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June 26, 2007

COPY

Karen Cahill
NYSDEC
Region 7
615 Erie Blvd West
Syracuse, NY 13204-2400

Re: Former Axiom Facility – South Hill Business Campus
950 Danby Road, Ithaca, NY
Brownfield Cleanup Program (BCP) Site # C755012
Interim Remedial Measure (IRM)
Sub-Slab Depressurization System (SSDS) Design

Dear Ms. Cahill:

S&W Redevelopment of North America, LLC (SWRNA) has reviewed the results of the sub-slab communication test conducted at the South Hill Business Campus by Radon Home Services, Inc. (RHS), a certified radon mitigation contractor. The communication test was done on February 27 and 28, 2007 in accordance with the NYSDEC-approved Interim Remedial Measure (IRM) Work Plan (SWRNA, January 2007, and February 13, 2007 addendum). The IRM Work Plan proposes a sub-slab depressurization system (SSDS) as an interim and precautionary remedy to mitigate potential soil vapor intrusion. This letter presents the results of the communication test, and describes the design and implementation approach for soil vapor mitigation based on those results.

GENERAL APPROACH

Soil vapor mitigation is considered an Interim Remedial Measure (IRM). As indicated in the New York State Department of Health (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (October 2006), the soil vapor intrusion (SVI) mitigation measures implemented at this site will stay in operation and undergo appropriate monitoring and maintenance until it is determined by NYSDEC/NYSDOH that contaminated environmental media have been remediated or until mitigation is no longer needed to address SVI-related exposures.

The IRM will be implemented in stages, with the first stage targeting the southern portion of the building where a southern SSDS will be installed (see Figure 1). The subsequent stages will address the northern portion of the building, and western rooms adjacent to the southern portion of the building, following further assessment of potential soil vapor mitigation alternatives. A staged effort is proposed for the following reasons:

1. The communication test indicates sub-slab depressurization can be readily implemented in the southern half of the building without further study or deliberation. However, the test indicates sub-slab communication is very limited in the northern half of the building, which requires additional assessment of soil vapor mitigation alternatives. Because the southern SSDS can operate effectively while northern alternatives are assessed, it is recommended that the southern SSDS be presently implemented.

2. An air exchange system is being designed to manage odors from the Therm area, north of the southern SSDS area. Two other air exchange systems also exist in the northern portion of the building, operated by building tenants. Although the operation of these systems is entirely unrelated to soil vapor contamination, they can nonetheless be designed to create positive pressure to eliminate the potential for soil vapor intrusion. SWRNA is working with the building's mechanical contractor and architect to modify the air exchange systems' designs, in an effort to create and maintain positive pressure which may either compliment or supplant a northern SSDS.

3. The southern portion of the building is closest to the potential soil vapor contaminant source area, as identified by the RI. An SSDS in this area is viewed as the key building control element to mitigate potential future soil vapor intrusion.

4. A final site-wide remedy is being developed for implementation, which will be presented in the Remedial Work Plan (RWP) for this site. The proposed final remedy will likely address the source of vapor contamination, providing a long-term and permanent solution.

5. Vapor concentrations in air samples collected throughout the lowest level of the building are relatively low, so steps to mitigate soil vapor intrusion in the northern portion of the building may be deferred until an appropriate assessment of alternatives is completed.

The following discussion provides the basis for the proposed IRM design and implementation approach described herein.

COMMUNICATION TEST RESULTS

A. Test Approach. The objective of the communication test was to determine the negative pressure field that could be achieved below the floor slab by applying a vacuum to a series of test holes drilled through the floor. The original plan had been to test communication on a sixty foot grid, with suction points located along the exterior building walls and test holes located along the centerline of the building. After RHS completed tests at the initial four suction holes, it became apparent that the sub-slab material did not communicate a pressure field across sixty feet. RHS drilled additional suction and test holes to create a 30 foot (±) grid.

In total, RHS drilled thirty-five 1 ¼ inch suction holes at 60 foot intervals through the ground floor slab, and forty-five 5/8 inch test holes were drilled midway between the suction points, at 30 foot intervals. A Sears 6.5 hp shop vac was used to generate suction at the suction holes and pressure was measured at the test holes using an Energy Conservatory Model DG3 micromanometer. Figure 1 shows the suction holes where a vacuum was applied (red squares) and test holes at which the pressure field was measured (blue circles). The alpha-numeric grid nodes are support columns within the building. Each column is identified by its corresponding letter and number in accordance with the grid sequence. Suction and test holes are identified by the nearest column or columns.

B. Air Monitoring. As the holes were drilled, SWRNA measured the total volatile organic compounds (VOCs) at each hole with a part per billion (ppb) photoionization detector (PID), in accordance with the IRM Work Plan. The objective of the PID monitoring was to determine whether air from the suction holes should be exhausted to the outdoors to prevent possible exposure to VOCs. Because VOCs were detected by SWRNA in the drilled holes, air from the suction tests was exhausted outdoors in accordance with the IRM Work Plan.

