing was to demonstrate a minimum vacuum over the central area of the contaminated zone, which was believed to be within the loading dock area and the main entryway room, at distances of approximately 20 to 30 feet from the extraction points. A secondary objective of the test was to determine if we could generate some capture of vapors at greater distances (i.e. greater than 20 or 30 feet) from the draw point where the sub-slab contaminant concentrations are lower. This secondary objective was demonstrated during the pilot tests with vacuums observed at 40 to 50 feet from the draw point, albeit less than the preferred minimum, but high enough to demonstrate some pressure loss and consequently evidence of air flow.

In response to the recommendations for a specific monitoring schedule and documentation of inspections, attached to this letter is a "Sub-Slab Depressurization System Inspection Form". During each periodic inspection, the inspector will record the times and dates of the inspection and provide any other information regarding the system's function and condition.

In response to the concerns regarding the electrical costs, this has been discussed with Sam-Son. Leica has agreed to install a meter in the facility and will be responsible for reimbursement of the electrical usage recorded on this meter. Energy*Solutions* has also planned the installation of warning lights to visually confirm that the SSDS fans are receiving power, as well as a warning light that would indicate loss of vacuum in the system piping. These warning lights would also be wired into the new Leica meter.

We anticipate that these responses will answer Mr. Hill's questions. Please feel free to call me at 801.303.1092 if you need any additional information. We look forward to receiving your authorization to move ahead with the system installation.

Sincerely,

Robert E. McPeak

Robert E. McPeak, Jr., P.E., LEP
Project Manager, Environmental Services

REM:pm
Enclosures
cc: C.Grabinski
J. Egan
B.Washington

Prepared by:PWM
Date: 4/29/10
Checked by: REM
Date:

Summary of Sub-Slab and Indoor Air Samples
Leica Microsystems, Eggert Road
Cheektowaga, NY

Sample location	Matrix 1 Indoor Air	Matrix 1 Sub Slab Vapor	Matrix 2 Indoor Air	Matrix 2 Sub Slab Vapor	SS3	SB-1		SB-1		SB-1		AA3C		IA-1		IA-1		IA-1	
Sample Area:					ENTRYWAY SUB SLAB							ENTRYWAY AMBIENT AIR							
						1106315		1162643						1106317		1162645			
Sample Collection Date:					12/20/2006	6/12/2008		12/12/2008		3/23/2010		12/20/2006		6/12/2008		12/12/2008		3/23/2010	
Analytical Dilution:					3,143	10,000		781		1		2		1		1.41		1	
Volatile Organic Compounds (mcg/m3)																			
acetone	---	---	---	---	ND	19000	U	1000	U	23000	U	83		24		6.60		9.30	
benzene	---	---	---	---	ND	5200	U	270	U	78	J	3.3		0.72		2.20		0.85	
bromodichloromethane	---	---	---	---	ND	2200	U	120	U	680	U	ND		0.22	U	0.21	U	0.23	U
bromoform	---	---	---	---	ND	17000	U	890	U	5200	U	ND		1.70	U	1.60	U	1.80	U
bromomethane	---	---	---	---	ND	6400	U	330	U	1900	U	ND		0.65	U	0.60	U	0.060	J
2-butanone (MEK)	---	---	---	---	ND	9700	U	510	U	62	J	26		6.30		1.80		1.00	
