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VAPOR INTRUSION MITIGATION REPORT

OLYMPIC MEDICAL FACILITY
5900 1st AVENUE SOUTH
SEATTLE, WASHINGTON

In Accordance with
AGREED ORDER NO. DE 5348

Submitted by:
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For:
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September 10, 2009

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ACRONYMS AND ABBREVIATIONS

ABP	Art Brass Plating
Agreed Order	Agreed Order No. DE 5348 entered into by Capital Industries, Inc. and the Washington State Department of Ecology on January 24, 2008
ASTM	ASTM International
Blaser	Blaser Die Casting
Capital	Capital Industries, Inc.
CEF	cancer exceedance factor
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
Farallon	Farallon Consulting, L.L.C.
HVAC	heating, ventilation, and air conditioning
IPIM	Inhalation Pathway Interim Measures
IPIMALs	Inhalation Pathway Interim Measures Action Levels
NCEF	non-cancer exceedance factor
O&M	operation and maintenance
Olympic Facility	Olympic Medical Building located at 5900 1st Avenue South in Seattle, Washington
PSC	Philip Services Corporation
PTC	Pioneer Technologies Corporation
PVC	polyvinyl chloride
RI Work Plan	Remedial Investigation Work Plan
SSDS	sub-slab depressurization system
TCE	trichloroethene
VIA Work Plan	*Vapor Intrusion Assessment Work Plan, Capital Industries, 5801 Third Avenue South, Seattle, Washington* dated September 2008, prepared by Farallon Consulting, L.L.C.
VIIMM	*Vapor Intrusion Inspection, Monitoring, and Maintenance Work Plan, Capital Industries, 5801 Third Avenue South, Seattle, Washington*, in preparation by Farallon Consulting, L.L.C.
VIM Report	*Vapor Intrusion Mitigation Report, Olympic Medical Facility, 5900 1st Avenue South, Seattle, Washington* dated July 2009, prepared by Farallon Consulting, L.L.C.
VOCs	volatile organic compounds

1.0 INTRODUCTION

Farallon Consulting, L.L.C. (Farallon) has prepared this Vapor Intrusion Mitigation Report (VIM Report) on behalf of Capital Industries, Inc. (Capital) to summarize the results of the pre-design data collection, design, and installation of the sub-slab depressurization system (SSDS) at the warehouse and manufacturing areas of the Olympic Medical Building located at 5900 1st Avenue South in Seattle, Washington (Olympic Facility), southwest of the Capital property (Figures 1 and 2). Mitigation of intrusion of vapors potentially containing concentrations of volatile organic compounds (VOCs) was determined by the Washington State Department of Ecology (Ecology) to be necessary at the Olympic Facility based on an evaluation of analytical results of indoor air and ambient air samples collected at the Olympic Facility. The evaluation and mitigation were conducted in accordance with the Vapor Intrusion Assessment Work Plan (VIA Work Plan) (Farallon 2008b) and the Vapor Intrusion Mitigation Work Plan (Farallon 2009a), in accordance with Exhibits B and D of Agreed Order No. DE 5348 entered into by Capital and Ecology on January 24, 2008 (Agreed Order), respectively.

1.1 PURPOSE

The purpose of the VIM Report is to summarize the results of the pre-design data collection, design, and installation of the SSDS for mitigation of intrusion of VOCs that may have migrated from groundwater in the Water Table Zone, as defined in the Remedial Investigation Work Plan (RI Work Plan) (Farallon 2008a), to indoor air within the warehouse and manufacturing areas of the Olympic Facility. The mitigation measures are consistent with the Revised Inhalation Pathway Interim Measures (IPIM) Work Plan prepared by Philip Services Corporation (PSC) (2002) and the Draft Interim Vapor Intrusion Plan prepared by Arrow Environmental et al. (2007), Exhibit D of the Agreed Order.

1.2 VIM REPORT ORGANIZATION

This VIM Report is organized as follows:

- Section 1 includes the purpose and organization of the VIM Report;
- Section 2 provides descriptions of and background information on the Olympic Facility, Capital Site, and Capital Area of Investigation, and presents the Vapor Intrusion Mitigation scope of work;
- Section 3 discusses the design, installation, and operation of the SSDS;
- Section 4 summarizes the VIM Report conclusions; and
- Section 5 provides a list of documents used in preparation of the VIM Report.

2.0 SITE DESCRIPTION AND BACKGROUND

The following sections provide a brief description of the Capital Property, the Capital Area of Investigation, and the Olympic Facility; a summary of relevant background information; and the Vapor Intrusion Mitigation scope of work. A more detailed description is provided in the RI Work Plan (Farallon 2008a).

2.1 CAPITAL PROPERTY AND CAPITAL AREA OF INVESTIGATION

The Capital Property is defined as the property located at 5801 3rd Avenue South, between South Mead Street on the north and South Fidalgo Street on the south, and between 4th Avenue South on the east and 1st Avenue South on the west in Section 39, Township 24 South, Range 4 East in Seattle, King County, Washington (Figure 2). The Capital Property consists of four contiguous King County Parcels: No. 1722802255 (5801 3rd Avenue South); No. 1722801620 (5801 3rd Avenue South); No. 1722802245 (5820 1st Avenue South); and No. 1722801530 (5801 3rd Avenue South), together totaling 182,468 square feet. Parcel Nos. 1722802255, 1722801620, and 1722802245 are developed with five adjoining tilt-up, slab-on-grade buildings designated as Plants 1 through 5. Parcel No. 1722801530 is located north of Plant 4 and has been used for storage of finished products, which include containers and dumpsters.

The Capital Area of Investigation as defined in the RI Work Plan (Farallon 2008a) is the area south of South Mead Street, east of 1st Avenue South, north of South Front Street, and west of 4th Avenue South, and includes the property on the northwestern corner of 4th Avenue South and South Mead Street (Figure 2). The Capital Area of Investigation is located within the Seattle city limits in King County, Washington (Figure 2) and is zoned as industrial light manufacturing (King County, Washington 2007). Facilities located within the Capital Area of Investigation include a mixture of light industrial, commercial, and residential properties.

2.2 OLYMPIC FACILITY

The Olympic Facility is located at 5900 1st Avenue South within the Capital Area of Investigation, southwest of Capital Property Plant 2 (Figure 2). King County, Washington (2007) parcel records identify the Olympic Facility as Parcel No. 2024049050, which is developed with a two-story tilt-up, elevated slab-on-grade building. The Olympic Facility building is divided into three areas used for office, manufacturing, and warehouse purposes (Figure 3). The building was constructed in 1957 and currently is occupied by Olympic Medical, a manufacturer of professional medical equipment and supplies.

The heating, ventilation, and air conditioning (HVAC) system for the Olympic Facility is serviced by Sea-Aire Inc. of Seattle, Washington (SeaAire). Farallon contacted SeaAire to request a description of the HVAC system, including the locations of air intakes located with the building and the location(s) of the air outflows. At the time of this report, Farallon had not received a response from SeaAire regarding this request.

The results of the remedial investigation that is being conducted by Capital concurrently with the vapor intrusion mitigation at the Olympic Facility will be used to delineate the boundary of the Capital Site, as defined by the Agreed Order, and will differentiate the source(s) of VOCs to groundwater beneath the Olympic Facility.

2.3 BACKGROUND

Conditions of the Resource Conservation and Recovery Act Facility Operation Permits and the Washington State Model Toxics Control Act Cleanup Regulation, as established in Chapter 173-340 of the Washington Administrative Code, required that PSC assess and mitigate vapor intrusion of VOCs associated with releases at the former waste management facility at 734 South Lucile Street in Seattle. PSC (2002) developed and began implementing the IPIM approach that integrated analytical results for groundwater and indoor air samples to assess the need for further investigation or for mitigation via an interim measure. The IPIM approach is defined or summarized in the following documents:

- Revised Inhalation Pathway Interim Measures Work Plan (PSC 2002);
- Summary of the Inhalation Pathway Interim Measures Approach (Pioneer Technologies Corporation [PTC] 2006);
- Exhibit D of the Agreed Order; Draft Interim Vapor Intrusion Plan (Arrow Environmental et al. 2007); and
- Vapor Intrusion Assessment Work Plan, Capital Industries, Inc. (Farallon 2008b).

As part of the IPIM approach, PSC conducted groundwater investigations in the Georgetown neighborhood west of 4th Avenue South (W4 Investigation Area). These investigations identified Capital as a potential source of VOCs released into the subsurface. Capital became the lead business for interim vapor intrusion measures for properties located down-gradient (south) of the Capital Property.

PSC investigations in the W4 Investigation Area identified VOC source areas at Art Brass Plating (ABP) located at 5516 3rd Avenue South and Blaser Die Casting (Blaser) located at 5700 3rd Avenue South. ABP, Capital, and Blaser are the lead businesses for interim vapor intrusion mitigation (VIM) in the W4 Investigation Area. To establish a consistent interim process to assess and mitigate potential vapor intrusion in the W4 Investigation Area, an Interim VIM Plan was prepared on behalf of PSC, ABP, Blaser, and Capital (Arrow et al. 2007) at the request of Ecology. The Interim VIM Plan listed the buildings identified by Ecology as assigned to each lead business, and proposed an interim VIM approach with methodologies from the PSC IPIM approach approved by Ecology for consistent implementation by each lead business.

Capital is identified as the lead business for the Olympic Facility, located down-gradient and south of Capital Plant 2 (Figure 2). Concentrations of trichloroethene (TCE) were detected in reconnaissance groundwater samples collected from direct-push borings and groundwater samples collected from monitoring wells proximate to the Olympic Facility (PTC 2006). The cancer exceedance factor (CEF) and non-cancer exceedance factor (NCEF) were calculated using the cancer and non-cancer groundwater Inhalation Pathway Interim Measures Action

Levels (IPIMALs) based on the IPIM approach (PTC 2006). The CEF calculated from the concentrations of TCE in groundwater samples collected from the Water Table Zone proximate to the Olympic Facility exceeded the benchmark of 10 determined by Ecology. Therefore, Tier 3 ambient air samples were collected for analysis under the IPIM approach at the Olympic Facility.

A Tier 3 assessment of vapor intrusion was conducted at the Olympic Facility by PSC (2005) by sampling ambient indoor and outdoor air to determine whether commercial ambient air CEFs and NCEFs exceeded their benchmark of 10 determined by Ecology. Commercial indoor air CEFs calculated from concentrations of TCE detected in indoor ambient air samples collected at the Olympic Facility exceeded the CEF and/or NCEF benchmarks in the warehouse and manufacturing areas (PTC 2006) (Figure 3; Table 1). Based on the concentrations of TCE detected in indoor ambient air, a mitigation system was proposed by PSC for the warehouse area located on the eastern side of the Olympic Facility.

Subsequent indoor air sampling conducted by GeoEngineers Inc. (2006) on behalf of Olympic Medical detected concentrations of TCE exceeding the CEF and NCEF benchmarks in ambient air in both the warehouse and the manufacturing areas of the Olympic Facility (Figure 4; Table 1). Ecology confirmed that a mitigation system for the office area was unnecessary, based on the corrected commercial ambient air CEFs and NCEFs that were calculated for the office area by subtracting outdoor CEFs and NCEFs from indoor values. Ambient air analytical data and calculated CEFs, NCEFs, and corrected indoor CEFs from previous investigations are presented in Table 1.

2.4 VAPOR INTRUSION MITIGATION SCOPE OF WORK

Mitigation via installation of an SSDS is approved by Ecology under the IPIM approach (PSC 2002) to depressurize beneath the floor slab to prevent volatilization of organic compounds in groundwater in the Water Table Zone from entering the interior of the building. The general SSDS design has been reviewed and approved by Ecology for effectively mitigating vapor intrusion at slab-on-grade commercial facilities. The SSDS is designed to be consistent with the 2003 ASTM International (ASTM) E2121-03, *Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings* (ASTM 2003), and with U.S. Environmental Protection Agency (EPA) radon mitigation standards (EPA 1993, 1994).

The SSDS is designed to depressurize immediately below the concrete floor slab by using an exhaust fan that generates sufficient negative pressure to prevent the flux of vapors from soil, through the slab, and into the building. This type of system has been designed for a wide variety of VOCs that migrate through soil, largely through diffusion. The SSDS decreases the pressure beneath the building slab, resulting in a higher pressure inside the building, which forces the flow of air and VOCs in the building downward, into the slab. The exhaust fan pulls the vapors containing VOCs from beneath the slab and vents to the ambient air via an exhaust stack located on the roof of the building.

Prior to installation of the SSDS at the Olympic Facility, diagnostic testing was performed to collect information necessary to determine the number of fans and associated exhaust systems required to adequately depressurize the sub-slab area. Based on the results of the diagnostic testing, a building-specific design was developed to adequately mitigate vapor intrusion to levels below IPIMALs at the Olympic Facility.

The design, installation, and operation work elements completed to mitigate vapor intrusion at the Olympic Facility are provided in the following section. The specific design for the SSDS for the Olympic Facility was submitted to Ecology in the Vapor Intrusion Mitigation Design Plan (VIM Design Plan) for approval prior to installation (Farallon 2009b).

3.0 VAPOR INTRUSION MITIGATION SYSTEM

This section summarizes pre-design data collection, the design and installation of the vapor mitigation system at the Olympic Facility, and post-installation operation testing and sampling.

3.1 DESIGN

Design of the SSDS consisted of collection and evaluation of pre-design data, preparation of a design plan, and submittal of a permit application to the City of Seattle Department of Planning and Development. Copies of the Mechanical Plan Permit Application are included in Appendix A.

3.1.1 Collection of Pre-Design Data

Sub-slab negative pressure field extension data were collected at the Olympic Facility to provide parameters for the design of the SSDS. The data were used to select the locations and sizes of the fans and vents to be installed as part of the SSDS. The pre-design data collection was conducted at the Olympic Facility by Advanced Radon Technologies from October 7 to 14, 2008 and included:

- Coring a total of ten 5-inch-diameter test-hole borings and multiple 3/8-inch-diameter test-hole borings surrounding each 5-inch-diameter boring in the concrete slab;
- Removing 10 to 20 gallons of soil from beneath the slab at each 5-inch-diameter boring to create a sump;
- Placing a diagnostic exhaust fan over the 5-inch-diameter boring;
- Measuring the negative soil vapor pressure at each of the 3/8-inch-diameter borings at a constant vacuum pressure using a micromanometer; and
- Measuring the exhaust volume reading at each 5-inch-diameter boring while multiple static vacuum pressures were applied.

The static pressure and exhaust volume measurements were taken at the exhaust fan, and negative soil vapor pressure measurements were taken at 10 test-hole borings located throughout the warehouse and manufacturing areas. The test-hole boring locations are shown on Figure 3. The measurements were used by Advanced Radon Technologies to design the SSDS system to prevent intrusion of VOCs to indoor air of the Olympic Facility.

3.1.2 Preparation of a Design Plan

The SSDS Design Plan was developed using the pre-design data collected and was provided to Ecology and the City of Seattle Department of Planning and Development as an appendix to the draft VIM Design Plan (Farallon 2009a). The draft VIM Design Plan included the number and locations of the sumps and the design specifications for the SSDS developed by Advanced Radon Technologies. Ecology approved the draft VIM Design Plan on December 5, 2008, and the VIM Design Plan was finalized.