C. Sub-Slab Material Conditions. Sub-slab material was mostly dry in the western portion of the building, with increasing moisture towards the east wall. One suction hole along the east wall of the building (grid location A12) filled with water when the suction was applied. The sub-slab material appeared to consist primarily of clay.

D. Sub-Slab Communication Measurements. The attached table, provided by RHS, presents the results of the communication test, and Figure 1 depicts those results.

Communication varied throughout the building. In the northern-most office tower area (see Figure 1) communication is apparently poor, with pressure measurements indicating no communication between any of the testing locations.

Communication was measurably better south of the office tower. There were varying degrees of communication, but generally communication was highest in the southernmost building area (currently vacant space), compared to the northern portion of the building including Therm area and other occupied areas between Therm and the office tower.

Referring to Figure 1, lines connecting suction holes (red squares) with test holes (blue circles) indicate pathways along which at least -0.5 Pascals (-0.002 inches of water column) were achieved. Although there was no communication beyond 30 feet in any part of the building, the results indicate the southern building area, the vacant area south of the fire wall, has better communication than the area north of the fire wall. The only exception is a line of test holes along the east wall of the building, north of the fire wall between columns A3 and A11, which had the highest communication pressures measured for the building (see attached Table). RHS indicated that a drain tile of some sort might run along the east wall, to remove excess water that is known to underlay that portion of the building. (As previously noted, one of the suction holes in this area – A12 – could not be used because it filled with water after being drilled).

IMPLEMENTATION APPROACH

A. Stage 1: Southern SSDS. The results of the communication test indicate that sub-slab depressurization is feasible in the southern portion of the building, and can provide adequate negative pressure (at least -0.002 inches of water) at a radius of less than 30 feet around each suction point. It is proposed that an SSDS be installed in the southern portion of the building as indicated on Figure 1.

As indicated in the IRM Work Plan, the SSDS design will follow guidelines prescribed by the Environmental Protection Agency (USEPA), as presented in Appendix E of the New York State Department of Health (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (October 2006). The SSDS will be installed by RHS, a certified radon mitigation contractor. A copy of RHS's radon mitigation proficiency certification is provided as Attachment 1.

The IRM Work Plan identified specific system and component requirements for the SSDS. An excerpt of the IRM Work Plan relative to those requirements is included in this design document as Attachment 2. Although the IRM Work Plan had indicated the design of the SSDS would carry a P.E. stamp, NYSDOH Guidance allows that systems be designed and installed by either a P.E. or a qualified professional. Because SWRNA will utilize the services of a certified radon mitigation professional, a P.E. stamp is not affixed to the design.

The system specifications provided by RHS to mitigate potential soil vapor intrusion in the 38,400 square foot area in the southern portion of the building are included as Attachment 3. The general design concept will be to utilize twenty-four 3-inch diameter suction points, consisting of three lines of 8 extraction points spaced 40 feet apart, adjacent to existing building support columns.

The suction pipes will run within the cavities of the I-beam support columns, and will flare out near the bottom of the columns to avoid the column footings (see Figure 2). Each of the vertical suction pipes will have a pressure gage and a built-in baffle that may be used to adjust flow as necessary based on pressure readings. The pressure gages will be used to monitor continued system performance (see Site Specific Management Plan below).

Suction cavities will be cleared around the suction pipe intakes to improve communication. Sub-slab material removed to make the cavities will be screened with a

PID, and observations will be recorded in a field log. The sub-slab cavities will also be checked for water which will likewise be screened with a PID if present. Based on screening results and observations, and following consultation with NYSDEC, samples of soil and/or water may be analyzed if determined necessary to characterize potential contamination below the floor slab, if evidence of contamination is observed.

The 24 vertical suction pipes will connect to horizontal piping which will connect to a single trunk line which will run parallel to long axis of the building. There will be eight horizontal pipes, which will run along the short axis of the building, and each will connect to three vertical suction pipes. The trunk line will run perpendicular to the horizontal pipes, forming a center line. The trunk line will be routed vertically through the ceiling and overlying floor, and exhaust above the roof (Figure 2). A pressure gage will be mounted on each of the vertical suction pipes and also on the vertical segment of pipe on the second floor of the building to monitor the system's performance. In accordance with standard practices for monitoring radon mitigation systems (ASTM 2121E; EPA/625/R-92/016), the SSDS pressure monitors will provide a visual indication of system performance, will be simple to read and interpret, and be located where they are easily seen. Pressure gage monitoring will be conducted in accordance with procedures identified in a Site Specific Management Plan that will be prepared after the system is installed (see Site Specific Management Plan below). The top of the exhaust stack will be two feet above to roof line.

A pressure field extension (PFE) test will be done following system installation and start up, as indicated in the approved IRM Work Plan, to verify extension of the suction field. Adjustments will be made to the system as necessary, based on the PFE test and pressure gages, to ensure full extension of the suction field across the target area south of the fire wall.