methyl-tert-butyl ether	---	---	---	---	ND	12000	U	620	U	3600	U	ND		1.20	U	1.10	U	1.20	U
carbon disulfide	---	---	---	---	ND	5100	U	270	U	1500	U	ND		0.52	U	0.48	U	0.029	BJ
carbon tetrachloride	0.25	5	---	---	ND	2100	U	110	U	320	U	0.50		0.61		0.64		0.57	
chlorobenzene	---	---	---	---	ND	7500	U	400	U	2300	U	ND		0.77	U	0.71	U	0.79	U
chloroethane	---	---	---	---	ND	8600	U	450	U	2600	U	ND		0.88	U	0.82	U	0.89	U
chloroform	---	---	---	---	ND	8000	U	420	U	180	J	ND		0.82	U	0.76	U	0.10	J
chloromethane	---	---	---	---	ND	6800	U	350	U	2000	U	ND		1.20		0.95		1.20	
dibromochloromethane	---	---	---	---	ND	2800	U	150	U	860	U	ND		0.28	U	0.26	U	0.29	U
1,2 dibromomethane	---	---	---	---	ND	2500	U	130	U	770	U	ND		0.26	U	0.24	U	0.26	U
1,3 dichlorobenzene	---	---	---	---	ND	20000	U	1000	U	6000	U	ND		2.00	U	1.90	U	2.00	U
1,4 dichlorobenzene	---	---	---	---	ND	20000	U	1000	U	6000	U	ND		2.00	U	1.90	U	0.047	BJ
1,2 dichlorobenzene	---	---	---	---	ND	20000	U	1000	U	6000	U	ND		2.00	U	1.90	U	2.00	U
1,1-dichloroethane	---	---	3	100	22000	67000	D	3800	D	25000		2		3.20		0.87		2.10	
1,2-dichloroethane	---	---	---	---	ND	6600	U	350	U	2000	U	ND		0.68	U	0.63	U	0.11	J
1,1-dichloroethene	---	---	---	---	3300	6500	U	340	U	2000		ND		0.66	U	0.61	U	0.20	J
trans-1,2-dichloroethene	---	---	---	---	2800	6500	U	340	U	1300	J	ND		0.66	U	0.61	U	0.19	J
cis-1,2-dichloroethene	---	---	3	100	5500	23000	D	1900	D	8800		ND		1.20		0.64		0.69	
1,2-dichloropropane	---	---	---	---	ND	7600	U	400	U	2300	U	ND		0.77	U	0.72	U	0.79	U
cis-1,3-dichloropropene	---	---	---	---	ND	15000	U	780	U	4500	U	ND		1.50	U	1.40	U	1.50	U
trans-1,3-dichloropropene	---	---	---	---	ND	7400	U	390	U	2300	U	ND		0.76	U	0.70	U	0.77	U
ethylbenzene	---	---	---	---	ND	14000	U	750	U	4300	U	4.5		4.50		2.20		0.40	J
2-hexanone	---	---	---	---	ND	6700	U	350	U	2000	U	ND		0.68	U	0.64	U	0.085	J
methylene chloride	---	---	---	---	ND	5700	U	300	U	110	J	ND		0.68		0.54	U	0.38	J
4-methyl-2-pentanone (MIBK)	---	---	---	---	ND	13000	U	700	U	4100	U	ND		1.40	U	1.30	U	0.077	J
styrene	---	---	---	---	ND	14000	U	730	U	4300	U	4.9		3.80		1.60		0.22	J
1,1,2,2-tetrachloroethane	---	---	---	---	ND	2200	U	120	U	680	U	ND		0.23	U	0.21	U	0.23	U
tetrachloroethene	---	---	3	100	ND	2200	U	120	U	740		ND		0.27		0.22		0.18	
toluene	---	---	---	---	ND	6200	U	320	U	1600	J	88	D	19.00		22.00		1.70	
1,1,1-trichloroethane	---	---	3	100	180000	260000	D	13000	D	91000		9.3		12.00		4.30		8.20	
1,1,2-trichloroethane	---	---	---	---	ND	8900	U	470	U	2700	U	ND		0.91	U	0.85	U	0.92	U
trichloroethene	0.25	5	---	---	91000	480000	D	32000	D	190000		0.81		18.00		12.00		17.00	
trichloroflouromethane	---	---	---	---	ND	9200	U	480	U	2800	U	ND		1.40		1.50		1.50	
1,1,2-trichloro-1,2,2-triflouroethane	---	---	---	---	ND	2500	U	130	U	770	U	ND		0.68		0.83		0.67	
vinyl acetate	---	---	---	---	ND	29000	U	1500	U	23000	U	ND		2.90	U	2.70	U	7.70	U
vinyl chloride	0.25	5	---	---	ND	4200	U	220	U	270	U	ND		0.43	U	0.40	U	0.092	U
o-xylene	---	---	---	---	ND	14000	U	750	U	4300	U	ND		2.50		1.60		0.21	J
m+p xylene	---	---	---	---	ND	28000	U	1500	U	8700	U	5.9		7.30		4.60		0.65	J
TOTAL VOCs					304600	830000		50700		320870		228.21		107.36		64.55		47.718	