The design components of the SSDS are discussed in the following sections, and are detailed on Sheet Nos. M1 through M4 of the City of Seattle Mechanical Expedited (Full) Permit application prepared by Advanced Radon Technologies, included in Appendix A. The SSDS was designed to be consistent with ASTM (2003) E2121-03, *Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings*. Photographs of specific design components of the completed SSDS are provided in Appendix B. Appendix C includes the ASTM Standard Practice E2121-03 System Installation Checklist for Radon Mitigation Systems completed by Advanced Radon Technologies.

3.1.2.1 Sumps

A total of seven sumps were installed to provide access for the suction applied by the exhaust fan to the area beneath the concrete floor slab. Each sump consists of a 5-inch-diameter boring that extends through the concrete floor slab to a 10- to 20-gallon cavity excavated beneath the floor slab. The 5-inch-diameter borings are fitted with a rubber seal and waterproof sealant to prevent air from being drawn from the interior of the building. A schematic of each of the sumps is presented on Sheet No. M4, included in Appendix A.

3.1.2.2 Risers and Piping

Riser pipes connect the sumps to the exhaust fan mounted on the roof of the Olympic Facility. The risers are seated in the rubber seal on the 5-inch-diameter borings and extend from the sump through the ceiling and/or roof. Seams are sealed with waterproof sealant. The roof is sealed with roof flashing and waterproof sealant where the riser pipes penetrate the roof. The riser pipes are 4-inch-diameter Schedule 40 or 3043 polyvinyl chloride (PVC) heavy wall pipe that extends from the sump below the concrete floor slab to approximately 5 feet above floor surface, and 3-inch-diameter PVC pipe that extends from 5 feet above floor surface through the roof of the Olympic Facility. Risers and associated sumps are located adjacent to either interior or exterior walls to provide structural support. Riser pipes are securely fastened to walls with pipe supports at multiple heights and offsets, and 45-degree elbows are used to adjust risers around ceiling supports and sprinkler lines where necessary. The specific details for each riser are presented on Sheet No. M4, included in Appendix A.

Piping connects the risers to the exhaust fan mounted on the top of the roof of the Olympic Facility. All of the piping connects to form one network, and is angled so that the connection to the exhaust fan is at the highest point and the connection to each riser is at the lowest point to prevent water vapor from condensing at low spots within the piping. Piping consists of 3- and 4-inch-diameter PVC pipe. The 3-inch-diameter PVC pipe connects to risers and the initial extensions toward the exhaust fan. The 4-inch-diameter PVC pipe was used for piping approaching and connected to the regenerative blower. Piping specifications are presented in detail on Sheet No. M3, included in Appendix A.

3.1.2.3 Exhaust Fan

The exhaust fan provides suction to the sumps via the risers and piping of the SSDS. Specifications for the exhaust fan were determined by Advanced Radon Technologies based on information collected during the pre-design testing conducted at the Olympic Facility. The exhaust fan is mounted to a raised platform on the roof of the Olympic Facility. Vibration isolators were used between the exhaust fan and the platform to prevent roof vibration and excess noise. Pre-design data were collected to determine the number and size(s) of exhaust fan(s) needed. Advanced Radon Technologies determined that one Rotron DR656K72X 3-horsepower regenerative blower manufactured by Ametek Technical and Industrial Products is sufficient for the SSDS at the Olympic Facility. The regenerative blower schedule presents specific details of the exhaust fan on Sheet No. M4, provided in Appendix A.

3.1.2.4 Exhaust Stack

The exhaust stack discharges extracted vapors to ambient air at a height that does not pose a threat to human health or the environment, approximately 7 feet above roof level. The exhaust stack consists of a stainless steel pipe attached to the exhaust fan, with PVC used to extend the exhaust stack to maximum height. The exhaust stack is angled 45 degrees off vertical from approximately 7 feet above roof level to prevent precipitation from entering the exhaust stack while exhausting VOC vapors and/or air. A schematic showing specific details of the exhaust stack is presented on Sheet No. M4 in Appendix A.

3.1.2.5 Pressure Gauges

A pressure gauge at each riser measures negative pressure and confirms that negative pressure is being applied throughout the SSDS. Although previously constructed systems in the area have included a manometer on each leg of the system to monitor system performance, the combined size of the Olympic Facility, subsurface conditions, the riser and piping network, and the exhaust fan would cause the pressure to exceed the limits of the commonly used manometer. Therefore, a Magnehelic pressure gauge will be used in place of a manometer to measure the pressure of the system. Because Magnehelic pressure gauges are more prone to failure during constant use, a valve system was installed to disconnect pressure gauges during non-monitoring periods.

The pressure gauge and valve system is mounted to the riser with solid or flexible tubing. The exact mounted location was established to avoid possible impact from facility operations. A main valve was installed between the riser and the pressure gauge to regulate the pressure applied to the gauge from the riser. A relief valve was installed to control the pressure between the main valve and the pressure gauge. The relief valve allows the pressure gauge to open to ambient air during non-monitoring periods to relieve pressure within the tubing after the main valve has been closed. The main valve will remain closed and the relief valve will remain open when system monitoring is not in progress. During system monitoring events, the main valve will be opened, and the relief valve will be closed to engage the pressure gauge. The pressure gauges will provide confirmation that negative pressure is being applied by the exhaust fan to the subsurface via each riser.

3.1.3 Permit Application

An application for a Mechanical Expedited (Full) Permit was prepared by Advanced Radon Technologies and submitted to the City of Seattle on November 7, 2008. The permit application included:

- The completed Mechanical Permit cover sheet;
- The year of City code with which the permit complies;
- A vicinity map;
- A to-scale site plan showing adjacent zoning;
- A legal description of the Olympic Facility property;
- The King County parcel number; and
- Any related building permit numbers.

The Mechanical Plan permit was approved by the City of Seattle on November 18, 2008. A copy of the permit application is included in Appendix A. Following permit approval, SSDS installation commenced at the Olympic Facility.

3.2 INSTALLATION

The information obtained during pre-design data collection was used to develop the construction specifications of the vapor intrusion mitigation system installed at the Olympic Facility. Installation of the SSDS was completed by Advanced Radon Technologies on January 23, 2009 and was observed by Farallon on behalf of Capital.

The SSDS consists of 3- and 4-inch-diameter Schedule 40 PVC heavy wall pipe that extends from below the concrete slab up through the roof of the Olympic Facility. Vent piping forms a network attached to the exhaust fan on the roof of the Olympic Facility. The exhaust fan operates continuously, pulling vapors from the sumps and venting to the ambient air above the roof of the building via an exhaust stack. A dedicated pressure gauge measures the pressure differential (in inches of water column) between the fan inlet and outlet, confirming that the fan is generating a pressure head. The system generates sufficient negative pressure beneath the building slab to prevent vapors from entering the Olympic Facility, as demonstrated by the negative pressure field extension measurements collected following installation of the SSDS, discussed in Section 3.3.1, Pressure Field Extension Testing.

3.3 OPERATION

Following SSDS installation, system operation was monitored, which included post-installation pressure field testing and air sampling. Post-installation activities included routine inspection, monitoring, and maintenance procedures, which will be presented in greater detail in the pending

Vapor Intrusion Inspection, Monitoring, and Maintenance Work Plan (VIIMM Work Plan) (Farallon 2009c). Protocols for system shutdown will be provided in the VIIMM Work Plan.

3.3.1 Pressure Field Testing

Negative pressure field measurements were collected during the diagnostic testing phase to determine the SSDS design needed to depressurize the targeted area. A post-construction round of negative pressure measurements were collected by Advanced Radon Technologies on January 23, 2009 and compared against pre-installation measurements to confirm that the SSDS is adequately depressurizing the warehouse and manufacturing areas of the Olympic Facility. Ecology has determined that sub-slab negative pressure field extension measurements should exceed 0.005 inches of water column to adequately prevent vapor intrusion over the target area.

Negative pressure field testing was conducted while the SSDS was operating to obtain negative pressure measurements used to confirm that the sub-slab is adequately depressurized. (Figure 3; Table 2). At the time of the pressure field extension measurements, the reported outdoor air temperature was 69.4 degrees Fahrenheit and barometric pressure was 30.04 inches of mercury. Indoor air temperature and barometric pressure readings were not collected during the pressure field extension measurements. However, the pressure field extension measurements were made while the building was being normally ventilated and the HVAC was operating under standard conditions. The weather conditions for January 23, 2009 are provided in Appendix D.

Post-installation 3/8-inch-diameter borings were advanced at locations proximate to 3/8-inch-diameter borings used during pre-design testing (Figure 3; Table 3). A micromanometer was used to record the negative soil vapor pressure at each 3/8-inch-diameter post-installation boring for comparison against measurements recorded during pre-installation pressure field extension testing. The results of the negative pressure field extension diagnostic testing are presented in Table 2. Results of the SSDS post-construction negative pressure measurements are presented in Table 3. The measurements confirm that the SSDS provides sufficient depressurization to the target areas to prevent intrusion of VOCs to indoor air.

3.3.2 Air Sampling

An initial operation assessment was conducted on April 15, 2009 by collecting indoor and outdoor ambient air samples following installation and operation of the SSDS. Air samples were collected using 6-liter Summa canisters equipped with particulate filters and 8-hour flow controllers at the approximate sampling locations used during the previous investigation by GeoEngineers (2006) and were analyzed for TCE using EPA Method TO-15 SIM. A canister was placed in the manufacturing area and a canister was placed in the warehouse area in the Olympic Facility. The canisters were located at an approximate height of 5 to 6 feet above ground surface to provide an assessment of conditions at the employee breathing level. A canister was placed upwind of the Olympic Facility at a height of approximately 10 feet above ground surface to collect an outdoor ambient air sample. Temperature, wind speed, wind direction, and barometric pressure were monitored and recorded prior to, during, and at the conclusion of the air sampling event. Weather conditions obtained from the Washington State Department of Transportation (2009) for the nearby Seattle Boeing Field weather station are included in Appendix D.

The analytical results of the air sampling are presented in Table 1. Concentrations of VOCs were not detected above the laboratory reporting limit in any of the air samples. However, the laboratory reporting limits were elevated in two of the air samples due to the presence of high concentrations of non-target compounds, including 2-propanol and pentane. The laboratory analytical report is included in Appendix E.

3.3.3 Inspection, Monitoring, and Maintenance of Sub-Slab Depressurization System

System operation and maintenance (O&M) includes SSDS inspections to confirm effective operation. Modifications may be required during operation of the SSDS to ensure optimal system performance. The criteria for assessing whether system modifications are required will be selected in accordance with the *Summary of the Inhalation Pathway Interim Measures Approach* (PTC 2006) and will be discussed in the VIIMM Work Plan (Farallon 2009c). Initial criteria include the following:

- Structural changes in the Olympic Facility;
- An increase in concentrations of VOCs in groundwater that would result in a 10-fold increase in commercial groundwater CEFs or NCEFs in the vicinity of the Olympic Facility as indicated by periodic groundwater sampling events;
- A change in the SSDS system from baseline conditions; and
- Problems associated with SSDS O&M.

The draft VIIMM Work Plan will be submitted to Ecology within 30 days of completion of this VIM report. Capital will mail Olympic Facility tenants quarterly "reminders" to periodically check SSDS pressure gauges to confirm that the system is operating effectively. Tenants will be asked to turn the pressure gauge switch to "On" at each location at the Olympic Facility and then verify that the reading at each gauge is above zero, which would indicate that the system fan is operating properly. A copy of Capital's reminder notice is provided in Appendix F.

Farallon conducted post-installation air monitoring of emissions from the mitigation stack using a Gastec air sampling and testing system. A monitoring port was installed on the stack, and two 100-milliliters air samples were collected and analyzed for TCE. Concentrations of TCE were not detected above the detection limit of 0.125 parts per million. The discharge at the stack was measured to vent air at a rate of 151 standard cubic feet per minute. Based on these results, the calculated amount of TCE discharged to the atmosphere each year is less than 3.37 pounds (Table 4), which is less than the Puget Sound Clean Air Agency limit of 1,000 pounds per year for toxic air contaminants for soil and groundwater remediation projects.

4.0 CONCLUSIONS

Mitigation of vapor intrusion from VOCs has been determined by Ecology to be necessary at the Olympic Facility in accordance with Exhibits B and D of the Agreed Order. Following data collection, Advanced Radon Technologies designed and installed an SSDS at the Olympic Facility. Post-construction negative pressure field measurements were collected following installation and system start-up to confirm that the SSDS adequately depressurized the slab below the warehouse and manufacturing areas of the Olympic Facility. Post-construction and operation ambient air samples were collected to assess whether operation of the SSDS successfully reduced concentrations of VOCs in the warehouse and manufacturing areas of the Olympic Facility.

Laboratory analytical results did not detect concentrations of VOCs in the air samples collected over an 8-hour period. However, laboratory reporting limits were above target concentrations due to interference from non-target species. The non-target compounds will be included in future air sampling analyses to accurately quantify concentrations of VOCs. An additional air sampling event will be conducted during the winter of 2009/2010 to re-evaluate the effectiveness of the SSDS at the Olympic Facility. Data collected during inspections, monitoring, and maintenance will be presented in the VIIMM Work Plan (Farallon 2009c).