Post-mitigation indoor air samples will be collected no sooner than 30 days after installation and start up of the SSDS. Three (3) indoor air samples will be taken at the same locations as the previous RI samples, which will include one air sample in the southern SSDS area, one air sample from the Therm area, and one sample from the northern cafeteria area.

Two weeks after system start up, air samples will be collected from the SSDS exhaust stack. Exhaust samples will be collected using Summa canisters, with grab flow regulators set for a forty five (45) minute sample duration. Three separate 45-minute sample runs will be completed on the same day, and all samples will be analyzed for TO-15 VOCs.

The first sample run will collect split air samples utilizing two canisters, connected to a split line converging to a single intake in the exhaust stream. Each of the next two 45-minute sample runs will occur immediately after the previous run is completed, and each will utilize a single one liter Summa canister.

For the initial split sample run, one of the canisters will be one liter and the second will be 1.4 liters. The larger of the two canisters will provide matrix spike and matrix spike duplicate (MS/MSD) so that a QA/QC recovery study can be conducted by the laboratory. The MS/MSD samples will be spiked and subsequently analyzed by the laboratory for the full list of TO-15 compounds.

As a QA/QC measure, the sample collection will end before pressure gages on the Summa canisters reach zero. Accordingly, sampling may terminate prior to 45 minutes depending on the pressure readings of the canisters. The pressure gages on the canisters will be visually monitored during sample collection to ensure that the test is terminated before zero pressure is reached. The end pressure will be recorded on the chain of custody forms, and the laboratory will measure the pressure of the canisters upon receipt to determine if there was any apparent leakage during transport.

To minimize the potential effects of moisture in the exhaust stream, the tube connecting the canisters to the exhaust stack will be looped to provide a collection point for moisture so that it is not introduced into the canisters.

Air flow measurements will also be made, immediately before each of the Summa canister collection runs. An anemometer or similar air flow measurement instrument will be used for this purpose.

The average measured flow rate and the average detected exhaust concentrations may be used to calculate the emission rate estimate of target compounds in the exhaust.

There are no specific regulations or air quality standards that require vapor phase emission controls for SSDS exhaust, nor does the construction or operation of the proposed SSDS require any NYSDEC Division of Air Resources (DAR) permits. Absent regulatory requirements specific to SSDS exhaust, DAR considers the effects of SSDSs on ambient air quality on a case by case basis. Action may be taken to control VOC levels in the SSDS exhaust if it is determined that the exhaust is likely to have a measurable negative effect on human health and the environment.

The SSDS exhaust stack will be approximately two feet above the roof top, which will limit dispersion. This means that ambient air impacts, if any, will occur primarily in close proximity to the exhaust, and measurable off-site effects are considered very unlikely. Ambient air effects, if any, are expected to be limited well within the property line, and there is no public access to the roof area near the exhaust stack. These factors are expected to minimize potential exposure to the effects of the exhaust.

B. Stage 2: Northern and Western Areas. North of the fire wall, beginning in the Therm area and extending northward to the office tower area, sub-slab communication noticeably decreases according to test results (see Figure 1), making sub-slab depressurization less feasible. The effects of the proposed southern SSDS are also unlikely to reach western rooms that extend outward from the southern main building section. For the northern building area and western rooms, multiple small SSDSs may be an alternative to a single large scale SSDS of the sort proposed for the southern building area. This option will be evaluated for the western rooms after the southern SSDS is completed as Stage 1, and a design and implementation approach will be developed for NYSDEC/NYSDOH review. However, for the northern building area it may be more feasible to create positive pressure above the slab as opposed to negative pressure below it, and reach the same mitigation objective.

Multiple air exchange systems are being designed and/or retrofitted in the northern building area, as building renovations continue to accommodate existing and new building tenants. These systems can be made to provide up to two air exchanges per hour, and maintain positive pressure of 0.01 inches of water column (2.5 Pascals). Positive pressure of 0.01 inches above the slab would be as effective (and in theory more so) as an SSDS that creates -0.002 inches of negative pressure below the slab. In addition, USEPA has indicated positive pressures of 0.005 to 0.01 inches of water column are effective at mitigating radon entry into commercial buildings and schools (EPA/625/R-92/016, June 1994). A positive pressure performance objective of 0.01 inches is therefore proposed to prevent soil vapor intrusion in the northern building area. To achieve this objective, the firewall that separates northern building area from the southern SSDS will be fitted with tight doors to maintain the needed pressure.

The implementation process for the northern building area will also include collecting three additional sub-slab vapor samples. Two of the sub-slab samples will be collected near the center of the northern cafeteria area and in the Therm area near the fire wall, respectively. These two sub-slab samples will be paired with the post-mitigation indoor air samples taken at the same locations, as described above for the Stage 1 SSDS. The third sub-slab sample will be collected in the northeast corner of the Therm area where communication test results indicate a drain line may be present. The three sub-slab vapor samples will be collected at the same time as the Stage 1 post-mitigation indoor air samples described above.