NOTES:
Bold = Exceeds applicable air matricies
ND = Not Detected
B = Analyte detected in method blank
D = Sample reanalyzed and quantified at higher dilution
E = Exceeds calibration range
J = Estimated concentration
U = Analyte was not detected

Prepared by:PWM
Date: 4/29/10
Checked by: REM
Date:

Summary of Sub-Slab and Indoor Air Samples
Leica Microsystems, Eggert Road
Cheektowaga, NY

Sample location	Matrix 1 Indoor Air	Matrix 1 Sub Slab Vapor	Matrix 2 Indoor Air	Matrix 2 Sub Slab Vapor	SS7	SB-3	SB-3	SB-3	SB-3	SB-3	AA7A	IA-3	IA-3	IA-3
Sample Area:					WAREHOUSE AREA SUB SLAB						WAREHOUSE AREA AMBIENT AIR			
						1106320	1162648			Duplicate		1106321	1162649	
Sample Collection Date:					12/20/2006	6/12/2008	12/12/2008	3/23/2010	3/23/2010	3/23/2010	12/20/2006	6/12/2008	12/12/2008	3/23/2010
Analytical Dilution:					37	40	15	1	1	1	4	2	1.42	1
Volatile Organic Compounds (mcg/m3)														
acetone	---	---	---	---	330	77 U	160	150 J	140 DJ	160 J	160.00 x	68.00	9.00	11
benzene	---	---	---	---	26	21 U	39	2.9 J	130 U	110 U	3.40	1.70	2.10	2.0
bromodichloromethane	---	---	---	---	ND	8.7 U	2.1 U	29 U	56 U	47 U	ND	0.43 U	0.21 U	0.21 U
bromoform	---	---	---	---	ND	67 U	16 U	220 U	420 U	360 U	ND	3.30 U	1.60 U	1.6 U
bromomethane	---	---	---	---	ND	25 U	6.2 U	82 U	160 U	130 U	ND	1.20 U	0.61 U	0.056 J
2-butanone (MEK)	---	---	---	---	ND	38 U	260	22 J	22 DJ	35 J	50.00 D	30.00	1.90	4.4
methyl-tert-butyl ether	---	---	---	---	ND	47 U	11 U	150 U	290 U	250 U	ND	2.30 U	1.10 U	1.1 U
carbon disulfide	---	---	---	---	ND	20 U	23	2.9 J	3.8 DJ	110 U	ND	1.00 U	0.49 U	0.041 J
carbon tetrachloride	0.25	5	---	---	ND	**8.2** U	2 U	13 U	26 U	22 U	ND	**0.64**	**0.60**	**0.62**
chlorobenzene	---	---	---	---	ND	30 U	7.3 U	97 U	190 U	160 U	ND	1.50 U	0.72 U	0.70 U
chloroethane	---	---	---	---	ND	34 U	8.4 U	110 U	220 U	180 U	ND	1.70 U	0.82 U	0.80 U
chloroform	---	---	---	---	ND	32 U	7.8 U	100 U	200 U	170 U	ND	1.60 U	0.76 U	0.099 J
chloromethane	---	---	---	---	ND	27 U	6.6 U	86 U	170 U	180 U	ND	1.30 U	0.95	1.1
dibromochloromethane	---	---	---	---	ND	11 U	2.7 U	36 U	71 U	60 U	ND	0.55 U	0.27 U	0.26 U
1,2 dibromomethane	---	---	---	---	ND	10 U	2.5 U	32 U	63 U	53 U	ND	0.49 U	0.24 U	0.23 U
1,3 dichlorobenzene	---	---	---	---	ND	78 U	19 U	250 U	490 U	410 U	ND	3.90 U	1.90 U	1.8 U
1,4 dichlorobenzene	---	---	---	---	ND	78 U	19 U	250 U	490 U	410 U	ND	3.90 U	1.90 U	0.063 BJ