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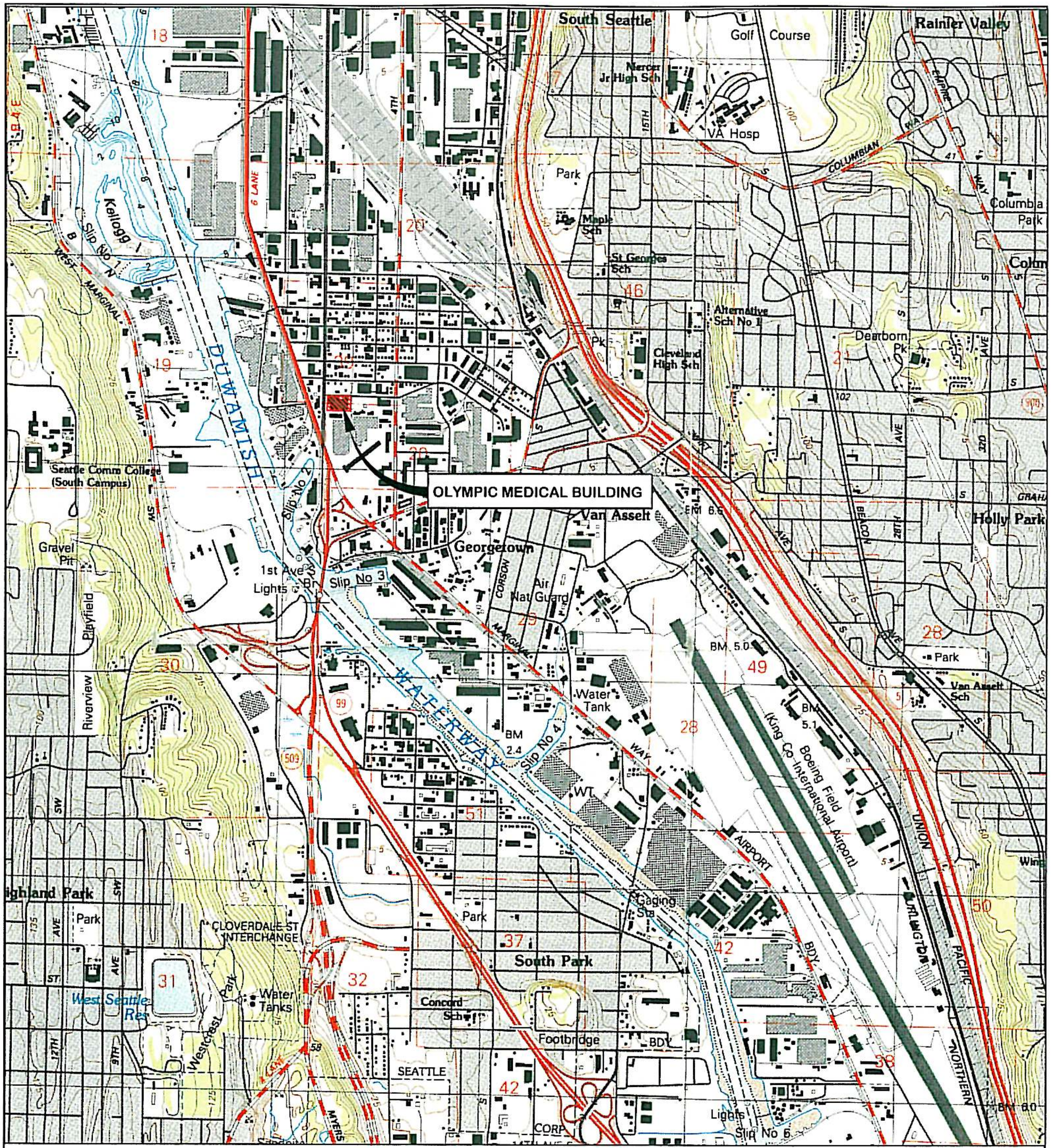
FIGURES

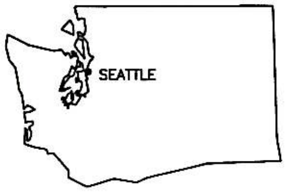
VAPOR INTRUSION MITIGATION REPORT
Olympic Medical Facility
5900 1st Avenue South
Seattle, Washington

Farallon PN: 457-004



REFERENCE: 7.5 MINUTE USGS QUADRANGLE SOUTH SEATTLE, WASHINGTON. DATED 1983

0 500
APPROXIMATE SCALE IN METERS



N

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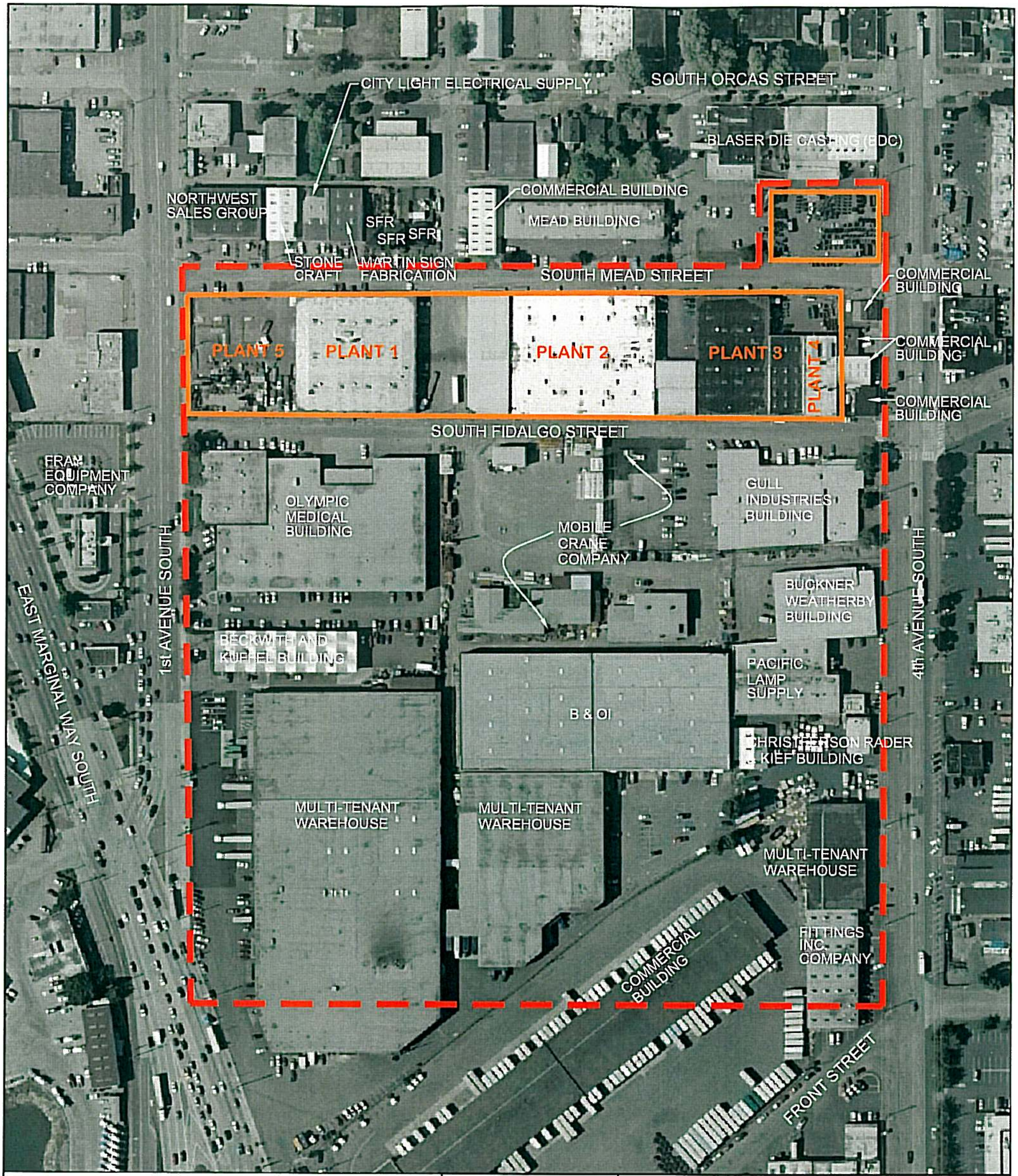
Issaquah, WA 98027

FIGURE 1

VICINITY MAP
VAPOR INTRUSION MITIGATION REPORT
OLYMPIC MEDICAL BUILDING
SEATTLE, WASHINGTON

FARALLON PN: 457-004

Drawn By: DEW	Checked By: DC	Date: 7/15/09	Disk Reference: FLOORJIM21



LEGEND

CAPITAL AREA OF INVESTIGATION

CAPITAL PROPERTY

SFR SINGLE FAMILY RESIDENCE

0 200

APPROXIMATE SCALE IN FEET

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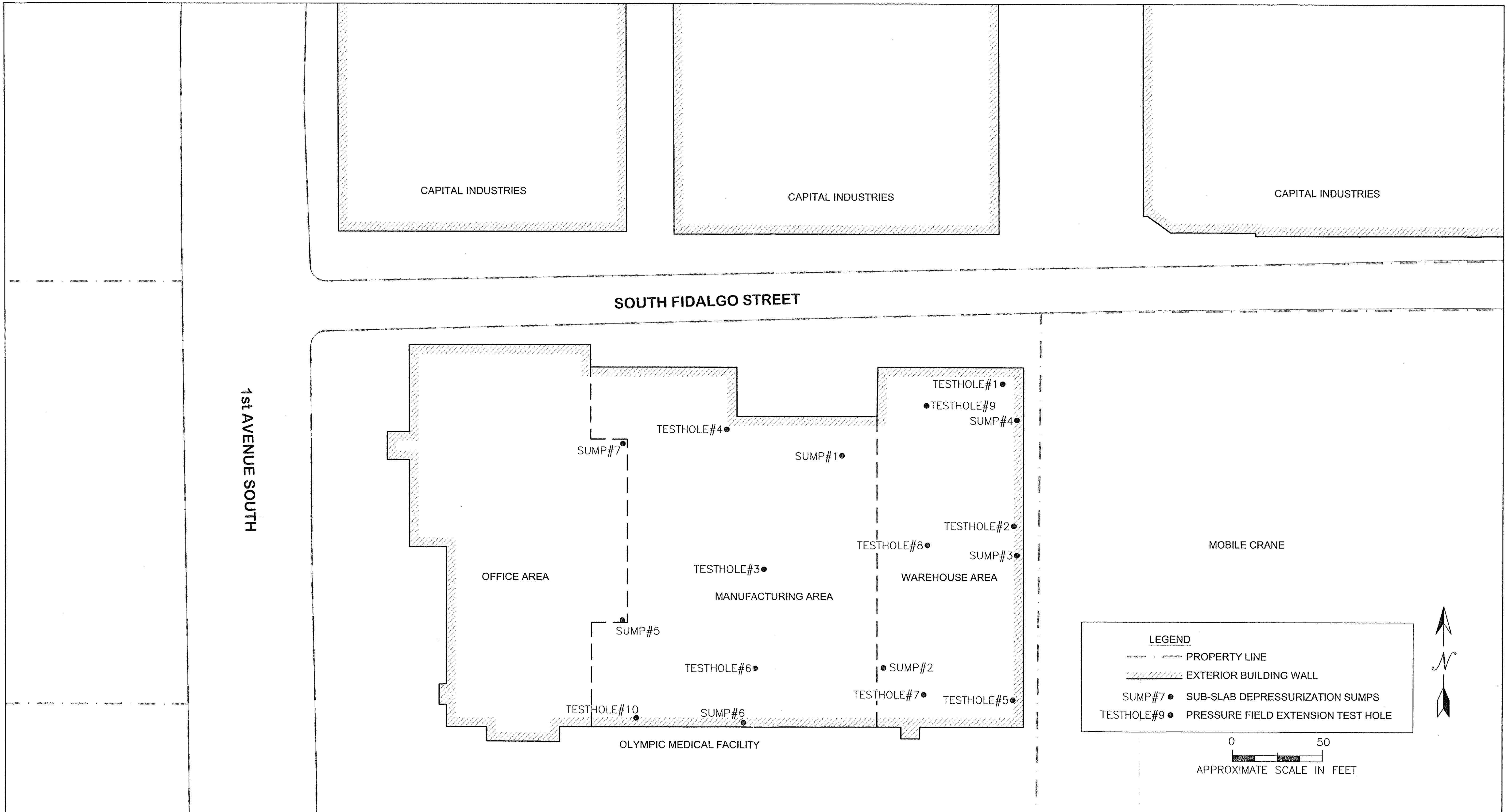
Issaquah, WA 98027

FIGURE 2

CAPITAL AREA OF INVESTIGATION
VAPOR INTRUSION MITIGATION REPORT
CAPITAL INDUSTRIES, INC.
SEATTLE, WASHINGTON

FARALLON PN: 457-004

Drawn By: DEW	Checked By: DC	Date: 7/28/09	Disk Reference: 457004a



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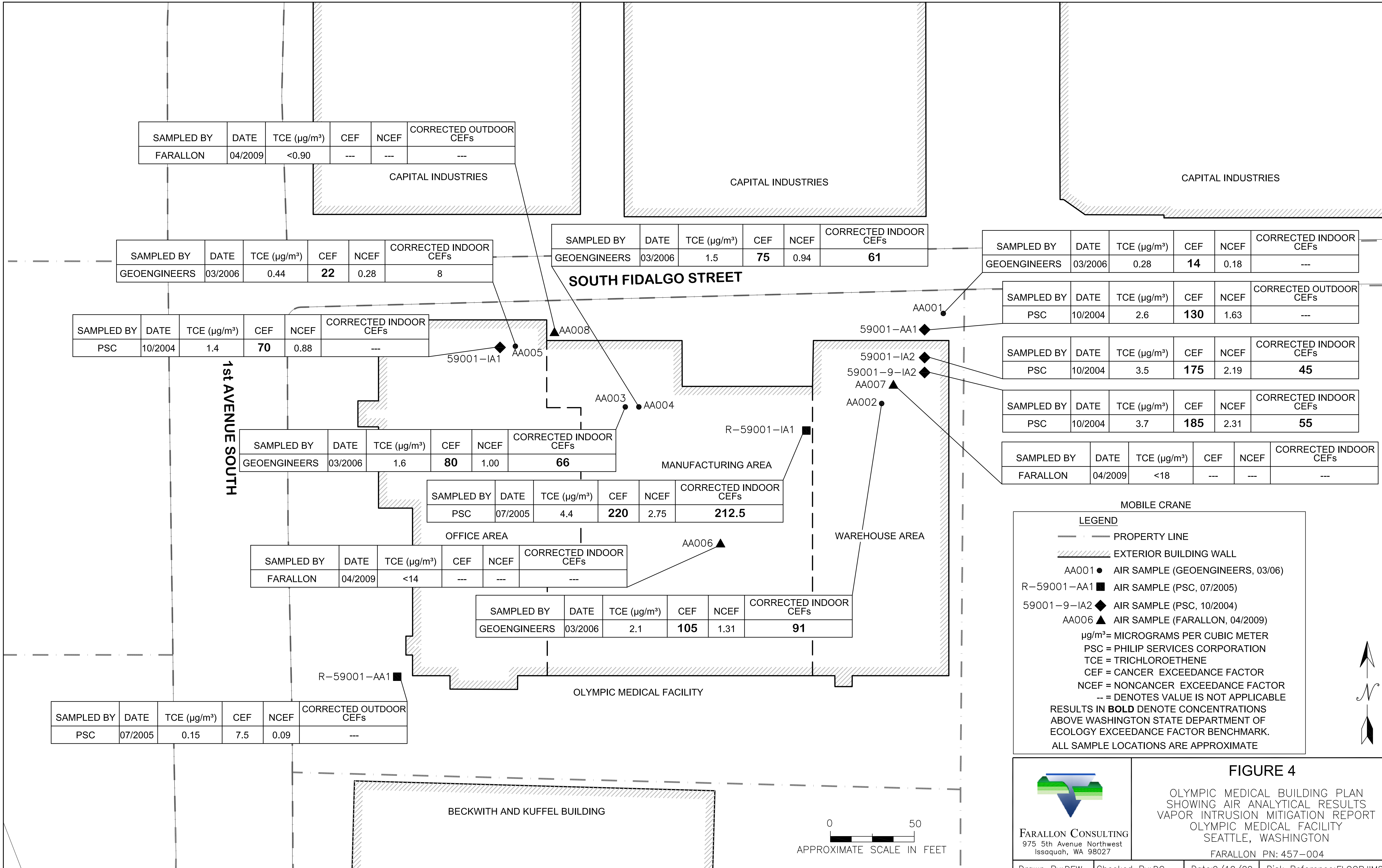
Issaquah, WA 98027

FIGURE 3

OLYMPIC MEDICAL BUILDING PLAN
VAPOR INTRUSION MITIGATION REPORT
OLYMPIC MEDICAL FACILITY
SEATTLE, WASHINGTON

FARALLON PN: 457-004

Drawn By: DEW | Checked By: DC | Date: 7/14/09 | Disk Reference: FLOORJIM21



AA008:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED OUTDOOR CEFs
FARALLON	04/2009	<0.90	---	---	---

AA005:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED INDOOR CEFs
GEOENGINEERS	03/2006	0.44	**22**	0.28	8

AA004:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED INDOOR CEFs
GEOENGINEERS	03/2006	1.5	**75**	0.94	**61**

AA001:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED INDOOR CEFs
GEOENGINEERS	03/2006	0.28	**14**	0.18	---