SWRNA will continue to work with the mechanical contractor to develop an approach and design to create positive pressure in the northern portion of the building as a soil vapor mitigation alternative to SSDS. As previously indicated, SWRNA will also evaluate a mitigation approach for the western rooms, following installation of the Stage 1 SSDS in the southern portion of the building.

A Stage 2 design concept for the northern area and western rooms will be presented to NYSDEC for review following implementation of Stage 1, which will include a description of system layout(s) and operation principals, operation requirements to maintain the desired respective pressures, an implementation schedule, and post-implementation effectiveness monitoring.

IRM REPORT

Following implementation of the above activities, SWRNA will provide an IRM Report to NYSDEC/NYSDOH that will include the following:

- Description of field activities and observations
- Photographs of work progress and the completed system
- Figures showing the location and layout of the system and its key components
- Analytical data and field test measurements associated with the IRM program, including results of pre- and post- implementation testing such as indoor air analytical results, sub-slab vapor analytical results, PID screening, ambient air quality data, and air pressure testing (sub-slab and ambient).

Because implementation will occur in separate stages, it is proposed that an initial IRM Report be provided within 60 days of SSDS start-up, and that addenda to the IRM Report be submitted as subsequent stages are completed.

SITE SPECIFIC MANAGEMENT PLAN

A Site Management Plan (SMP) will be provided for NYSDEC/NYSDOH review within 30 days of SSDS start-up. Following NYSDEC/NYSDOH approval the SMP will be provided to the building owner, and a copy will be placed on site with the building facility manager so that building tenants will have access to it.

As indicated in the IRM Work Plan, the SMP will describe the SSDS and air exchange design and operation, monitoring and maintenance requirements and schedule, provide troubleshooting guidance, points of contact for service, and manufacturer's information and specifications.

SCHEDULE

An implementation schedule for the southern SSDS is provided below, subject to NYSDEC/NYSDOH acceptance of the proposed implementation approach.

Installation of SSDS and start up	July 16 to August 3, 2007
Pressure field extension (PFE) test	August 6 to 7, 2007
System adjustments/modifications, and subsequent PFE tests[1]	August 13 to 24, 2007
Collect post-mitigation roof-top air samples	September 7, 2007 [2]
Submit Site-Specific Management Plan	September 24, 2007 [3]
Collect post-mitigation indoor and sub-slab air samples	September 24, 2007 [3]

Submit Initial IRM Report October 24, 2007 [4]

Notes:

1 If necessary.
2 Two weeks after system start up and any necessary adjustments/modifications
3 Thirty days after system start up and any necessary adjustments/modifications
4 Sixty days after system start up and any necessary adjustments/modifications

SWRNA can begin the implementation of the southern SSDS upon your acceptance of the approach described above. If you have any questions or wish to discuss the approach please call me at (315) 422-4949.