1,2 dichlorobenzene	---	---	---	---	ND	78 U	19 U	250 U	490 U	410 U	ND	3.90 U	1.90 U	1.8 U
1,1-dichloroethane	---	---	3	100	ND	26 U	6.5 U	86 U	14 DJ	140 U	ND	1.30 U	0.63 U	0.17 J
1,2-dichloroethane	---	---	---	---	ND	26 U	6.5 U	86 U	170 U	140 U	ND	1.30 U	0.63 U	0.20 J
1,1-dichloroethene	---	---	---	---	ND	26 U	6.3 U	84 U	160 U	140 U	ND	1.30 U	0.62 U	0.030 J
trans-1,2-dichloroethene	---	---	---	---	200 D	320 D	96	30 J	30 DJ	25 J	ND	1.30 U	0.62 U	0.094 J
cis-1,2-dichloroethene	---	---	3	100	**220** D	**300** D	**110**	43 J	44 DJ	33 J	ND	1.30 U	0.62 U	0.35 J
1,2-dichloropropane	---	---	---	---	ND	30 U	7.4 U	97 U	190 U	160 U	ND	1.50 U	0.72 U	0.70 U
cis-1,3-dichloropropene	---	---	---	---	ND	59 U	14 U	190 U	370 U	310 U	ND	2.90 U	1.40 U	1.4 U
trans-1,3-dichloropropene	---	---	---	---	ND	30 U	7.2 U	96 U	190 U	160 U	ND	1.50 U	0.71 U	0.69 U
ethylbenzene	---	---	---	---	ND	57 U	14 U	28 J	18 DJ	19 J	8.00	32.00	2.20	2.2
2-hexanone	---	---	---	---	ND	27 U	6.5 U	86 U	170 U	140 U	ND	1.30 U	0.64 U	0.077 J
methylene chloride	---	---	---	---	ND	23 U	5.5 U	5.7 J	9.1 DJ	7.9 J	ND	2.80	0.55	0.41 J
4-methyl-2-pentanone (MIBK)	---	---	---	---	ND	53 U	13 U	170 U	340 U	280 U	ND	2.60 U	1.30 U	0.11 J
styrene	---	---	---	---	ND	55 U	14 U	180 U	350 U	290 U	9.00	30.00	1.60	5.7
1,1,2,2-tetrachloroethane	---	---	---	---	ND	8.9 U	2.2 U	29 U	56 U	47 U	ND	0.44 U	0.21 U	0.21 U
tetrachloroethene	---	---	3	100	31	64 D	18	36	31 D	29	ND	0.44 U	0.21 U	0.14
toluene	---	---	---	---	50 D	25 U	81	8900 E	7300 D	8000	130.00 D	110.00	25.00	9.0
1,1,1-trichloroethane	---	---	3	100	ND	48 D	9.7	14 J	42 DJ	13 J	ND	1.80 U	0.85 U	0.57 J
1,1,2-trichloroethane	---	---	---	---	ND	36 U	8.7 U	110 U	220 U	190 U	ND	1.80 U	0.85 U	0.83 U
trichloroethene	0.25	5	---	---	**1500** D	**3100** D	**660**	**220**	**260** D	**190**	**8.10**	**4.90**	**5.70**	**9.0**
trichloroflouromethane	---	---	---	---	ND	37 U	9 U	120 U	230 U	190 U	ND	1.90	1.50	1.6
1,1,2-trichloro-1,2,2-triflouroethane	---	---	---	---	ND	10 U	2.8	32 U	63 U	53 U	ND	0.78	0.85	0.72
vinyl acetate	---	---	---	---	ND	110 U	28 U	960 U	1900 U	1600 U	ND	7.30	2.70 U	0.24 J
vinyl chloride	0.25	5	---	---	ND	**17** U	**8.4**	**11** U	**22** U	**19** U	ND	**0.82** U	**0.40** U	0.083 U
o-xylene	---	---	---	---	ND	57 U	14 U	30 J	19 DJ	21 J	ND	16.00	1.50	1.3
m+p xylene	---	---	---	---	ND	110 U	28 U	99 J	61 DJ	64 J	ND	44.00	4.90	3.9
TOTAL VOCs					2357	3832	1467.9	9583.5	7993.9	8596.9	368.50	350.02	58.35	55.190