59001–AA1:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED OUTDOOR CEFs
PSC	10/2004	2.6	**130**	1.63	---

59001–IA2:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED INDOOR CEFs
PSC	10/2004	3.5	**175**	2.19	**45**

59001–9–IA2:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED INDOOR CEFs
PSC	10/2004	3.7	**185**	2.31	**55**

AA007:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED INDOOR CEFs
FARALLON	04/2009	<18	---	---	---

59001–IA1:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED INDOOR CEFs
PSC	10/2004	1.4	**70**	0.88	---

AA003:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED INDOOR CEFs
GEOENGINEERS	03/2006	1.6	**80**	1.00	**66**

R–59001–IA1:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED INDOOR CEFs
PSC	07/2005	4.4	**220**	2.75	**212.5**

AA006:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED INDOOR CEFs
FARALLON	04/2009	<14	---	---	---

AA002:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED INDOOR CEFs
GEOENGINEERS	03/2006	2.1	**105**	1.31	**91**

R–59001–AA1:

SAMPLED BY	DATE	TCE ($\mu g/m^3$)	CEF	NCEF	CORRECTED OUTDOOR CEFs
PSC	07/2005	0.15	7.5	0.09	---

FIGURE 4

OLYMPIC MEDICAL BUILDING PLAN SHOWING AIR ANALYTICAL RESULTS
VAPOR INTRUSION MITIGATION REPORT
OLYMPIC MEDICAL FACILITY
SEATTLE, WASHINGTON

FARALLON PN: 457–004

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

Drawn By: DEW | Checked By: DC | Date: 9/10/09 | Disk Reference: FLOORJIM21

TABLES

VAPOR INTRUSION MITIGATION REPORT
Olympic Medical Facility
5900 1st Avenue South
Seattle, Washington

Farallon PN: 457-004

Table 1
TCE in Air Analytical Results
Vapor Intrusion Mitigation
Olympic Medical Facility
Seattle, Washington
Farallon PN: 457-004

Sample Identification	Sampled By	Sample Date	Sample Location	Commercial Air IPIMALs[1]		TCE (µg/m³)[2]	CEF[3]	NCEF[3]	Corrected Indoor CEF[4]
				Cancer (µg/m³)	Noncancer (µg/m³)				
59001-IA1	PSC	10/2004	Office	0.02	1.6	1.4	**70**	0.88	--
59001-IA2	PSC	10/2004	Warehouse	0.02	1.6	3.5	**175**	2.19	**45**
59001-9-IA2	PSC	10/2004	Warehouse	0.02	1.6	3.7	**185**	2.31	**55**
59001-AA1	PSC	10/2004	Outdoor	0.02	1.6	2.6	**130**	1.63	--
R-59001-IA1	PSC	07/2005	Manufacturing	0.02	1.6	4.4	**220**	2.75	**212.5**
R-59001-AA1	PSC	07/2005	Outdoor	0.02	1.6	0.15	7.5	0.09	--
AA001	GeoEngineers	03/2006	Outdoor	0.02	1.6	0.28	**14**	0.18	--
AA002	GeoEngineers	03/2006	Warehouse	0.02	1.6	2.1	**105**	1.31	**91**
AA003	GeoEngineers	03/2006	Manufacturing	0.02	1.6	1.6	**80**	1.00	**66**
AA004	GeoEngineers	03/2006	Manufacturing	0.02	1.6	1.5	**75**	0.94	**61**
AA005	GeoEngineers	03/2006	Office	0.02	1.6	0.44	**22**	0.28	8
AA006	Farallon	4/15/2009	Manufacturing	0.02	1.6	<14[6]	--	--	--
AA007	Farallon	4/15/2009	Warehouse	0.02	1.6	<18[6]	--	--	--
AA008	Farallon	4/15/2009	Outdoor	0.02	1.6	<0.90	--	--	--
Ecology Exceedance Factor Benchmarks[5]							**10**	**10**	**10**

Notes:

Results in **bold** denote concentrations above Ecology Exceedance Factor Benchmark.

-- denotes value not applicable.

[1]Commercial Air IPIMALs for TCE as part of the IPIM Approach, developed by PSC and Ecology.

[2]Analyzed by U.S. Environmental Protection Agency Method TO-15 SIM .

[3]CEFs and NCEFs are calculated by dividing the corrected indoor air concentrations by cancer and noncancer-based indoor air IPIMALs, respectively.

[4]Corrected indoor CEFs are calculated by subtracting the outdoor CEF from the individual indoor CEFs for each sampling location.

[5]A CEF/NCEF of 10 indicates that exposure to indoor air concentrations could potentially lead to a cumulative risk of 1E-05, and further evaluation is recommended to determine if assessment at the location should proceed to Tier 4.

[6]Laboratory reporting limits were elevated due to the presence of high level non-target compounds.

Ecology = Washington State Department of Ecology

CEF = cancer exceedance factor

GeoEngineers = GeoEngineers, Inc.

IPIM = Inhalation Pathway Interim Measure

IPIMALs = Inhalation Pathway Interim Measures Action Levels

µg/m³ = micrograms per cubic meter

NCEF = noncancer exceedance factor

PSC = Philip Services Corporation

SIM = selective ion monitoring

TCE = trichloroethene

Table 2
Negative Pressure Field Extension Testing Measurements[1]
Vapor Intrusion Mitigation
Olympic Medical Facility
Seattle, Washington
Farallon PN: 457-004

Test Hole[2]	Pressure Applied to Sump[3]	Negative Pressure[4]
Sump #1		
1	20	0.025
2		0.009
3		0.010
4		0.010
Sump #2		
1	20	0.011
3		0.021
4		0.016
5		0.003
6		0.008
7		0.130
8		0.013
9		0.025
Sump #3		
1	20	0.000
5		0.012
8		0.016
9		0.012
Sump #4		
1	20	1.170
8		0.002
9		0.063
Sump #5		
3	20	0.011
6		0.005
Sump #6		
3	20	0.019
6		0.144
10		0.034
Sump #7		
3	20	0.000
4		0.050

Notes:

[1]All measurements were taken prior to installation of the sub-slab depressurization system.

[2]Test hole locations are presented on Figure 3 of the Vapor Intrusion Mitigation Report.

[3]Pressure is shown in negative inches of water column.

[4]Pressure measurements shown here were collected using a portable micromanometer from a small hole drilled through the building slab.

Table 3
Sub-Slab Depressurization System Post-Installation Pressure Extension Measurements
Vapor Intrusion Mitigation
Olympic Medical Facility
Seattle, Washington
Farallon PN: 457-004

SSDS Pressure Gauge Measurements

Sump[1]	Date	Pressure[2,3]
1	1/23/2009	7.0
2	1/23/2009	6.5
3	1/23/2009	7.0
4	1/23/2009	NA[4]
5	1/23/2009	7.0
6	1/23/2009	7.0
7	1/23/2009	6.5

Notes:

[1]Sump locations are presented on Figure 3 of the Vapor Intrusion Mitigation Report.

[2]Pressure measurements shown here were collected from the pressure gauge installed on the piping above each sump.

[3]Pressure is shown in inches of water column.

[4]The pressure gauge at sump #4 was not accessible during this event.

Negative Pressure Extension Measurements

Test Hole[5]	Date	Time	Negative Pressure[6,7]
1	1/23/2009	9:42 AM	0.268
2	1/23/2009	9:47 AM	0.147
3	1/23/2009	10:05 AM	0.008
4	1/23/2009	9:48 AM	0.008
5	1/23/2009	9:55 AM	0.040
6	1/23/2009	10:15 AM	0.040
7	1/23/2009	9:50 AM	0.310
8	1/23/2009	9:45 AM	0.120
9	1/23/2009	9:43 AM	0.150
10	1/23/2009	10:25 AM	0.005

Notes:

[5]Test hole locations are presented on Figure 3 of the Vapor Intrusion Mitigation Report.

[6]The pressure measurement shown here was collected using a portable micromanometer from a small hole drilled through the building slab.

[7]Pressure is shown in negative inches of water column.

Table 4
TCE Discharge Calculations
Vapor Intrusion Mitigation
Olympic Medical Facility
Seattle, Washington
Farallon PN: 457-004

TCE DISCHARGE CALCULATIONS							
	TCE[1] (ppm vol)	**Flow (cfm)**	**Air Density (lbs/cf)**	**Time (min/year)**	**TCE Molecular Weight**	**Air Molecular Weight**	**Total Discharge (lbs/year)**
Blower Discharge	< 0.125	151	0.0748	525948.7	131.4	28.96	**< 3.37**

CALCULATION FORMULA FOR POUNDS TCE PER YEAR:

$$\frac{\text{ppm-vol} \times \text{flow (cfm)} \times \text{air density (lb/cf)} \times 525948.7\ \text{(min/year)} \times \text{TCE molecular weight}}{28.96\ \text{(air molecular weight)} \times 1{,}000{,}000}$$

NOTES:

[1] via Gastec System

cfm = cubic feet per minute
lbs/year = pounds per year
lbs/cf = pounds per cubic foot
min/year = minutes per year
ppm vol = parts per million volume
TCE = trichloroethene

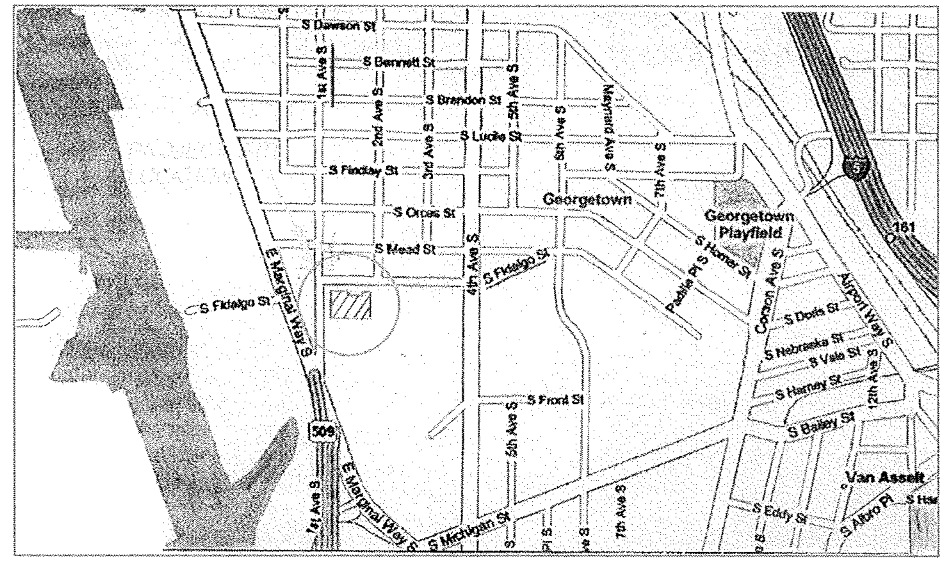
APPENDIX A
MECHANICAL PLAN PERMIT APPLICATION

VAPOR INTRUSION MITIGATION REPORT
Olympic Medical Facility
5900 1st Avenue South
Seattle, Washington

Farallon PN: 457-004

OLYMPIC MEDICAL BUILDING
City of Seattle
Department of Planning & Development

Olympic Medical Building
5900 1st. Avenue South
Seattle, Washington
98108-3248



MECHANICAL ENGINEER:

MANDATORY CODE COMPLIANCE

	VOC PIPING (VOLATILE ORGANIC COMPOUND)		CAPPED END	AFF	ABOVE FINISHED FLOOR
	CONTINUATION OF PIPING		PLAN NOTE	BV	BALL VENT
	TEE DOWN		SECTION DESIGNATION / SHEET ON WHICH SECTON IS DRAWN	CU	CONDENSING UNIT
	TEE UP			EF	EXHAUST FAN
	ELBOW DOWN		DETAIL DESIGNATION / DETAIL NUMBER / SHEET ON WHICH DETAIL IS DRAWN	FA	FRESH AIR INTAKE
	ELBOW UP			IE	INVERT ELEVATION
	EXHAUST FAN			RD	ROOF DRAIN
				RV	RELIEF VENT
				RTU	ROOF TOP UNIT
				TYP	TYPICAL
				VOC	VOLATILE ORGANIC COMPOUND
				VTR	VENT THRU ROOF

GENERAL NOTES

1. EQUIPMENT AND MATERIAL REMOVED SHALL BECOME PROPERTY OF THE CONTRACTOR UNLESS NOTED OTHERWISE AND SHALL BE REMOVED OFF-SITE.
2. DRAWINGS ARE PARTLY DIAGRAMMATIC AND DON'T NECESSARILY SHOW EXACT CONDITIONS OF CONSTRUCTION. LOCATION OF PIPING SHALL BE FIELD VERFIED TO DETERMINE THAT IT CLEARS ALL OPENINGS AT STRUCTURAL MEMBERS, CHASES AND THAT EQUIPMENT, ETC. HAVING FIXED LOCATIONS WILL BE CLEARED.
3. EXAMINE PREMISES AND BECOME FAMILIAR WITH EXISTING CONDITONS BEFORE STARTING WORK. FIELD VERIFY CONSTRUCTION MATERIALS OF FLOORS, WALLS, CEILINGS AND ROOFS BEFORE STARTING WORK. OTHER EXISTING MATERIALS AND EQUIPMENT ARE NOT SHOWN ON THESE DRAWINGS SUCH AS DUCTWORK, HVAC EQUIPMENT, HEATING PIPING, GAS PIPING, CONDUIT, ETC. THE CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND SIZES OF EXISTING MATERIALS AND EQUIPMENT AND SHALL OFFSET NEW PIPING AS NECESSARY AROUND EXISTING MATERIALS AND EQUIPMENT.
4. REMOVE MEANS, REMOVE AND DISPOSE OF UNLESS SPECIFICALLY DIRECTED OTHERWISE.
5. DO NOT ALLOW ANY WORK (PIPING/EQUIPMENT) TO BE COVERED UP OR ENCLOSED UNTIL INSPECTED, TESTED AND APPROVED BY AUTHORITY HAVING JURISDICTION AND/OR THE OWNER'S REPRESENTATIVE.
6. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. WHERE CONFLICTS OCCUR, BRING THOSE TO THE ATTENTION OF THE DESIGN ENGINEER IMMEDIATELY AND BEFORE INSTALLING THE PIECE OF EQUIPMENT OR ITEM.
7. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY SAW CUTTING AND CORE DRILLING AND PATCHING OF FLOORS, WALLS, CEILINGS AND ROOFS IN ORDER TO INSTALL THE NEW VOC SYSTEMS.
8. THE CONTRACTOR SHALL ARRANGE AND PAY FOR ALL PERMITS, INSPECTIONS AND FEES REQUIRED IN CONNECTION WITH THIS PROJECT.