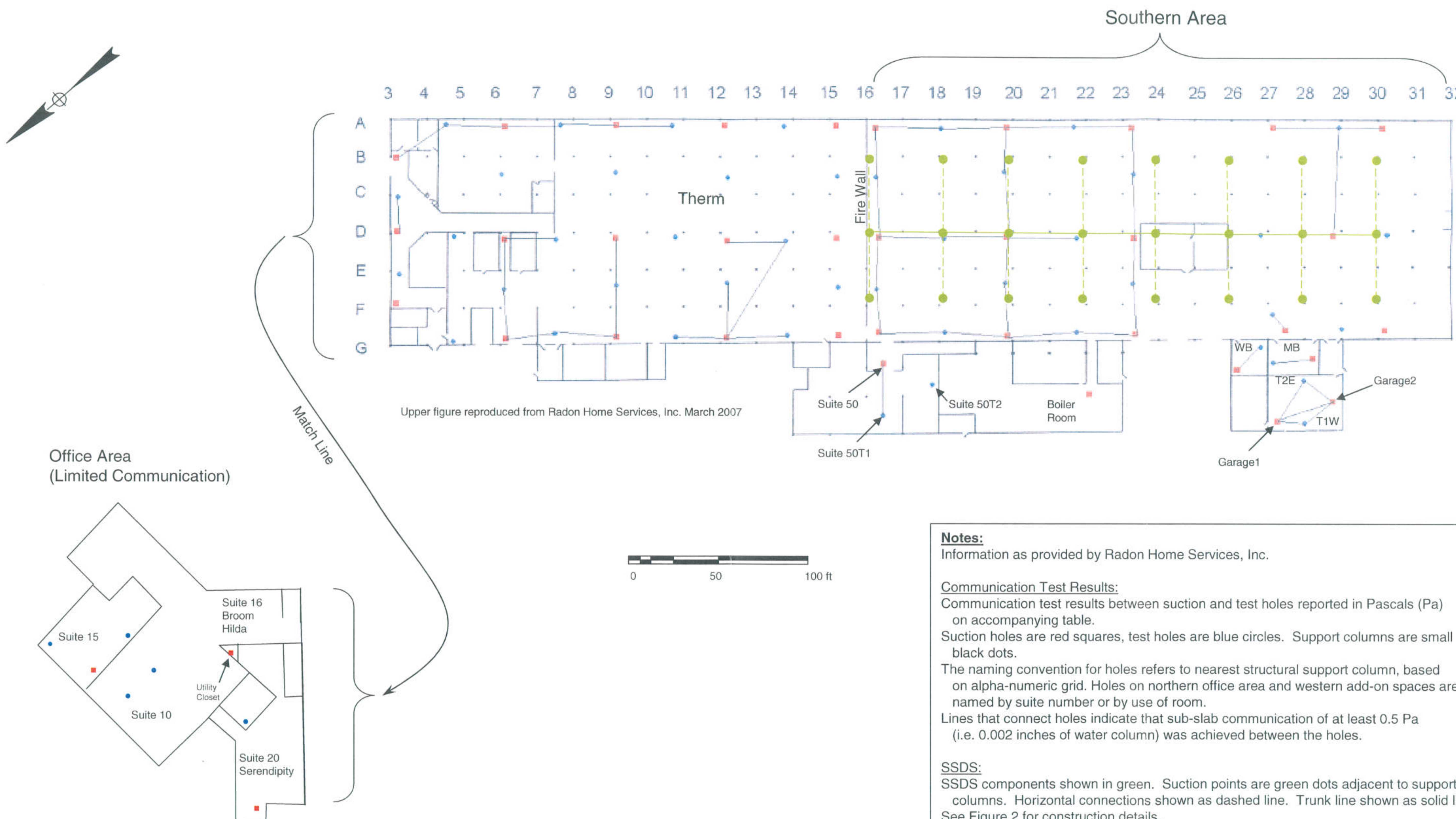
Very truly yours,
S&W REDEVELOPMENT OF NORTH AMERICA, LLC

Robert M. Petrovich
Executive Vice President

Daniel P. Ours, C.P.G.
Senior Project Manager

pc: A. Sciarabba, South Hill Business Campus
S. Shearer, NYSDOH

FIGURES



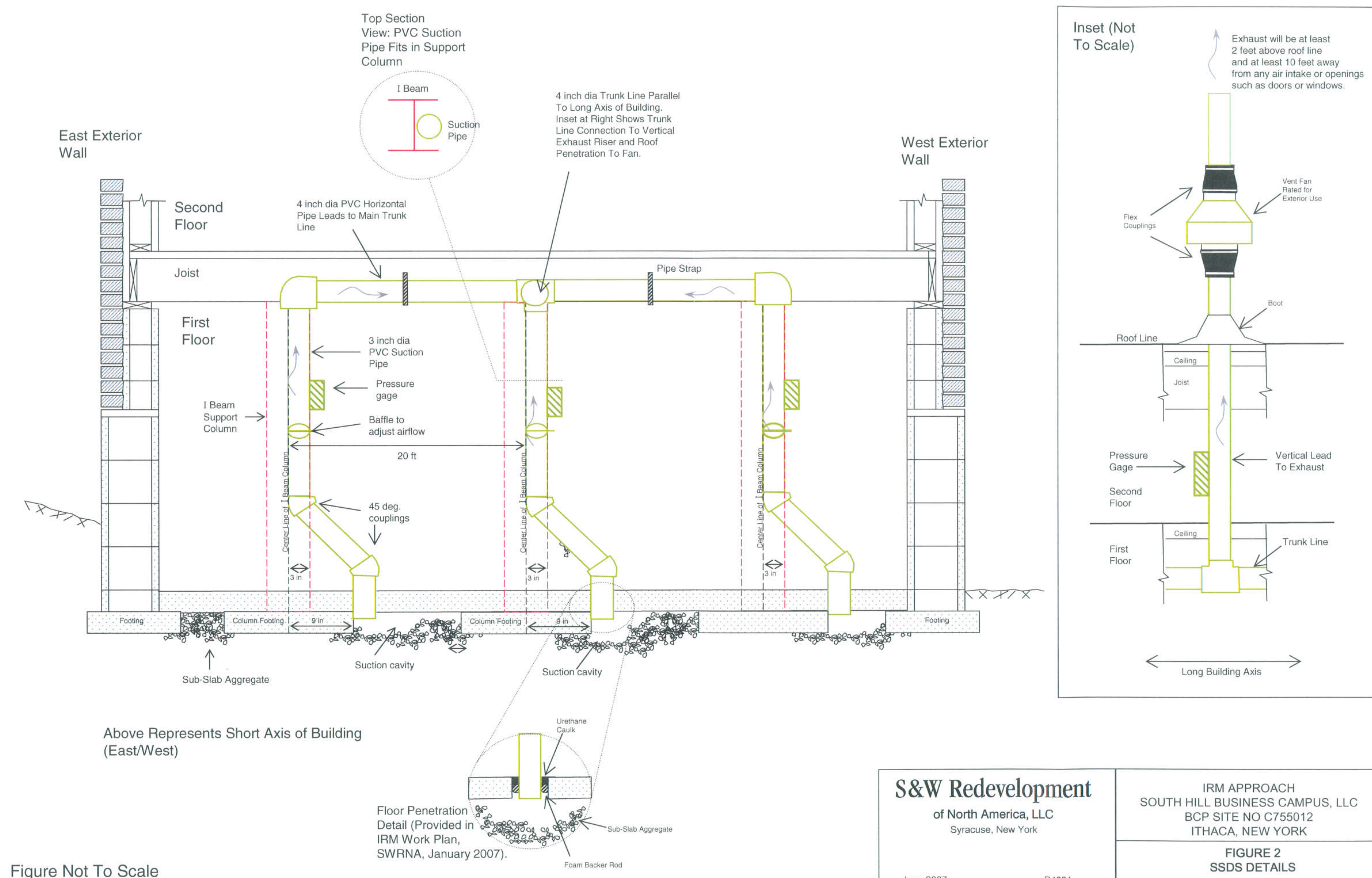
Upper figure reproduced from Radon Home Services, Inc. March 2007