NOTES:
Bold = Exceeds applicable air matricies
ND = Not Detected
B = Analyte detected in method blank
D = Sample reanalyzed and quantified at higher dilution
E = Exceeds calibration range
J = Estimated concentration
U = Analyte was not detected

Prepared by:PWM
Date: 4/29/10
Checked by: REM
Date:

Summary of Sub-Slab and Indoor Air Samples
Leica Microsystems, Eggert Road
Cheektowaga, NY

Sample location	Matrix 1 Indoor Air	Matrix 1 Sub Slab Vapor	Matrix 2 Indoor Air	Matrix 2 Sub Slab Vapor	SS2		SB-2		SB-2		SB-2		AA1A		IA-2		IA-2		IA-2	
Sample Area:					LOADING DOCK SUB SLAB								LOADING DOCK AMBIENT AIR							
							1106318		1162647						1106319					
Sample Collection Date:					12/20/2006		6/12/2008		12/12/2008		3/23/2010		12/20/2006		6/12/2008		12/12/2008		3/23/2010	
Analytical Dilution:					100		1,200		141		1		2		2		1		1	
Volatile Organic Compounds (mcg/m3)																				
acetone	---	---	---	---	ND		2300	U	230	D	120	J	59.00	X	43.00		7.00		12	
benzene	---	---	---	---	ND		630	U	50	U	5.4	J	2.60		1.70		2.00		1.3	
bromodichloromethane	---	---	---	---	ND		260	U	21	U	35	U	ND		0.44	U	0.21	U	0.21	U
bromoform	---	---	---	---	ND		2000	U	160	U	260	U	ND		3.40	U	1.60	U	1.6	U
bromomethane	---	---	---	---	ND		760	U	60	U	100	U	ND		1.30	U	0.60	U	0.61	U
2-butanone (MEK)	---	---	---	---	ND		1200	U	220	D	21	J	20.00		11.00		1.60		1.4	
methyl-tert-butyl ether	---	---	---	---	ND		1400	U	110	U	180	U	ND		2.40	U	1.10	U	1.1	U
carbon disulfide	---	---	---	---	ND		610	U	48	U	79	U	ND		1.00	U	0.48	U	0.038	BJ
carbon tetrachloride	0.25	5	---	---	ND		**250**	U	**20**	U	**16**	U	**0.51**		**0.75**		**0.59**		**0.57**	
chlorobenzene	---	---	---	---	ND		910	U	71	U	120	U	ND		1.50	U	0.71	U	0.72	U
chloroethane	---	---	---	---	ND		1000	U	82	U	130	U	ND		1.70	U	0.82	U	0.82	U
chloroform	---	---	---	---	ND		960	U	76	U	20	J	ND		1.60	U	0.76	U	0.094	J
chloromethane	---	---	---	---	ND		810	U	64	U	100	U	ND		1.40	U	0.88		1.2	
dibromochloromethane	---	---	---	---	ND		330	U	26	U	44	U	ND		0.56	U	0.26	U	0.27	U
1,2 dibromomethane	---	---	---	---	ND		300	U	24	U	39	U	ND		0.50	U	0.24	U	0.24	U
1,3 dichlorobenzene	---	---	---	---	ND		2400	U	190	U	310	U	ND		3.90	U	1.90	U	1.9	U
1,4 dichlorobenzene	---	---	---	---	ND		2400	U	190	U	310	U	ND		3.90	U	1.90	U	0.045	BJ
1,2 dichlorobenzene	---	---	---	---	ND		2400	U	190	U	310	U	ND		3.90	U	1.90	U	1.9	U
1,1-dichloroethane	---	---	3	100	**220**		**4200**	D	**400**	D	**1000**		ND		1.30	U	0.63	U	0.074	J
1,2-dichloroethane	---	---	---	---	ND		800	U	63	U	100	U	ND		1.30	U	0.63	U	0.13	J
1,1-dichloroethene	---	---	---	---	ND		780	U	61	U	100	U	ND		1.30	U	0.61	U	0.62	U
trans-1,2-dichloroethene	---	---	---	---	ND		780	U	61	U	76	J	ND		1.30	U	0.61	U	0.033	J
cis-1,2-dichloroethene	---	---	3	100	ND		**780**	U	77	D	**130**		ND		1.30	U	0.61	U	0.19	J
1,2-dichloropropane	---	---	---	---	ND		910	U	72	U	120	U	ND		1.50	U	0.72	U	0.72	U
cis-1,3-dichloropropene	---	---	---	---	ND		1800	U	140	U	230	U	ND		3.00	U	1.40	U	1.4	U
trans-1,3-dichloropropene	---	---	---	---	ND		890	U	70	U	120	U	ND		1.50	U	0.70	U	0.71	U
ethylbenzene	---	---	---	---	ND		1700	U	130	U	8.2	J	2.70		11.00		1.80		0.97	J
2-hexanone	---	---	---	---	ND		810	U	64	U	100	U	ND		1.30	U	0.64	U	0.089	J
methylene chloride	---	---	---	---	ND		680	U	54	U	5.9	J	ND		1.40		0.54	U	0.50	J
4-methyl-2-pentanone (MIBK)	---	---	---	---	ND		1600	U	130	U	210	U	ND		2.70	U	1.30	U	0.067	J
styrene	---	---	---	---	ND		1700	U	130	U	220	U	3.70		4.30		1.30	U	0.52	J
1,1,2,2-tetrachloroethane	---	---	---	---	ND		270	U	21	U	35	U	ND		0.45	U	0.21	U	0.21	U
tetrachloroethene	---	---	3	100	**28**		**1200**	D	77	D	**190**		0.55		0.58		0.21	U	0.27	
toluene	---	---	---	---	ND		740	U	58	U	1900		57.00	D	52.00		21.00		3.9	
1,1,1-trichloroethane	---	---	3	100	**430**		**11000**	D	**920**	D	**1900**		ND		1.80	U	0.85	U	0.22	J
1,1,2-trichloroethane	---	---	---	---	ND		1100	U	85	U	140	U	ND		1.80	U	0.85	U	0.85	U
trichloroethene	0.25	5	---	---	**5000**	D	**75000**	D	**5100**	D	**12000**		**5.50**		**5.10**		**4.70**		**4.4**	
trichloroflouromethane	---	---	---	---	ND		1100	U	87	U	140	U	ND		2.10		1.50		1.5	
1,1,2-trichloro-1,2,2-triflouroethane	---	---	---	---	ND		630	D	93	D	120		1.00		0.91		0.92		0.80	
vinyl acetate	---	---	---	---	ND		3500	U	270	U	1200	U	ND		5.80	U	2.70	U	0.056	J
vinyl chloride	0.25	5	---	---	ND		**500**	U	**62**	D	**14**	U	ND		**0.84**	U	**0.40**	U	0.085	U
o-xylene	---	---	---	---	ND		1700	U	130	U	7.9	J	ND		4.70		1.30	U	0.55	J
m+p xylene	---	---	---	---	ND		3400	U	270	U	22	J	ND		14.00		3.90		1.7	J
TOTAL VOCs					5678		92030		7179		17526.4		152.56		152.54		45.89		32.616	