M-1	COVER SHEET
M-2	SITE PLAN
M-3	ROOF PLAN
M-4	DETAILS & SCHEDULE

PLOT SCALE: 1/4"=1'-0"

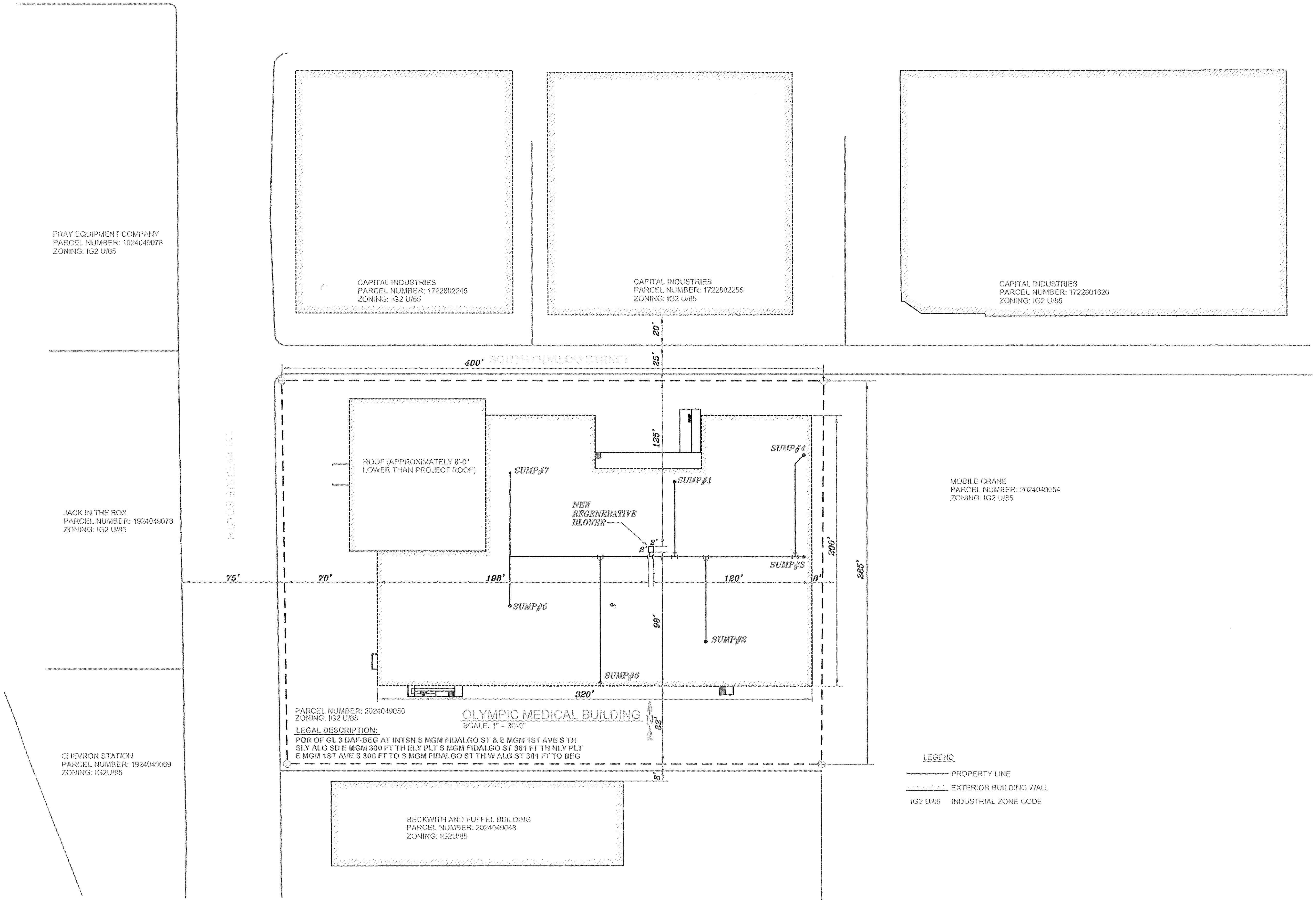
326-5127

RADON MITIGATION TESTING AND INSTALLATION
NORTH 2801 MONROE, SUITE A
SPOKANE, WASHINGTON
(509) 326-5127

PROJECT:
SEATTLE, WASHINGTON 98108-3248

JOB NO.: 6198563
DATE: 11/07/08
DRAWN: KJ
CHECKED: DG

SHEET NO.:



SCALE: 1"=30'

ADVANCED RADON TECHNOLOGIES

RADON MITIGATION TESTING AND INSTALLATION

NORTH 2801 MONROE, SUITE A
SPOKANE, WASHINGTON
(509) 326-5127

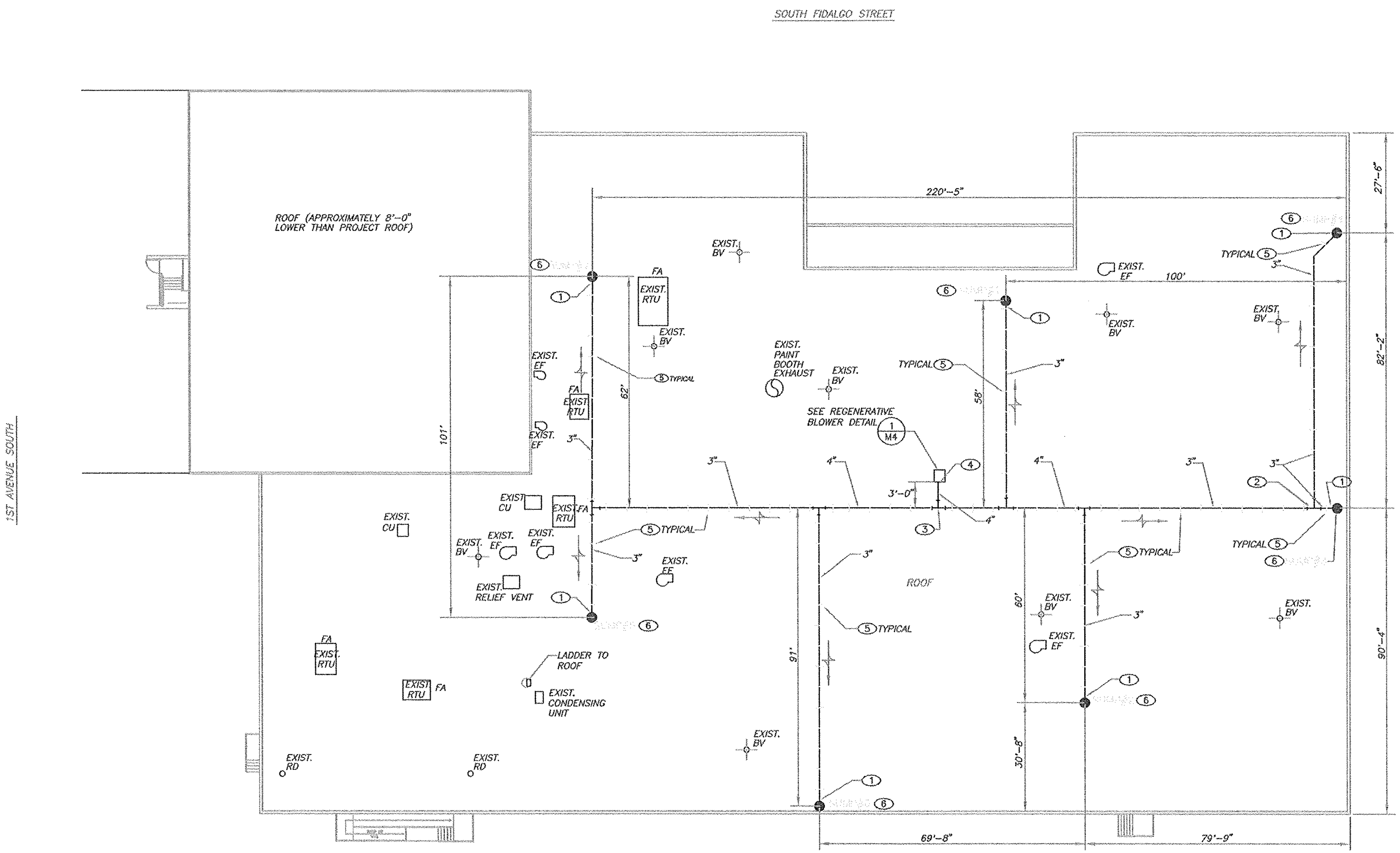
326-5127

PROJECT:

SEATTLE, WASHINGTON 98108-3248

JOB NO.: 6198563
DATE: 11/07/08
DRAWN: KJ
CHECKED: DG

SHEET NO.:



PLAN NOTES:

1. PIPE INVERT ELEVATION AT THIS APPROXIMATE LOCATION IS 12 INCHES ABOVE ROOF LEVEL.
2. PIPE INVERT ELEVATION AT THIS APPROXIMATE LOCATION IS 22 INCHES ABOVE ROOF LEVEL.
3. PIPE INVERT ELEVATION AT PIPE TEE AT THIS APPROXIMATE LOCATION IS 35 INCHES ABOVE ROOF LEVEL.
4. PIPE INVERT ELEVATION AT INLET CONNECTION TO BLOWER FAN IS 38 INCHES ABOVE ROOF LEVEL.
5. CONTRACTOR SHALL PROVIDE ROOF PIPE SUPPORT SADDLES A MINIMUM OF EVERY 6 FEET FOR PIPE SUPPORT ON ROOF. PIPING ON ROOF SLOPES 1/8" PER FOOT. PIPE SADDLE SUPPORT HEIGHTS VARY. CONTRACTOR SHALL FIELD VERIFY DURING INSTALLATION OF PIPE SADDLE SUPPORTS THE EXACT HEIGHTS FOR EACH SUPPORT SADDLE INSTALLED ON ROOF AS REQUIRED.
6. SEE DETAIL SHEET M4 FOR SUMP INSTALLATIONS SUMP #1 THROUGH SUMP #7.

EXIST. RTU = 80 sg. ft. x 5 = 400 sq. ft.
EXIST. EF = 4 sg. ft. x 7 = 28 sq. ft.
EXIST. CU = 9 sg. ft. x 4 = 36 sq. ft.
EXIST. BV = 1 sg. ft. x 9 = 9 sq. ft.
EXIST. RV = 2 sg. ft. x 1 = 2 sq. ft.
EXIST. RD = .5 sg. ft. x 2 = 1 sq. ft.
NEW BLOWER= 4 sg. ft. x 1 = 4 sq. ft.
TOTAL APPROX. SQ.FT. = 480 sq. ft.

ROOF AREA = 52,800 GSF
EXISTING HVAC EQUIPMENT AREA = 476 GSF
NEW HVAC EQUIPMENT AREA = 4 GSF
ROOF COVERAGE = $\frac{\text{EXIST. HVAC (476) + NEW HVAC (4)}}{52,800}$ X 100% = .91%

NEW REGENERATIVE BLOWER = 83 dBA
DISTANCE TO CLOSEST PROPERTY LINE = 130 FT.
dBA REDUCTION FROM EQUIPMENT (TABLE 2) 38 dBA
NET SOUND LEVEL = 83 dBA − 38 dBA = 45 dBA

OLYMPIC MEDICAL BUILDING - VOC MITIGATION SYSTEM ROOF PLAN
SCALE: 1/16" =1'-0"

PLOT SCALE: 1/4"=1'-0"

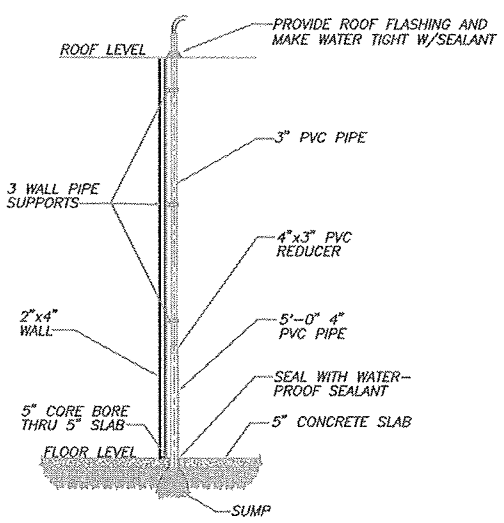
THOMAS R. GIRARD — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER
EXPIRES 7/20/09

326-5127

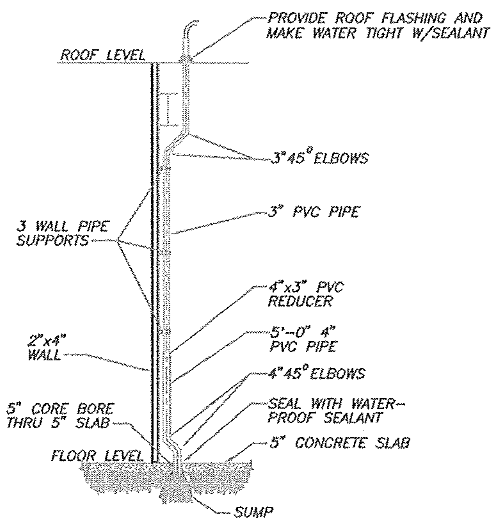
ADVANCED RADON TECHNOLOGIES
RADON MITIGATION TESTING AND INSTALLATION
NORTH 2801 MONROE, SUITE A
SPOKANE, WASHINGTON
(509) 326-5127

PROJECT:
VOC MITIGATION SYSTEM
OLYMPIC MEDICAL BLDG.
5900 1ST AVENUE SOUTH
SEATTLE, WASHINGTON 98108-3248

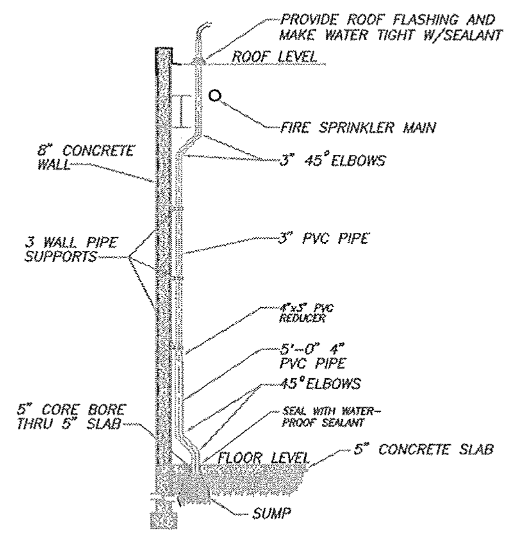
JOB NO.: 6198563
DATE: 11/07/08
DRAWN: KJ
CHECKED: DG
SHEET NO.: M1



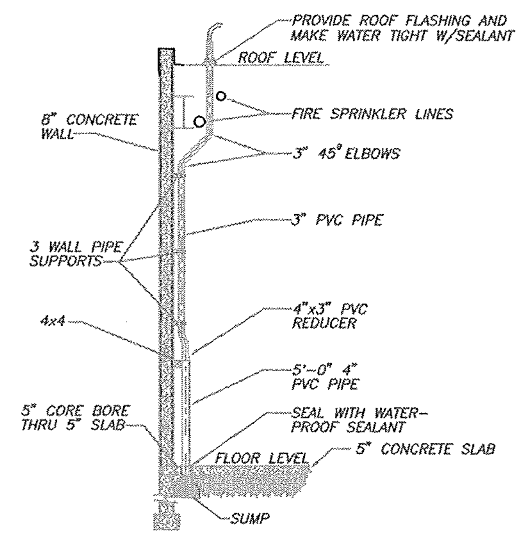
SUMP NO. 1
SCALE: 1/4" =1'-0"