Notes:
Information as provided by Radon Home Services, Inc.

Communication Test Results:
Communication test results between suction and test holes reported in Pascals (Pa) on accompanying table.
Suction holes are red squares, test holes are blue circles. Support columns are small black dots.
The naming convention for holes refers to nearest structural support column, based on alpha-numeric grid. Holes on northern office area and western add-on spaces are named by suite number or by use of room.
Lines that connect holes indicate that sub-slab communication of at least 0.5 Pa (i.e. 0.002 inches of water column) was achieved between the holes.

SSDS:
SSDS components shown in green. Suction points are green dots adjacent to support columns. Horizontal connections shown as dashed line. Trunk line shown as solid line. See Figure 2 for construction details.

S&W Redevelopment of North America, LLC Syracuse, New York June 2007 B4001	IRM APPROACH SOUTH HILL BUSINESS CAMPUS, LLC BCP SITE NO C755012 ITHACA, NEW YORK FIGURE 1 COMMUNICATION TEST RESULTS AND SSDS LAYOUT



S&W Redevelopment
of North America, LLC
Syracuse, New York

June 2007 B4001

IRM APPROACH
SOUTH HILL BUSINESS CAMPUS, LLC
BCP SITE NO C755012
ITHACA, NEW YORK

FIGURE 2
SSDS DETAILS

TABLES

Sub-Slab Communication Test
South Hill Business Campus, Ithaca, NY

Suction Point	Flow, cfm	Test1	FAN OFF	FAN ON	Test2	FAN OFF	FAN ON	Test3	FAN OFF	FAN ON	Test4	FAN OFF	FAN ON
G30	22.2	D30	+1.8	+1.3	G27S	+0.6	+0.6	G29	+0.6	+0.6			
G27	17.1	F27	+0.6	-12.6	D27	0.0	0.0	G30S	+1.6	+1.6			
A27	19.6	A29	+0.4	-0.3	D27	0.0	0.0	A30S	+0.1	+0.1			
A30	17.1	D30	+1.8	+1.8	A29S	+0.4	+0.3	A27S	+0.2	+0.2			
D29	16.1	D30	+1.8	+1.8	D27	0.0	0.0	G29	+0.6	+0.6	A29	+0.4	-0.3
G23	21.1	D23S	0.0	0.0	EF23	+0.3	-0.4	G21	-0.3	-1.5			
D23	17.5	EF23	+0.3	-0.2	BC23	+0.3	-0.1	D21	0.0	0.0			
A23	19.6	BC23	+0.3	-0.4	D23S	0.0	0.0	A21	+1.6	+1.3			
G20	19.1	EF20	-0.3	-1.7	G21	-0.3	-1.3	G18	-0.1	-0.3			
D20	22.3	EF20	-0.3	-21.5	BC20	-0.8	-212.0	D21	0.0	-2.1	D18	-0.2	-18.5
A20	21.0	A21	+0.2	-1.4	BC20	-0.8	-46.0	A18	0.0	-2.2			
G16	22.3	G18	-0.1	-0.3	EF16	-0.1	-5.9	D18	-0.2	-0.2			
D16	22.6	EF16	-0.1	-2.6	D18	-0.2	-5.1	BC16	+0.1	-3.2			
A16	20.0	BC16	+0.1	-3.1	A18	0.0	-4.6	D18	-0.2	-0.2			
G15	17.7	G14	+1.9	+1.9	EF15	+0.1	+0.1						
D15	20.5	BC15	+0.1	+0.1	EF15	+0.1	+0.1	D14	-0.1	+0.1			
A15	20.7	BC15	+0.1	+0.1	A14	+0.1	+0.1						
G12	17.9	G14	+1.9	-2.1	EF12	+0.2	-0.1	D14	+0.1	-0.2	G11	-2.2	-12.5
D12	19.0	D14	+0.1	-8.5	EF12	+0.2	+0.2	BC12	0.0	0.0	D11	+0.1	+0.1
A12	0.0	Water table rose and filled suction hole											
G9	19.4	G11	+2.2	+2.2	G6	+0.1	-11.5	EF9	+0.1	-5.1			
D9	22.2	D11	+0.1	+0.1	BC8	+0.1	+0.1	EF9	+0.1	-1.9	D8	-0.1	+0.1
A9	23.8	A8	0.0	-95.8	A11	+0.1	-196.4	BC9	+0.1	+0.1			
G6	20.6	G8	+0.3	-1.2	G5	+0.1	+0.1	EF6	+0.2	-0.7			
D6	22.4	EF6	+0.2	-1.5	D8	+0.1	-0.3	D5	0.0	-0.2	BC6	0.0	0.0
A6	24.1	A8	0.0	-48.5	A4	+0.1	-65.8	BC6	0.0	0.0			
F3	18.3	E3	+0.1	+0.1	A4	+0.1	+0.1						
D3	19.6	C3	+0.1	-6.9	D5	0.0	0.0	E3	+0.1	+0.1			
B3	19.7	A4	+0.1	-25.6	C3	+0.1	+0.1						
WB	16.5	WBT	0.0	-0.2									
MB	17.0	MBT	0.0	-0.2									
GARAGE1	23.5	T1W	+0.2	-11.5	T2E	0.0	-0.1	GARAGE2	+0.2	-4.8			