NOTES:
Bold = Exceeds applicable air matricies
ND = Not Detected
B = Analyte detected in method blank
D = Sample reanalyzed and quantified at higher dilution
E = Exceeds calibration range
J = Estimated concentration
U = Analyte was not detected

Prepared by:PWM
Date: 4/29/10
Checked by: REM
Date:

Summary of Sub-Slab and Indoor Air Samples
Leica Microsystems, Eggert Road
Cheektowaga, NY

Sample location	Matrix 1 Indoor Air	Matrix 1 Sub Slab Vapor	Matrix 2 Indoor Air	Matrix 2 Sub Slab Vapor	SS5	SB-4	SB-4	SB-4	SB-4	AA5A	IA-4	IA-4	IA-4
Sample Area:					BASEMENT AREA SUB SLAB					BASEMENT AREA AMBIENT AIR			
						1106322					1106323	1162651	
Sample Collection Date:					12/20/2006	6/12/2008	12/12/2008	3/23/2010	3/23/2010	12/20/2006	6/12/2008	12/12/2008	3/23/2010
Analytical Dilution:					1,571	1,000	633.6	1	2	1.00	1.00	1.35	1.00
Volatile Organic Compounds (mcg/m3)													
acetone	---	---	---	---	ND	1900 U	830 U	160 U	3500 U	16.00	24	2.90	4.0 J
benzene	---	---	---	---	ND	500 U	220 U	130 U	250 U	1.50	0.52 U	1.00	0.67
bromodichloromethane	---	---	---	---	1000	210 U	93 U	54 U	110 U	ND	0.22 U	0.20 U	0.22 U
bromoform	---	---	---	---	ND	1600 U	720 U	410 U	800 U	ND	1.70 U	1.50 U	1.60 U
bromomethane	---	---	---	---	ND	610 U	270 U	150 U	300 U	ND	0.63 U	0.58 U	0.62 U
2-butanone (MEK)	---	---	---	---	ND	930 U	410 U	230 U	460 U	2.20	3.60	0.88 U	0.80 J
methyl-tert-butyl ether	---	---	---	---	ND	1100 U	500 U	280 U	550 U	ND	1.20 U	1.10 U	1.10 U
carbon disulfide	---	---	---	---	ND	490 U	220 U	120 U	240 U	ND	0.50 U	0.46 U	0.250 J
carbon tetrachloride	0.25	5	---	---	ND	**200** U	**88** U	**25** U	**49** U	**0.61**	**0.60**	**0.60**	**0.71**
chlorobenzene	---	---	---	---	ND	720 U	320 U	180 U	360 U	ND	0.74 U	0.68 U	0.73 U
chloroethane	---	---	---	---	ND	830 U	370 U	210 U	410 U	ND	0.85 U	0.78 U	0.84 U
chloroform	---	---	---	---	ND	770 U	340 U	20 J	18 DJ	ND	0.79 U	0.72 U	0.12 J
chloromethane	---	---	---	---	ND	650 U	290 U	160 U	320 U	0.80	1.20	0.84	1.3
dibromochloromethane	---	---	---	---	ND	270 U	120 U	68 U	130 U	ND	0.28 U	0.25 U	0.27 U
1,2 dibromomethane	---	---	---	---	ND	240 U	110 U	61 U	120 U	ND	0.25 U	0.23 U	0.24 U
1,3 dichlorobenzene	---	---	---	---	ND	1900 U	840 U	470 U	920 U	ND	1.90 U	1.80 U	1.9 U
1,4 dichlorobenzene	---	---	---	---	ND	1900 U	840 U	470 U	920 U	ND	1.90 U	1.80 U	0.054 BJ
1,2 dichlorobenzene	---	---	---	---	ND	1900 U	840 U	470 U	920 U	ND	1.90 U	1.80 U	1.9 U
1,1-dichloroethane	---	---	3	100	**4200**	**5100** D	**3200** D	**3900**	**3600** D	ND	0.65 U	0.60 U	0.18 J
1,2-dichloroethane	---	---	---	---	ND	640 U	280 U	160 U	320 U	ND	0.65 U	0.60 U	0.10 J
1,1-dichloroethene	---	---	---	---	3200	1000 D	280 U	520	440 D	ND	0.64 U	0.59 U	0.63 U
trans-1,2-dichloroethene	---	---	---	---	ND	620 U	280 U	320	280 DJ	ND	0.64 U	0.59 U	0.63 U
cis-1,2-dichloroethene	---	---	3	100	**3200**	**870** D	**520** D	**460**	**390** D	ND	0.64 U	0.59 U	0.11 J
1,2-dichloropropane	---	---	---	---	ND	730 U	320 U	180 U	360 U	ND	0.75 U	0.69 U	0.043 J
cis-1,3-dichloropropene	---	---	---	---	ND	1400 U	630 U	360 U	700 U	ND	1.50 U	1.30 U	1.4 U
trans-1,3-dichloropropene	---	---	---	---	ND	710 U	320 U	180 U	350 U	ND	0.73 U	0.67 U	0.72 U
ethylbenzene	---	---	---	---	ND	1400 U	610 U	10 J	670 U	ND	1.40 U	1.30 U	0.12 J
2-hexanone	---	---	---	---	ND	640 U	290 U	160 U	320 U	ND	0.66 U	0.61 U	0.061 J
methylene chloride	---	---	---	---	ND	550 U	240 U	9.2 J	270 U	0.53	0.90	0.52	0.43 J
4-methyl-2-pentanone (MIBK)	---	---	---	---	ND	1300 U	570 U	320 U	630 U	ND	1.30 U	1.20 U	1.3 U
styrene	---	---	---	---	ND	1300 U	590 U	340 U	660 U	1.30	1.40 U	1.30 U	1.4 U
1,1,2,2-tetrachloroethane	---	---	---	---	ND	220 U	96 U	54 U	110 U	ND	0.22 U	0.20 U	0.22 U
tetrachloroethene	---	---	3	100	**16000**	**430** D	**250** D	**340**	**290** D	0.28	0.22 U	0.20 U	0.076 J
toluene	---	---	---	---		590 U	260 U	3600	3100 D	8.10	4.80	2.60	0.63
1,1,1-trichloroethane	---	---	3	100	**110000**	**15000** D	**3900** D	**5100**	**4400** D	1.10	1.20	1.20	0.19 J
1,1,2-trichloroethane	---	---	---	---	ND	860 U	380 U	220 U	420 U	ND	0.88 U	0.81 U	0.86 U
trichloroethene	0.25	5	---	---	**110000**	**59000** D	**25000** D	**25000** E	**22000** D	**1.40**	**1.10**	**0.92**	**0.35**
trichloroflouromethane	---	---	---	---	ND	880 U	390 U	220 U	430 U	1.90	2.50	1.80	2.6
1,1,2-trichloro-1,2,2-triflouroethane	---	---	---	---	ND	240 U	110 U	27 J	23 DJ	0.74	0.69	0.63	0.70
vinyl acetate	---	---	---	---	ND	2800 U	1200 U	1800 U	3500 U	ND	2.80 U	2.60 U	7.20 U
vinyl chloride	0.25	5	---	---	ND	**400** U	**180** U	**22** U	**42** U	ND	**0.41** U	**0.38** U	0.086 U
o-xylene	---	---	---	---	ND	1400 U	610 U	12 J	12 DJ	ND	1.40 U	1.30 U	0.10 J
m+p xylene	---	---	---	---	ND	2700 U	1200 U	32 J	29 DJ	ND	2.80 U	2.60 U	0.33 J
TOTAL VOCs					247600	81400	32870	39350.2	34582	36.46	40.59	12.49	13.924