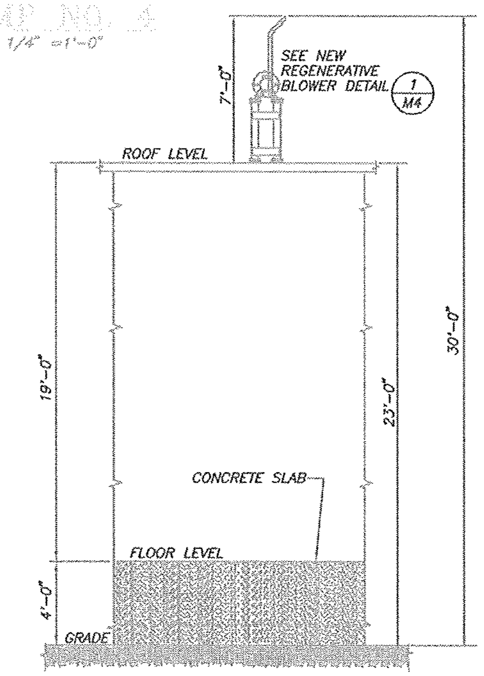
SUMP NO. 2
SCALE: 1/4" =1'-0"



SUMP NO. 3
SCALE: 1/4" =1'-0"



SUMP NO. 4
SCALE: 1/4" =1'-0"

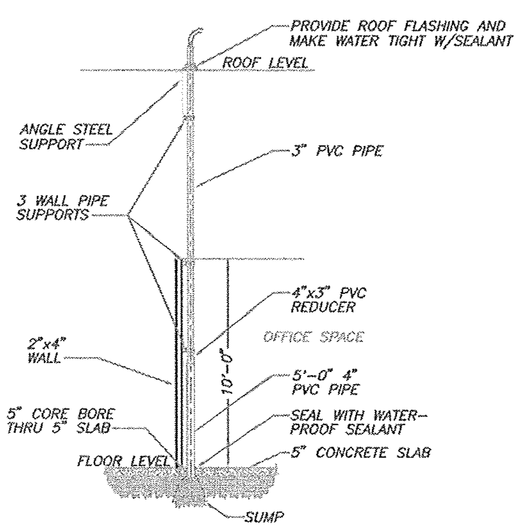


ELEVATION VIEW
SCALE: 1/4" =1'-0"

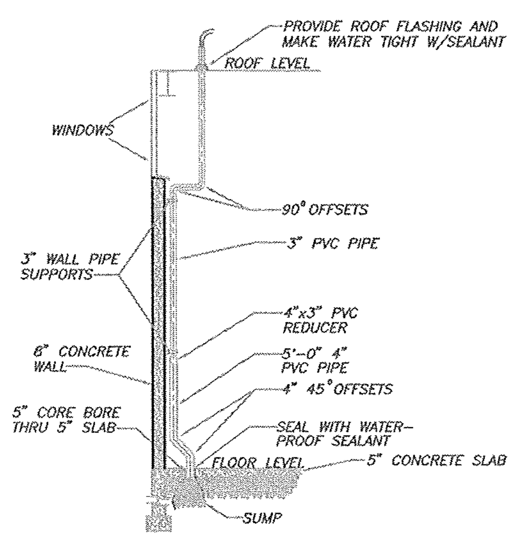
REGENERATIVE BLOWER SCHEDULE													
UNIT #	BRAND NAME	MODEL #	MOTOR ENCLOSURE SHAFT MATERIAL	HP	VOLTAGE	PHASE-FREQUENCY	INSULATION CLASS	NEMA RATED MOTOR AMPS	SERVICE FACTOR	LOCKED ROTOR AMPS	MAXIMUM BLOWER AMPS	RECOMMENDED NEMA STARTER SIZE	SHIPPING WEIGHT
1	ROTRON	DR656K72X	TEFC-CS	3	230/460	3-60-Hz	F	7.4/3.7	1.15	54/27	8.8/4.4	0/0	114 lb.

NOTES:

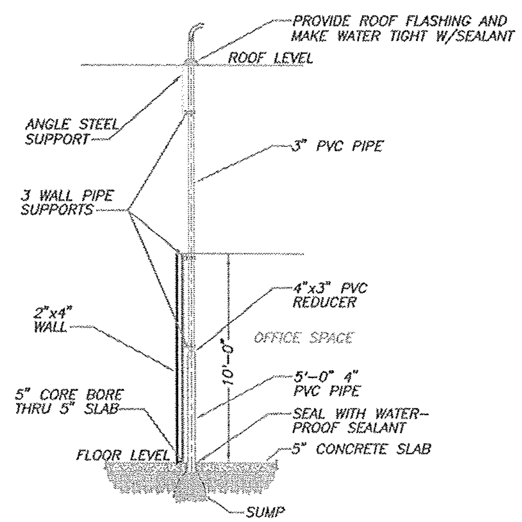
1. MAXIMUM FLOW: 210 SCFM; MAXIMUM PRESSURE: 106 IWG; MAXIUMUM VACUUM: 6.39"Hg (87 IWG); CAST ALUMINUM BLOWER HOUSING, IMPELLER & COVER, CAST IRON MUFFLER EXTENSION & FLANGES (THREADED); PERMANENTLY SEALED BALL BEARINGS; INLET & OUTLET INTERNAL MUFFLING.
2. MANUFACTURED BY AMETEK TECHNICAL AND INDUSTRIAL PRODUCTS KENT, OHIO 44240 e-mail: rotronindustrical@ametek.com internet: www.ametektmd.com
2. REGENERATIVE BLOWER MOTOR TO BE HIGH EFFICIENCY. BLOWER TO MEET 2006 NON-RESIDENTIAL ENERGY CODE EFFICIENCY REQUIREMENTS AS A MINIMUM.



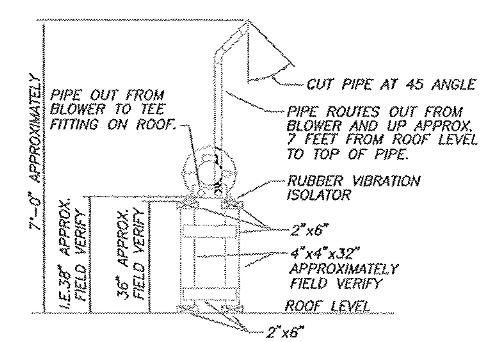
SCALE: 1/4" =1'-0"



SCALE: 1/4" =1'-0"



SCALE: 1/4" =1'-0"



SCALE: 1/2" =1'-0"

SCALE:1/4"=1'-0"

326-5127

RADON MITIGATION TESTING AND INSTALLATION
NORTH 2801 MONROE, SUITE A
SPOKANE, WASHINGTON
(509) 326-5127

PROJECT:
SEATTLE, WASHINGTON 98108-3248

JOB NO.: 6198563
DATE: 11/07/08
DRAWN: KJ
CHECKED: DG

SHEET NO.:

APPENDIX B
PHOTOGRAPHS

VAPOR INTRUSION MITIGATION REPORT
Olympic Medical Facility
5900 1st Avenue South
Seattle, Washington

Farallon PN: 457-004

SITE PHOTOGRAPHS

Vapor Intrusion Mitigation Report
Olympic Medical Facility
Seattle, Washington
Farallon PN: 457-004

Photograph 1: Riser leading to roof network with gauge.

Photograph 2: Visible portion of sump.

Photograph 3: Depressurization leg and gauge.

Photograph 4: System gauge and polyvinyl chloride tubing leading to roof network.

Photograph 5: Pressure hose leading from depressurization leg to gauge.

Photograph 6: System gauge open to depressurization leg.

Photograph 7: Roof network.

Photograph 8: Roof network looking east from blower.

Photograph 9: Roof network looking west from blower.

Photograph 10: Roof network looking northeast.

Photograph 11: Roof network and stack.

Photograph 12: Blower and stack looking south. Air intake is approximately 40 feet away.

Photograph 13: SSES System 004.

Photograph 14: Blower and stack looking southeast.

Photograph 15: Blower and stack with nearest air intake in the distance, approximately 36 feet away.

Photograph 16: Stack with air sampling port (plugged).

Photograph 17: Blower with warning signs.

Photograph 18: Warning signs posted by blower and stack.

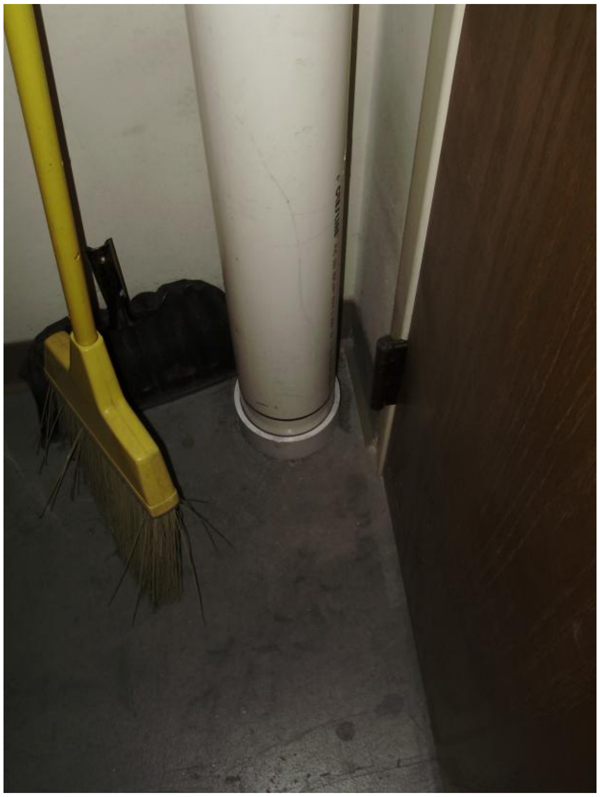
Photograph 19: Stack signage, left side.

Photograph 20: Stack signage, right side.

Photograph 21: Roof system signage.

SITE PHOTOGRAPHS
Vapor Intrusion Mitigation Report
Olympic Medical Facility
Seattle, Washington

Photograph 1: Riser leading to roof network with gauge.



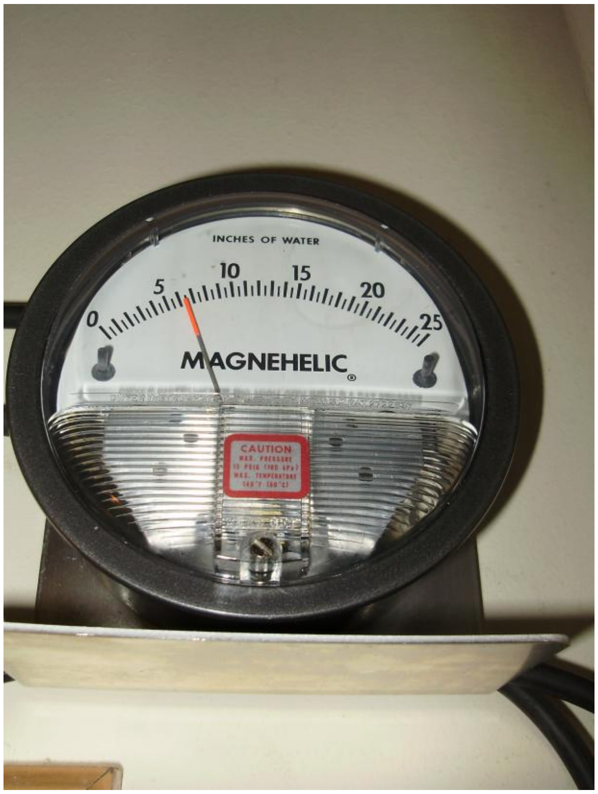
Photograph 2: Visible portion of sump.

Photograph 3: Depressurization leg and gauge.

Photograph 4: System gauge and polyvinyl chloride tubing leading to roof network.

SITE PHOTOGRAPHS (continued)
Vapor Intrusion Mitigation Report
Olympic Medical Facility
Seattle, Washington

Photograph 5: Pressure hose leading from depressurization leg to gauge.



Photograph 6: System gauge open to depressurization leg.

SITE PHOTOGRAPHS (continued)
Vapor Intrusion Mitigation Report
Olympic Medical Facility
Seattle, Washington

Photograph 7: Roof network.

Photograph 8: Roof network looking east from blower.

Photograph 9: Roof network looking west from blower.

Photograph 10: Roof network looking northeast.

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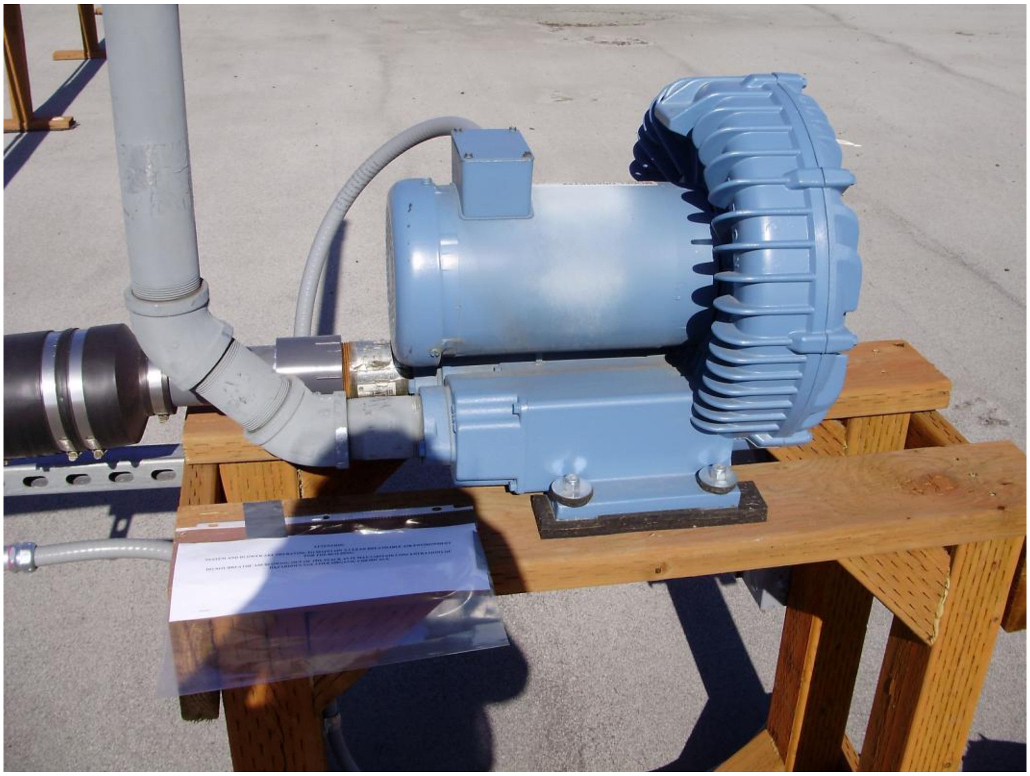
Photograph 16: Stack with air sampling port (plugged).

SITE PHOTOGRAPHS (continued)
Vapor Intrusion Mitigation Report
Olympic Medical Facility
Seattle, Washington



Photograph 17: Blower with warning signs.

Photograph 18: Warning signs posted by blower and stack.

Photograph 19: Stack signage, left side.

Photograph 20: Stack signage, right side.

Photograph 21: Roof system signage.