GARAGE2	23.8	T1W	+0.2	-3.8	T2E	0.0	-1.2	GARAGE1	+0.2	-2.6			
SUITE50	16.8	SUITE50T1	+0.4	-0.3	SUITE50T2	0.0	0.0						
SUITE20	12.7	SUITE20	0.0	0.0									
UTILITY	15.7	SUITE20	0.0	0.0	SUITE10T1	0.0	0.0						
SUITE15	21.2	SUITE15T1	0.0	0.0	SUITE15T2	0.0	0.0	SUITE10T1	0.0	0.0	SUITE10T2	0.0	0.0

Notes
1. Locations refer to grids on attached drawing
2. Pressures on chart are in Pascals
3. An "S" after location indicates that communication was measured at a suction point

ATTACHMENTS

Attachment 1

National Environmental
Health Association
Radon Proficiency Certification

NEHA Certification

National Environmental Health Association
National Radon Proficiency Program

Richard A. Kornbluth

Residential Mitigation Provider

ID Number: 100038 RMT Expiration: 7/31/2008

To confirm validity of this certification call (800) 269-4174. Verification of adherence to state and local regulations is advised. See reverse for specific certification designations.

Attachment 2

IRM Work Plan Excerpt – SSDS System Requirements

SECTION 2 - DESIGN REQUIREMENTS

The following describes the basic design concepts that will be incorporated into the SSD system, as prescribed by USEPA and NYSDOH. The final design of the SSD system will be based on findings of a pilot test and building inspection completed as the first step of the implementation process (see Section 3 – *Implementation Approach*). A final design document will be provided and submitted to the NYSDEC.

2.1 - GENERAL REQUIREMENTS

Following installation, a documentation report will be prepared that establishes the SSD system was installed in accordance with the approved design. An Operations, Monitoring, and Maintenance (OM&M) Plan (see Section 3) will be prepared and provided to the building owner and tenants, to facilitate understanding of the system's design and operation.

2.2 - SYSTEM REQUIREMENTS

The principal design and installation requirements of the SSD system are identified below, and incorporate many design aspects of systems to mitigate radon exposure.

- Sealing. The operating principle of the SSD will be to create negative pressure (i.e. a vacuum) below the building floor slab relative to inside the building, which will prevent vapors below the slab from entering the building. To improve system performance, visible cracks, holes, and gaps in the floor will be filled with compatible caulks, non-shrink mortar, grouts, or expanding foam to create a seal that will prevent short-circuiting of air. Materials used as sealants will not contain any VOCs.

- Operation. The system vent fan will run on electrical power, and designed in such a manner to avoid excess energy usage. The system shall be designed to avoid the creation of other health, safety, or environmental hazards to building occupants (e.g. backdrafting of natural draft combustion appliances), and shall also avoid compromising moisture and temperature controls and other comfort features, and to minimize noise.

- Vent Fan. The vent fan and discharge piping shall not be located within or below an occupied area of the building to avoid entry of subsurface vapors in the event of a fan leak.