NOTES:
Bold = Exceeds applicable air matricies
ND = Not Detected
B = Analyte detected in method blank
D = Sample reanalyzed and quantified at higher dilution
E = Exceeds calibration range
J = Estimated concentration
U = Analyte was not detected

Prepared by:PWM
Date: 4/29/10
Checked by: REM
Date:

Summary of Sub-Slab and Indoor Air Samples
Leica Microsystems, Eggert Road
Cheektowaga, NY

Sample location	Matrix 1 Indoor Air	Matrix 1 Sub Slab Vapor	Matrix 2 Indoor Air	Matrix 2 Sub Slab Vapor	SS4		OA-1		QA-1		QA-1	
Sample Area:					OUTDOOR AIR SAMPLE (BACKGROUND)							
							1106351		1162652			
Sample Collection Date:					12/20/2006		6/12/2008		12/12/2008		3/23/2010	
Analytical Dilution:					20		1		1.36		1	
Volatile Organic Compounds (mcg/m3)												
acetone	---	---	---	---	48		23		3.40		3.3	J
benzene	---	---	---	---	17		0.55	U	0.75		0.51	
bromodichloromethane	---	---	---	---	ND		0.23	U	0.20	U	0.21	U
bromoform	---	---	---	---	ND		1.80	U	1.50	U	1.6	U
bromomethane	---	---	---	---	ND		0.67	U	0.58	U	0.039	J
2-butanone (MEK)	---	---	---	---	ND		4.90		0.88	U	0.54	J
methyl-tert-butyl ether	---	---	---	---	ND		1.20	U	1.10	U	1.1	U
carbon disulfide	---	---	---	---	46		0.54	U	0.47	U	0.017	J
carbon tetrachloride	0.25	5	---	---	ND		**0.59**		**0.63**		**0.63**	
chlorobenzene	---	---	---	---	ND		0.79	U	0.69	U	0.71	U
chloroethane	---	---	---	---	ND		0.91	U	0.79	U	0.81	U
chloroform	---	---	---	---	ND		0.84	U	0.73	U	0.079	J
chloromethane	---	---	---	---	ND		1.50		0.99		1.2	
dibromochloromethane	---	---	---	---	ND		0.29	U	0.25	U	0.26	U
1,2 dibromomethane	---	---	---	---	ND		0.27	U	0.23	U	0.24	U
1,3 dichlorobenzene	---	---	---	---	ND		2.10	U	1.80	U	1.8	U
1,4 dichlorobenzene	---	---	---	---	ND		2.10	U	1.80	U	0.039	BJ
1,2 dichlorobenzene	---	---	---	---	ND		2.10	U	1.80	U	1.8	U
1,1-dichloroethane	---	---	3	100	**66**		0.70	U	0.61	U	0.63	U
1,2-dichloroethane	---	---	---	---	ND		0.70	U	0.61	U	0.088	J
1,1-dichloroethene	---	---	---	---	ND		0.68	U	0.59	U	0.61	U
trans-1,2-dichloroethene	---	---	---	---	ND		0.68	U	0.59	U	0.61	U
cis-1,2-dichloroethene	---	---	3	100	**120**		0.68	U	0.59	U	0.61	U
1,2-dichloropropane	---	---	---	---	ND		0.80	U	0.69	U	0.71	U
cis-1,3-dichloropropene	---	---	---	---	ND		1.60	U	1.40	U	1.4	U
trans-1,3-dichloropropene	---	---	---	---	ND		0.78	U	0.68	U	0.70	U
ethylbenzene	---	---	---	---	ND		1.50	U	1.30	U	0.062	J
2-hexanone	---	---	---	---	ND		0.71	U	0.61	U	0.630	U
methylene chloride	---	---	---	---	ND		0.60	U	0.52	U	0.27	J
4-methyl-2-pentanone (MIBK)	---	---	---	---	ND		1.40	U	1.20	U	1.3	U
styrene	---	---	---	---	ND		1.50	U	1.30	U	1.3	U
1,1,2,2-tetrachloroethane	---	---	---	---	ND		0.24	U	0.21	U	0.21	U
tetrachloroethene	---	---	3	100	**5.6**		**3.20**		0.20	U	0.070	J
toluene	---	---	---	---	28		1.60		1.50		0.41	J
1,1,1-trichloroethane	---	---	3	100	55		0.94	U	0.82	U	0.061	J
1,1,2-trichloroethane	---	---	---	---	ND		0.94	U	0.82	U	0.83	U
trichloroethene	0.25	5	---	---	**890**		**8.10**		0.23		0.031	J
trichloroflouromethane	---	---	---	---	ND		1.40		1.40		1.4	
1,1,2-trichloro-1,2,2-triflouroethane	---	---	---	---	ND		0.71		0.64		0.65	
vinyl acetate	---	---	---	---	ND		3.00	U	2.60	U	7.0	U
vinyl chloride	0.25	5	---	---	ND		**0.44**	U	**0.38**	U	0.083	U
o-xylene	---	---	---	---	ND		1.50	U	1.30	U	0.059	J
m+p xylene	---	---	---	---	ND		3.00	U	2.60	U	0.17	J
TOTAL VOCs					1275.6		45.00		9.54		9.625	

NOTES:
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U = Analyte was not detected