APPENDIX C
ASTM STANDARD PRACTICE E2121-03 SYSTEM INSTALLATION CHECKLIST

VAPOR INTRUSION MITIGATION REPORT
Olympic Medical Facility
5900 1st Avenue South
Seattle, Washington

Farallon PN: 457-004

ASTM Standard Practice E2121-03
System Installation Checklist

This checklist is completed following the installation of every IPIM Tier 4 Depressurization System to ensure that the system meets the requirements for a Radon Mitigation System, as outlined in ASTM E2121-03.
(Numbers in parentheses indicate the location of this item in the ASTM standard)

General Practices

✓ The system was designed and installed to conform to applicable building codes, and to maintain the function and operation of all existing equipment and building features, including doors, windows, access panels, etc. (7.1.1)

✓ Prior to the start of work, the building owner and tenant were informed of the nature of work to be done, the use of any potentially hazardous solvents or other materials, and the need to ventilate work areas during and after such materials as recommended by the manufacturer of the material. (7.1.2)

✓ Prior to installing the depressurization system, a visual inspection of the building was done to evaluate characteristics of the building that might affect the depressurization system performance. (7.1.3)

N/A Where the contractor (ART) had concerns about the potential for back drafting, a qualified person was hired to inspect the natural draft combustion appliances and venting systems for compliance with local codes and regulations. Where noncompliance was found, the building owner was requested to bring the non-complying appliance or venting system into compliance. (7.1.4)

System Design

✓ The depressurization system was designed and installed to avoid the creation of other health, safety, and environmental hazards to building occupants, such as spillage/spillage of natural draft combustion appliances, constriction of blockage of building exits with pipe runs, or degradation of fire rated assemblies with pipe, or cabling penetrations, or both. (7.2.2)

✓ The depressurization system design was not limited to safety, vapor reduction effectiveness, and compliance with building codes and regulations. The system design was also concerned with installation costs, operating costs, energy usage, durability, reliability, maintainability, physical comfort for occupants, quietness for occupants and neighbors, and impact on interior and exterior building appearance. (7.2.3)

System Installation
General Requirements

✓ All components of the depressurization system are in compliance with the applicable mechanical, electrical, building, plumbing, energy and fire prevention codes, standards, and regulations of the local jurisdiction. (7.3.1.1)

N/A Where portions of structural framing were removed to accommodate system components, the amount of the member removed was no greater than that permitted for plumbing installations by applicable building or plumbing codes. (7.3.1.2)

Pipe Installation Requirements

✓ All vent piping is solid, rigid pipe not less than 3 inches inside diameter (ID). The vent stack piping ID is at least as large as the largest used in the manifold piping. All manifold piping is rigid pipe not less than 3 inches ID. The manifold pipe ID is at least as large as that used in any suction point. Manifold piping to which two or more suction points are connected is at least 4 inches ID. All suction point piping is rigid pipe not less than 3 inches ID. Alternate pipe sizes were only used when it was justified by field diagnostic measurements, including static pressure, air velocity, and the rate of air flow measurements, and documented using the methodologies found in "Industrial Ventilation: A Manual of Standard Practice, 23rd Edition". When alternate pipe sizes were used, a statement of justification, including justification methodology, calculations employed, and all site-specific field data collected was prepared. (7.3.2.1)

✓ All pipe joints and connections, both interior and exterior, were sealed permanently. Exceptions include installation of fans and sump covers, which may need to be accessed periodically. (7.3.2.2)

✓ Piping installed in the interior or on the exterior of the building is installed or insulated in such a manner to prevent exterior pipe condensation from dripping and damaging floors or ceilings, and to prevent condensation on the interior of the pipe from freezing and partially or fully blocking the soil-gas exhaust. (7.3.2.3)

✓ System piping is fastened to the structure of the building with hangers, strapping, or other supports that will secure it adequately. System piping is not attached to or supported by existing pipes, ducts, conduits, or any kind of equipment. System piping does not block windows or doors or access to other installed equipment. (7.3.2.4)

✓ Supports for system piping are installed at least every 6 feet on horizontal runs. Vertical runs are secured either above or below the points of penetration through floors, ceilings, or the roof, or at least every 8 feet on runs that do not penetrate floors, ceilings, or the roof. (7.3.2.5)

✓ To prevent blockage of airflow into the bottom of suction point pipes, pipes are supported and secured in a permanent manner that prevents their downward movement to the bottom of suction pits or sump pits, or into the soil beneath the soil-gas-retardant membrane. (7.3.2.6)

✓ Horizontal pipe runs are sloped to ensure that water from rain or condensation drains downward into the ground beneath the slab or soil-gas-retardant membrane. (7.3.2.7)

N/A Where sump pumps are located in sump pits, the system was designed to facilitate removal of the sump pit cover for sump pump maintenance. (7.3.2.8)

✓ The discharge from vent stack pipes is at least: (7.3.2.9) (7' Above Roof Line

N/A Vertical and upward, outside the structure, at least 10 feet above the ground level, and above the edge of the roof;

✓ Where practical, the vent stack is above the highest roof of the building and above the highest ridge;

- Ten feet or more away from any window, door, or other opening into conditioned or otherwise occupiable spaces of the structure if the vapor discharge point is not at least 2 feet above the top of such openings;
- Ten feet or more away from any opening into conditioned or other occupiable spaces of an adjacent building. An opening includes chimney flues;
- Vent stacks that penetrate the roof are at least 12 inches above the surface of the roof. Vent stacks pipes attached to or penetrating the sides of buildingshave a vertical discharge that is a minimum of 6 inches above the edge of the roof;
- Where a horizontal run of vent stack pipe penetrates gable end walls, the pipe outside of the structure was routed to a vertical position and the vent stack meets the requirements listed above;
- Discharge points that are not in a direct line of sight from openings into conditioned or otherwise occupiable space meet the vent stack separation requirements listed above.

Fan Installation Requirements

✓ The system fan was installed either outside of the building, or inside the building, outside of occupiable space and above the conditioned spaces of the building. The fan location was chosen to minimize the risk of vapor entry into living spaces that could result from leaks in the fan housings or in the vent stack piping above the fan. (7.3.3.2)

✓ The fan was installed in a configuration that avoids condensation buildup in the fan housing. (7.3.3.3)

✓ If the fan was mounted on the exterior of the building, the fan is rated for outdoor use or it was installed in a weatherproof protective housing. (7.3.3.4)

✓ The fan was mounted and secured in a manner that minimizes transfer of vibration to the structural framing of the building. (7.3.3.5)

✓ The fan was installed in the vent pipe using removable couplings or flexible connections that can be tightly secured to both the fan and the vent pipe. (7.3.3.6)

N/A Any outside air intake vents of fan-powered systems were screened to prevent the intake of debris. Any installed screens are removable to permit cleaning or replacement and the building owner was informed of the need to periodically replace or clean the screen. (7.3.3.7)

General Sealing Requirements

✓ Openings around the suction point piping penetration(s) of the slab, accessible openings around utility penetrations of the foundation walls and slab, and other openings in slabs that reduce the pressure field extension and the effectiveness of the soil depressurization system was sealed, using methods and materials that are permanent and durable. (7.3.4.1)

✓ Openings and cracks where the slab meets the foundation wall were sealed where appropriate. Where urethane caulk or equivalent material was used, and when the joint was greater than ½ inch in width, a foam backer rod or other comparable filler material was inserted into the joint before the application of the sealant. (7.3.4.2)

N/A Utility and other penetrations through the soil-gas-retarder membrane were sealed. (7.3.4.4)

Sump Pit Requirements

N/A Sump pits and other large openings in slabs or basement walls that may allow a significant amount of soil gas leakage into the basement or air leakage into the sub-floor areas were covered and sealed. (7.3.6.1)

N/A Where soil gas was drawn from a sump pit, a sump cover was installed. (7.3.6.2)

Submembrane Depressurization System Requirements

N/A All seams in soil-gas-retardant membrane systems used for sub-membrane depressurization systems were lapped at least 12 inches, and the seams were sealed. The membrane was sealed around posts and other penetrations, and the edges were sealed to foundation walls where practical. Where there were indications that water was likely to collect on the membrane, it was fitted with trapped drains at the lowest part of the locations that were likely to become wet. (7.3.8.1)

N/A Sub-slab and sub-membrane depressurization methods were used as the preferred crawlspace mitigation methods. (7.3.11.1)

Electrical Requirements

✓ Wiring for the depressurization system conforms to provisions of the "1999 National Electrical Code Handbook, Eighth Edition" and all additional local requirements. (7.3.12.1)

✓ System wiring was not located inside the depressurization system piping or within any other heating or cooling ductwork. (7.3.12.2)

N/A Any plugged cord used to supply power to the fan was no more than 6 feet in length. (7.3.12.3)

N/A No plugged cord penetrated a wall or was concealed within a wall. (7.3.12.4)

✓ A disconnecting switch is present in the electric circuit powering the fan. The fan disconnect is located within sight of the system fan. Operation of the fan disconnect does not interrupt the power to other electrical devices in the building. (7.3.12.5)

✓ A hard-wired electrical connection was used for the system fan. (7.3.12.6)

Materials

✓ All mitigation system electrical components are listed. (7.4.1)

✓ Fittings used in system piping are of the same material as the piping itself. However, when removable connections were necessary, such as for the fan mount, rubber couplings suitable for use in sanitary sewer systems were used instead of cemented pipe joints. (7.4.3)

✓ The plastic pipe cleaner and cement used are compatible with the kind of plastic used in the system piping and were used as recommended by the manufacturer. (7.4.4)

✓ Only appropriate sealants were used for sealing cracks in slabs and other small openings around penetrations of the slab and foundation walls. Urethane sealants were used wherever possible. (7.4.5)

N/A Only non-shrink mortar, grouts, expanding foam, or similar materials were used for sealing holes for plumbing rough-in or other large openings in slabs and foundation walls below ground surface. (7.4.6)

N/A Sump pit covers were made of durable plastic or other rot proof rigid material and were designed to permit air-tight sealing. The cover was sealed using silicone or other nonpermanent type caulking materials or an air-tight gasket and mechanical fasteners. (7.4.7)

N/A Any sump pit cover penetrations were designed to permit air-tight sealing around the penetrations, using caulking or grommets. (7.4.8)

N/A All wood or other material used that contacts masonry or soil was pressure treated. (7.4.10)

Monitors and Labeling

✓ The system includes a manometer, used to provide a visual indication of system function. The manometer is simple to read and is located in an easily accessible location for review by building owners and/or occupants. (7.5.1)

✓ The manometer is clearly marked to indicate the initial pressure readings of the system. (7.5.3)

✓ A system description label was placed on the mitigation system in a prominent location. The label is legible from at least 3 feet, includes the name of the system, and has contact information in the event of a system malfunction. All exposed and visible interior piping is identified with at least one label on each floor that identifies the pipe as part of the depressurization system. (7.5.4)

✓ The circuit breaker(s) controlling the circuits on which the fan operates is (are) labeled. (7.5.5)

Certification of Installation

I certify that the installed system meets the requirements outlined in the Final Depressurization System Design Document: A Supplemental Inhalation Pathway Interim Measures Work Plan (May, 2003) and the applicable requirements of ASTM E-2121-03.

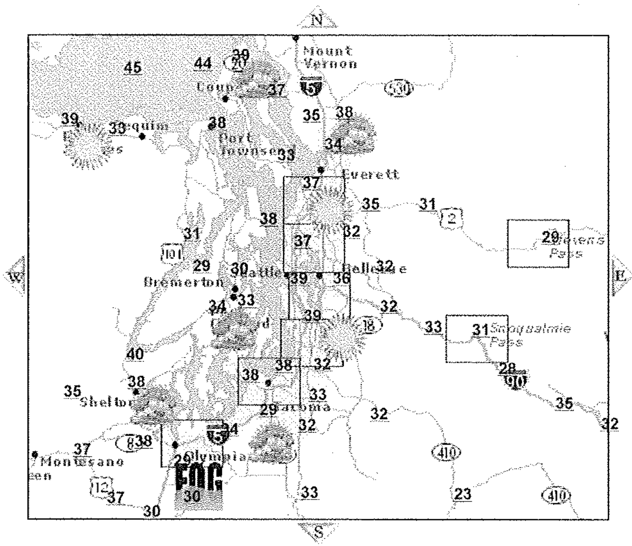
Signed [signature] Date 8/20/09

APPENDIX D
BOEING FIELD WEATHER CONDITIONS

VAPOR INTRUSION MITIGATION REPORT
Olympic Medical Facility
5900 1st Avenue South
Seattle, Washington

Farallon PN: 457-004

WEATHER



Zoom Out [1] 2 [3] Zoom In

More Weather Info

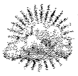
- Weather Stations
- Forecasts
- Road Temperatures
- Radar
- Satellite
- Ferry Weather
- Tides
- Storm Prediction Center
- Earthquakes
- Landslides
- Volcanoes
- Tsunamis

SEATTLE SEATTLE BOEING FIELD

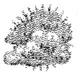
Updated: Wednesday April 15, 2009 5:53 AM

Condition:	Partly Cloudy	Humidity:	92%
Air Temp:	36°F	Dew Point:	34
24hr High/Low:	53/36	Visibility:	9Miles
Pressure:	30.60in	Wind Speed	5mph
Elevation:	16 ft/5 m	Wind Direction:	SE

Recent Weather Data

Today  Partly Cloudy

Tonight  Mostly Cloudy

Thursday  Mostly Cloudy

Thursday night  Rain

Details and Extended Forecast

Franklin Falls

Price Creek

Stevens Pass

Elk Heights

EB I-90 SR-18 Echo Lake

SB I-5 144th

130th Street

Nisqually on I-5 @ MP 116

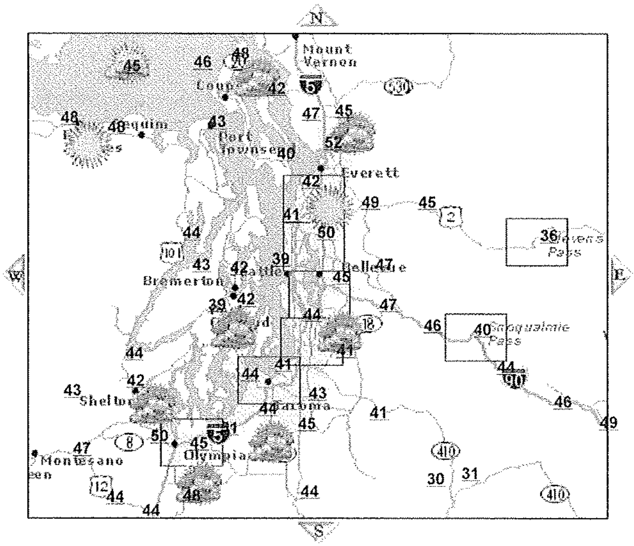
Mt Walker, SR-101@ 301.5

Rock Candy Mountain

Seibert Creek Bridge

BREMERTON NATIONAL AUTOMATIC WEATHER OBSERVING / REPORTING SYSTEM

WEATHER



Zoom Out [1] 2 [3] Zoom In

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- Tides
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- Landslides
- Volcanoes
- Tsunamis

SEATTLE SEATTLE BOEING FIELD
Updated: Wednesday April 15, 2009 10:53 AM

Condition:	Cloudy,Fog	Humidity:	89%
Air Temp:	41°F	Dew Point:	38
24hr High/Low:	53/36	Visibility:	6Miles
Pressure:	30.66in	Wind Speed	N/A
Elevation:	16 ft/5 m	Wind Direction:	

Recent Weather Data

Today	Partly Cloudy
Tonight	Mostly Cloudy
Thursday	Mostly Cloudy
Thursday night	Rain