- Exhaust. The vent pipe's exhaust shall be a minimum of 12 inches above the roof line of the building, and at least 10 feet above ground level. It shall be at least 10 feet (laterally) away from any openings in the building (i.e. doors, windows) that are less than 2 feet (vertically) below the exhaust point.

- Labeling. The SSD system shall be clearly labeled to identify its purpose, and a telephone number will be identified to call if there are any questions.

- Monitor. A pressure monitor shall be installed on the system to alert building occupants if the system stops working properly. The monitor may be a liquid gauge (a manometer), sound alarm, or needle display gauge. The monitor shall be placed in a visible location, and building manager will be made aware of it, how it works, and how it is read, and what to do if it indicates a problem.

2.3 - COMPONENT REQUIREMENTS

Figure 2-1 is a conceptual design schematic that identifies the main system components, which are discussed below.

2.3.1 Piping Requirements

- Piping will be schedule 40 PVC. All joints and connections shall be permanently sealed with adhesives as specified by the manufacturer of the pipe. Joints and connections shall be made air tight.

- External piping runs shall be insulated to avoid freezing and condensation.

- Vent pipes shall be fastened to the structure of the building with hangers, straps, or other supports that will secure the piping. Existing plumbing pipes, ducts, or mechanical equipment shall not be used to support SSD system pipe.

- Supports for vent pipes shall be installed at least every six (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.

- To prevent blockage of air flow into the bottom of the vent pipe (i.e. at the extraction point), the pipe shall be supported or secured in a permanent manner that prevents downward settlement into soil beneath the sub-slab aggregate material.

- Vent pipes shall be installed in a configuration that allows condensation and/or rainwater to drain downward into the ground beneath the slab.

- Vent pipes shall not block access to any areas requiring maintenance or inspection. Pipes shall not be installed in front of or interfere with any light sources, opening, door, window, or equipment access required by code.

2.3.2 Vent Fan Requirements

- The vent fan(s) shall be designed or otherwise sealed to reduce the potential for leakage of vapors from the vent fan housing.

- The vent fan(s) shall be installed in a configuration that avoids condensation buildup in the fan housing. Whenever possible, the fan should be installed in vertical runs on the vent pipe.

- Vent fan(s) mounted on the exterior of the building shall be rated for outdoor use.

- Vent fan(s) shall be installed in the vent pipe using removable couplings or flexible connections that can be tightly secured to both the fan and the vent pipe.

- The fan intake shall be screened to prevent intake of debris that could damage the fan. Screens shall be removable to enable cleaning and replacement.

2.3.3 Electrical

- Wiring of the vent fan shall conform to local regulations. The wiring may not be located in or chased through the installation ducting or any other heating or cooling ductwork.

- The fan(s) for this project will be mounted on the exterior side of the building. The use of an exterior fan prohibits the use of plugged cords to supply power to the fan. (If a plugged cord is used to supply power to the fan, it may not penetrate a wall or be concealed in a wall).

- High–flow vent fans typically rate at between 112 to 245 Watts. If the rated electricity requirements of the system fan exceeds 50 percent of the circuit capacity into which it will be connected, or if the total connected load on the circuit (including the vent fan) exceeds 80 percent of the circuit's rated capacity, a separate, dedicated circuit shall be installed to power the fan.

- An electrical disconnect switch or circuit breaker shall be installed to permit deactivation of the fan for maintenance or repair.

Attachment 3

SSDS Specifications
(Provided By
Radon Home Services, Inc)

P.O. Box 8048
Teall Avenue Station
Syracuse, NY 13217
Tel: (315) 422-6000
Fax: (315) 422-6001

Radon Home Services, Inc.

Specifications
Vapor Intrusion Mitigation System
South Hill Business Campus
South End

The following specifications cover the area from the south end of Therm to the south end of the building (approx 38,400 sf).

1. A series of twenty four 3" sub slab suction points will be drilled through the slab. These suction points will be located along lines twenty feet from the East and West walls of the building (Front and rear) and along the center of the building (See Figure 1 of design document). The holes will be spaced 40 feet apart and will be placed adjacent to vertical support pillars. Four to five gallons of sub-slab material will be removed from each suction point to create a suction pit.

2. Three inch schedule 40 PVC piping will be placed vertically into the suction points. The vertical pipes will connect to 4" Schedule 40 pipe horizontally placed overhead. The horizontal piping will connect to a single 4" schedule 40 PVC trunk line running parallel to the long axis of the building from north to south.

3. In the center of the building section, a vertical 4" schedule 40 PVC pipe will be routed through the ceiling and through the floor above the roof.

4. A Cincinnati Model HPC Series 1 direct drive fan will be mounted on the roof and wiring will be supplied to the fan per code.

5. Upon completion of the installation of the sub-slab depressurization system a sub-slab pressure field extension test will be done.

6. Adjustments to the system will be made, if necessary, to ensure full extension of the suction field.