Leica Sub-Slab Depressurization System Inspection Form
2012

Date: ______________________

Time: ______________________

Weather Conditions: ______________________

System Fan 1 power: ______________________

System Fan 2 power: ______________________

System Vacuum Light: ______________________

Draw Point 1 seal: (Condition of seal, bolts, bollards, piping)

Draw Point 2 seal: (Condition of seal, bolts, bollards, piping)

Electrical System Meter Reading: ______________________

Comments: ______________________

Signature of Inspector: ______________________

Printed Name of Inspector: ______________________

Date: ______________________

Notes:

*A copy must be made and left with a Sam-Son representative

*Notes on system deficiencies should be relayed to both Sam-Son and EnergySoltuions Immediately

January-12	May-12	Sep-12
Feb-12	Jun-12	Oct-12
Mar-12	Jul-12	Nov-12
Apr-12	Aug-12	Dec-12

HILL
CONSULTING

VIA ELECTRONIC MAIL

February 1, 2012

Mr. Steven E. Northman
Sam-Son Distribution
203 Eggert Road
Buffalo, NY 14215

RE: EnergySolutions – Sub-Slab Depressurization System

Dear Mr. Northman:

Hill Consulting, Inc. (HCI) is please to provide Sam-Son Distribution (Sam-Son) with our comments on the *Sub-Slab Depressurization System Installation Work Plan – September 2011* (Plan), prepared by EnergySolutions. As previously mentioned, we have designed, installed and operated similar systems for more than ten years. These comments are based on our experience with similar systems. This review was approached primarily with consideration of a safe work environment for Sam-Son employees and visitors. In addition, the effect that the system installation and operation may have on Sam-Son's day-to-day activities and expenses were considered.

There are a few items in the Plan that we would like to bring to your attention and a few items that we recommend you ask to be explained more clearly.

Ambient indoor air sampling was performed in December 2006 and Section 1.3 indicates that TCE concentrations of indoor air quality were as high as 16 micrograms per meter cubed ($\mu g/m^3$). The New York State Department of Health (NYSDOH) guidance level for TCE is 5 $\mu g/m^3$. While this concentration is well below the OSHA permissible exposure limit (PEL) for industrial applications (approximately 537,000 $\mu g/m^3$), I think you would have a difficult time explaining to one of your employees who works in that area all day long that the air they are breathing has up to three times the amount of TCE the state of New York would allow in their home. The questions that I suggest you pose to EnergySolutions are: **The Plan indicates that follow-up indoor air quality sampling was performed in 2008 and 2010 and NYSDOH guidance levels were once again exceeded, but no concentrations were provided in the Plan. Please provide this data. Were the samples collected in December 2006, 2008 and 2010 "grab samples" or were they "Time Weighted Average" (TWA) samples? Has the concrete floor been inspected for exposure pathways from the 380,000 $\mu g/m^3$ samples collected beneath the slab to the worker breathing space? Has EnergySolutions considered a floor sealant to 1) limit exposure to employees and 2) ensure that EnergySolutions are not extracting air that Sam-Son has already paid to cool or heat?**

107 OLD CROSSING LANE, ANNAPOLIS, MARYLAND 21401 | 410.279.6950 | ROLF@HILLCONSULTING.US

This type of system is sized and installed based primarily on data collected during the Pilot Study. The number and location of extraction points are based upon the influence measured during the Pilot Test. Section 2.0, next to last paragraph indicates "The pilot study demonstrated that pressure differentials can be created beneath the existing concrete slab and there is communication within the annular space beneath the slab at distances as far as 20 feet from the extraction point." Section 3.0, third paragraph states "As demonstrated in the Pilot Study.....air movement beneath the slab was observed at distances approximately 40 and 50 feet from the extraction points in the main entryway and loading dock areas, respectively." The request that I suggest you pose to EnergySolutions is: **Please explain what method was used to identify "air movement beneath the slab" and please explain why pressure differentials were used to determine the influence of the system in one location and "air movement" was used in another.**

It is our recommendation that Sam-Son look extremely closely at the proposed vapor extraction well locations and piping locations presented on Figure 3, prior to agreeing to this configuration. Will protection be installed around the piping? How will the piping be sealed as it leaves the building? What dust-suppression techniques will be used when coring the slab?

Section 3.2 describes the ongoing operation of the system and describes "periodic" monitoring. **It is our recommendation that you ask for a specific monitoring schedule and confirm that EnergySolutions will monitor during a time that is convenient to Sam-Son. It is also our recommendation that you request that documentation be made during each monitoring event as to the condition of the seal of the piping at the slab. If this seal is not intact, the system will be pulling cooled or heated air out of the building.**

Section 3.1 of the Plan indicates that two AMG Force fans will be installed. The provided cut sheet indicates that the electrical usage of each of these fans is 302 watts. I do not know what Sam-Son pays for electrical service, but if your rate is $0.10 kw/h, the cost to operate these fans is more than $500 per year. If the system is set to operate for the next 10 years, your electrical cost would likely exceed $5,000.

Should you have any questions or would like to discuss this, please do not hesitate to contact me at 410-279-6950. I look forward to a continued successful relationship with Sam-Son Distribution.

Sincerely,
HILL CONSULTING, INC.

D. R. Hill

D. Rolf Hill
Hydrogeologist