Details and Extended Forecast

Alpental Exit

Price Creek

Snoqualmie River Bridge

Stevens Pass

SB I-405 N.E. 195th

Elk Heights

EB I-90 SR-18 Echo Lake

SB I-5 144th

Nisqually on I-5 @ MP 116

Seibert Creek Bridge

Oyster Bay Rd

Bullfrog

Mt Walker, SR-101@ 301.5

BREMERTON NATIONAL AUTOMATIC WEATHER OBSERVING / REPORTING SYSTEM

THUN FIELD
SMITH ISLAND
WEST POINT
WHIDBEY ISLAND NAVAL AIR STATION
TACOMA / MCCHORD AIR FORCE BASE
EVERETT SNOHOMISH COUNTY AIRPORT
SHELTON SHELTON SANDERSON FIELD
PORT ANGELES WILLIAM R FAIRCHILD INTERNATIONAL AIRPORT
TACOMA TACOMA NARROWS AIRPORT
NEW DUNGENESS (HEIN BANK) BUOY
Edmonds-Kingston Ferry
TACOMA INDIAN HILL RESERVOIR (5225 TOWER DRIVE NE)
LACEY COLLEGE STREET (MT VIEW ELEM)
MEADOWDALE KITSAP COUNTY (725 BLACKBIRD DR NE)
MARYSVILLE JUNIOR HIGH SCHOOL (JUNIOR HIGH SCHOOL)
CARNATION
EATONVILLE
PORT TOWNSEND
GOLD BAR
SUMNER
LAKE GOODWIN
PORT ORCHARD
POTLATCH
TENINO
COVINGTON
ARLINGTON / PIONEER ELEM SCH
MATLOCK / MARY M KNIGHT SCHOOL 12
BELLEVUE / PHANTOM LAKE ELEM SCH
ELMA
OAKVILLE MS/HS
CAMANO ISLAND
MONROE
GRAND MOUND ELEM SCHOOL
LANGLEY
SEABECK
SUNRISE-MT RAINIER
CRYSTAL MTN-BASE

Washington State Department of Transportation

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WEATHER

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- Ferry Cameras
- Tacoma
- Gig Harbor
- DuPont
- Olympia
- Vancouver
- Mount Vernon
- Bellingham
- Stanwood
- Monroe
- Canadian Border
- Spokane
- Wenatchee

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- Mountain Passes
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- State Highway Map
- Interstate Exits
- Featured Services

ADDITIONAL INFO

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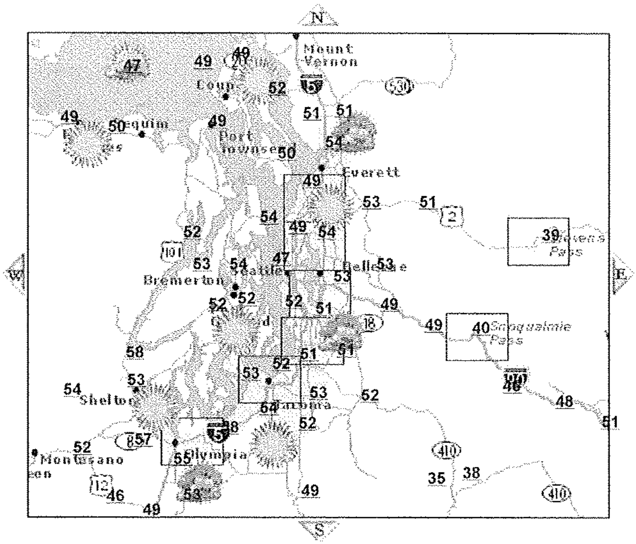
- Driver & Vehicle Licensing
- Washington State Tourism
- Contact Us
- Disclaimer

511 Travel Info



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- Storm Prediction Center
- Earthquakes
- Landslides
- Volcanoes
- Tsunamis

SEATTLE SEATTLE BOEING FIELD
Updated: Wednesday April 15, 2009 14:53 PM

Condition:	Partly Cloudy	Humidity:	58%
Air Temp:	50°F	Dew Point:	36
24hr High/Low:	53/36	Visibility:	10Miles
Pressure:	30.63in	Wind Speed	N/A
Elevation:	16 ft/5 m	Wind Direction:	

Recent Weather Data

Today	Partly Cloudy
Tonight	Mostly Cloudy
Thursday	Mostly Cloudy
Thursday night	Rain

Details and Extended Forecast

 Traffic & Roads | Search | Contact WSDOT | WSDOT Business | WSDOT Home

- Asahel Curtis
- Franklin Falls
- Bullfrog
- Snoqualmie River Bridge
- Stevens Pass
- WEST POINT
- SMITH ISLAND
- WHIDBEY ISLAND NAVAL AIR STATION
- TACOMA / MCCHORD AIR FORCE BASE
- BREMERTON NATIONAL AUTOMATIC WEATHER OBSERVING / REPORTING SYSTEM
- SB I-405 N.E. 195th
- OLYMPIA OLYMPIA AIRPORT
- Elk Heights
- TACOMA TACOMA NARROWS AIRPORT

EVERETT SNOHOMISH COUNTY AIRPORT
RENTON RENTON MUNICIPAL AIRPORT
SHELTON SHELTON SANDERSON FIELD
PORT ANGELES WILLIAM R FAIRCHILD INTERNATIONAL AIRPORT
EB I-90 SR-18 Echo Lake
Rock Candy Mountain
THUN FIELD
Nisqually on I-5 @ MP 116
NEW DUNGENESS (HEIN BANK) BUOY
Mt Walker, SR-101@ 301.5
Seibert Creek Bridge
ENUMCLAW
EATONVILLE
CARNATION
PORT TOWNSEND
FEDERAL WAY
SUMNER
LAKE GOODWIN
GOLD BAR
KINGSTON
PORT ORCHARD
COVINGTON
POTLATCH
TENINO
ARLINGTON / PIONEER ELEM SCH
MATLOCK / MARY M KNIGHT SCHOOL 12
BELLEVUE / PHANTOM LAKE ELEM SCH
TRACYTON
ELMA
CAMANO ISLAND
BROWNS POINT ELEM SCHOOL
GRAND MOUND ELEM SCHOOL
LANGLEY
SEABECK
MONROE
SHORELINE / KINGS ELEM SCHOOL
MARYSVILLE JUNIOR HIGH SCHOOL (JUNIOR HIGH SCHOOL)
OAKVILLE MS/HS
SUNRISE-MT RAINIER
CRYSTAL MTN-BASE

APPENDIX E
LABORATORY ANALYTICAL REPORT

VAPOR INTRUSION MITIGATION REPORT
Olympic Medical Facility
5900 1st Avenue South
Seattle, Washington

Farallon PN: 457-004

Air Toxics LTD.
Laboratory Services Since 1989

6/4/2009
Mr. Daniel Caputo
Farallon Consulting, LLC
975 Fifth Avenue NW

Issaquah WA 98027-3333

Project Name: CAPITAL IND.
Project #: 457-004
Workorder #: 0904459R1

Dear Mr. Daniel Caputo

The following report includes the data for the above referenced project for sample(s) received on 4/21/2009 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for you air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner
Project Manager

Air Toxics LTD.
Laboratory Services Since 1989

WORK ORDER #: 0904459R1

Work Order Summary

CLIENT:	Mr. Daniel Caputo Farallon Consulting, LLC 975 Fifth Avenue NW Issaquah, WA 98027-3333	**BILL TO:**	Mr. Daniel Caputo Farallon Consulting, LLC 975 Fifth Avenue NW Issaquah, WA 98027-3333
PHONE:	425-295-0840	**P.O. #**	
FAX:	425-295-0850	**PROJECT #**	457-004 CAPITAL IND.
DATE RECEIVED:	04/21/2009	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	04/30/2009		
DATE REISSUED:	06/02/2009		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	AA008	Modified TO-15	6.0 "Hg	5 psi
02A	AA006	Modified TO-15	0.1 psi	5 psi
03A	AA007	Modified TO-15	6.5 "Hg	5 psi
04A	Lab Blank	Modified TO-15	NA	NA
05A	CCV	Modified TO-15	NA	NA
06A	LCS	Modified TO-15	NA	NA

CERTIFIED BY: Linda d. Fruman DATE: 06/04/09

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/08, Expiration date: 06/30/09
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15
Farallon Consulting, LLC
Workorder# 0904459R1

Three 6 Liter Summa Canister (100% Certified) samples were received on April 21, 2009. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 1.0 liter of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	*TO-15*	*ATL Modifications*
ICAL %RSD acceptance criteria	+- 30% RSD with 2 compounds allowed out to < 40% RSD	30% RSD with 4 compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	</= 30% Difference with four allowed out up to </=40%.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases
Sample collection media	Summa canister	ATL recommends use of summa canisters to insure data defensibility, but will report results from Tedlar bags at client request

Receiving Notes

The Chain of Custody (COC) information for sample AA008 did not match the information on the canister with regard to canister identification. The client was notified of the discrepancy and the information on the canister was used to process and report the sample.

Analytical Notes

There were no analytical discrepancies.

DUE TO LABORATORY ERROR, THE REPORT WAS RE-ISSUED ON 6/2/2009 TO INCLUDE THE FOLLOWING NARRATIVE:

DILUTION WAS PERFORMED ON SAMPLES AA006 AND AA007 DUE TO THE PRESENCE OF HIGH LEVEL NON-TARGET SPECIES.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: AA008

Lab ID#: 0904459R1-01A
No Detections Were Found.

Client Sample ID: AA006

Lab ID#: 0904459R1-02A
No Detections Were Found.

Client Sample ID: AA007

Lab ID#: 0904459R1-03A
No Detections Were Found.

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Client Sample ID: AA008

Lab ID#: 0904459R1-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**t042706**	**Date of Collection: 4/15/09 4:07:00 PM**
Dil. Factor:	**1.68**	**Date of Analysis: 4/27/09 10:32 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.17	Not Detected	0.43	Not Detected
1,1-Dichloroethene	0.17	Not Detected	0.67	Not Detected
trans-1,2-Dichloroethene	0.17	Not Detected	0.67	Not Detected
cis-1,2-Dichloroethene	0.17	Not Detected	0.67	Not Detected
Trichloroethene	0.17	Not Detected	0.90	Not Detected
Tetrachloroethene	0.17	Not Detected	1.1	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: AA006

Lab ID#: 0904459R1-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**t042709**	**Date of Collection: 4/15/09 4:17:00 PM**
Dil. Factor:	**26.6**	**Date of Analysis: 4/27/09 12:40 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	2.7	Not Detected	6.8	Not Detected
1,1-Dichloroethene	2.7	Not Detected	10	Not Detected
trans-1,2-Dichloroethene	2.7	Not Detected	10	Not Detected
cis-1,2-Dichloroethene	2.7	Not Detected	10	Not Detected
Trichloroethene	2.7	Not Detected	14	Not Detected
Tetrachloroethene	2.7	Not Detected	18	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	76	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: AA007

Lab ID#: 0904459R1-03A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**t042708**	**Date of Collection: 4/15/09 4:14:00 PM**
Dil. Factor:	**34.2**	**Date of Analysis: 4/27/09 11:47 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	3.4	Not Detected	8.7	Not Detected
1,1-Dichloroethene	3.4	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	3.4	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	3.4	Not Detected	14	Not Detected
Trichloroethene	3.4	Not Detected	18	Not Detected
Tetrachloroethene	3.4	Not Detected	23	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	76	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: Lab Blank

Lab ID#: 0904459R1-04A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**t042704**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/27/09 08:47 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.10	Not Detected	0.26	Not Detected
1,1-Dichloroethene	0.10	Not Detected	0.40	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
cis-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Trichloroethene	0.10	Not Detected	0.54	Not Detected
Tetrachloroethene	0.10	Not Detected	0.68	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: CCV

Lab ID#: 0904459R1-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**t042702**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 4/27/09 06:39 AM**

Compound	%Recovery
Vinyl Chloride	124
1,1-Dichloroethene	90
trans-1,2-Dichloroethene	108
cis-1,2-Dichloroethene	113
Trichloroethene	94
Tetrachloroethene	95

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	107	70-130

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Client Sample ID: LCS

Lab ID#: 0904459R1-06A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**t042703**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 4/27/09 07:15 AM**

Compound	%Recovery
Vinyl Chloride	83
1,1-Dichloroethene	101
trans-1,2-Dichloroethene	89
cis-1,2-Dichloroethene	92
Trichloroethene	99
Tetrachloroethene	91

Container Type: NA - Not Applicable

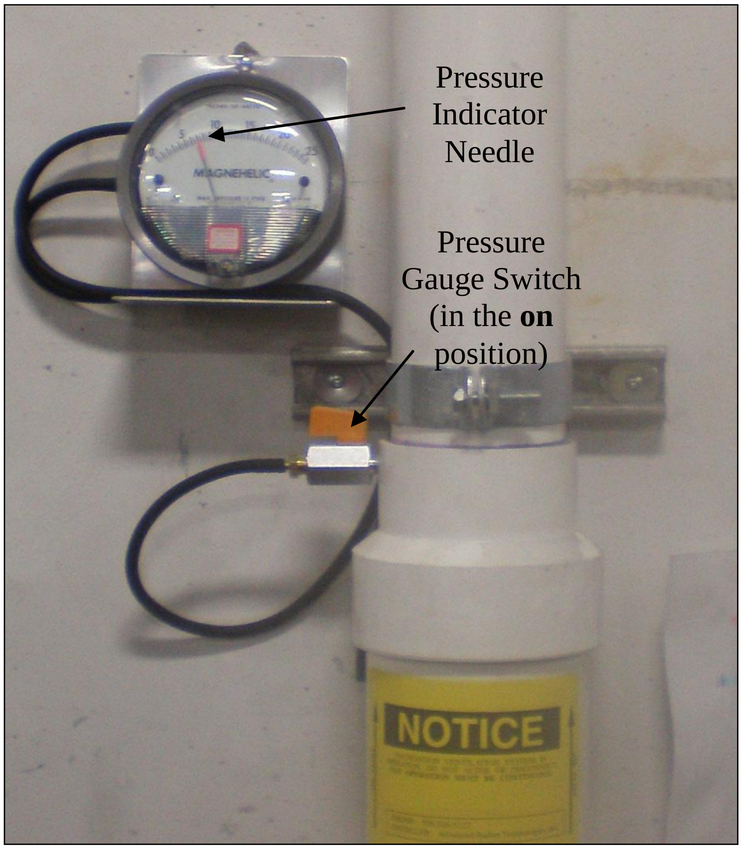
Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	85	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	100	70-130

APPENDIX F
REMINDER NOTICE TO TENANTS

VAPOR INTRUSION MITIGATION REPORT
Olympic Medical Facility
5900 1st Avenue South
Seattle, Washington

Farallon PN: 457-004

Reminder



Please check periodically to make sure your depressurization system is working by looking at the pressure gages installed on the system. Turn the pressure gauge switch to the **on** position (parallel to the hose) to engage the pressure gage (as shown in photograph). If the pressure indicator needle reads **above** zero then the system is working properly. However, if the pressure indicator needle reads **zero**, then please call me so that we can make arrangements to fix any problems.

Temporary problems with the system would not indicate any health risks – we just need to make sure the system is operating correctly. Please call me if you have any questions.

Thank you for your cooperation,

Dan Caputo
Project Manager
Farallon Consulting, LLC
(425) 295-0800