APPENDIX A

Sampling and Analysis Plan, Initial Vapor Intrusion Assessment, 106 Building

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A. Sampling and Analysis Plan

A vapor intrusion evaluation will be conducted at the building located at 106 N 2nd Avenue in Walla Walla, Washington (herein referred to as the 106 Building). The work will be completed to evaluate the properties of sub-slab conditions, including type and porosity of sub-slab soil, the presence/absence of water, and concentrations of petroleum hydrocarbons and related volatile organic compounds (VOCs) in indoor air and sub-slab soil gas to evaluate potential risk from vapor intrusion and to support the development and implementation of mitigation measures, if necessary. The work will consist of the collection and laboratory analysis of eight, co-located sub-slab soil gas and indoor air samples throughout the basement of the 106 Building. Additionally, up to two ambient air samples will be collected outside of the 106 Building near air intakes.

Prior to the sampling, a building inspection will be completed to identify any potential background sources of chemical contaminants (such as cleaning products or new building materials) that may interfere with the results of indoor air sampling. Any potential sources of interference will be consolidated and/or isolated at least one week prior to sampling, as practicable.

A.1. Locations

A total of eight permanent soil vapor pins will be installed in the basement to evaluate current conditions, including the following locations:

- SSG-1 will be installed in the room where the stormwater sump is located and VOCs have previously been measured in indoor air.
- SSG-2 will be installed in a presumed downgradient groundwater flow location from the stormwater sump.
- SSG-3 will be installed in the staff room to the west of the stormwater sump.
- SSG-4 will be installed in the office spaces to the east of the stormwater sump.
- SSG-5 will be installed in the office space located on the eastern side of the basement space.
- SSG-6 will be installed in the main office area located in the north-central portion of the basement.
- SSG-7 and SSG-8 will be installed in the eastern portion of the basement.

The vapor pins will be installed in accordance with the manufacturer's Standard Operating Procedure (Attachment A) within the concrete slab at each location by drilling a 5/8-inch hole to a depth of approximately 3 to 6 inches, depending on the slab thickness, and installing a stainless-steel pin with a silicon seal.

The vapor pins will be flush with the concrete floor but will be installed outside of primary foot-traffic corridors to minimize potential trip hazards. The preliminary locations are shown on Figure A-1 and the final locations may be modified in the field at the time of the installation based on access limitations and flooring conditions.

In addition to the installation of permanent soil vapor pins, two larger diameter holes will be drilled in the concrete floor slab for evaluation of sub-slab conditions and serve as potential locations to establish sub-slab depressurization. These holes will be 4-inches in diameter and will be capped with an air-tight seal[1] while future application of the coring locations are evaluated. Aspect will evaluate the sub-slab material, checking for the presence of non-native gravel and/or sand (typical base materials for slab pours); if a granular base material does not exist beneath the slab, Aspect will evaluate the soil lithology to determine if sufficient soil porosity exists for engineered depressurization methods. The evaluation of sub-slab material will include sieve particle size analysis to assist in the evaluation of screen-slot size for potential depressurization/venting parameters. Lastly, moisture content in the sub-slab material will be documented to determine if depressurization is viable (saturated conditions beneath the slab would decrease or eliminate porosity, a primary requirement for vacuum/depressurization propagation).

A.2. Sampling Methods

A.2.1. Indoor and Ambient Air

Ambient (outdoor) air and indoor air samples will be collected concurrently. Indoor air sampling will be collected in accordance with the following general field procedures:

- The samples will be collected in the breathing zone, approximately 5 feet off the ground. The sample locations will be visibly assessed for potential sources of cross-contamination. A photoionization detector (PID) will be used to screen background levels of VOCs.
- Time-integrated 8-hour samples will be collected over the course of a normal working day (between 8am and 6pm). The samples will be collected in 6-liter (L) vacuum canisters that are prepared under negative pressure and individually certified clean by the analytical laboratory supplying them. The canister number will be recorded on the sampling log. Each canister will be equipped with dedicated flow regulators set at a fill rate for an 8-hour sampling event.
- Once the canisters have been placed, the initial vacuum on each canister will be recorded, and the valve on each canister will be opened. The sampling start time will also be recorded.

[1] Air tight seal will consist of a 4-inch temporary well cap or a sand-backfill covered by tape-sealed plastic sheeting.

- After sampling begins, the operation of the flow rate controller will be verified by measuring the rate of change on the canister vacuum gauge. Samples will be monitored during the monitoring event to ensure the flow regulators are functioning properly, and the canisters have not been disturbed.
- The final pressure at the end of sampling should be -5 to -6 inches of mercury. Once the canister has reached this point, sampling is complete, and the final pressure and time will be recorded. Sample collection will be considered complete after 8 hours, if the pressure in the canister is less than -10 inches of mercury.
- The final recorded vacuum prior to sample delivery will be submitted to the laboratory for verification that the canister did not leak in transit. Samples will be delivered as soon as possible following collection.

Ambient air samples will be collected concurrently with the indoor air samples using the same general procedures described above for indoor air samples.

A.2.2. Sub-Slab Soil Gas

The day following completion of the indoor and ambient air sampling, eight soil gas samples will be obtained from beneath the concrete floor slab of the basement using permanent vapor pins. The soil gas samples will be collected in accordance with the sampling methods described below.

Soil gas samples will be collected using laboratory-supplied and individually certified, evacuated, 1-liter (L) Summa canisters fitted with 150 milliliters per minute (mL/min) flow regulators and dedicated sampling trains. The sampling train will be leak-tested prior to sampling using a shut-in test to verify there are no leaks in the fittings or connections. The leak test will consist of applying a vacuum, with a minimum vacuum of 10 inches of mercury, for a period of 5 minutes. If no change in vacuum is observed during the shut-in test, it will be assumed that the sampling train is free of leaks that could introduce ambient indoor air to the soil gas sample and sample collection will begin.

The vapor pin will be enclosed in a leak-testing shroud and a known concentration of helium tracer gas will be added to the shroud (approximately 25 to 30 percent). The selected concentration of tracer gas will be maintained within the shroud throughout the duration of sampling.

Prior to sample collection, the sample train will be purged at a rate of a 200 milliliters (mL) per minute using a low-flow pump until a total of approximately 500 mL of air has been removed. The purged soil gas will be collected in Tedlar® bags and field-screened for helium to ensure that leakage is less than 5 percent of the shroud concentration.

After confirming that no significant leakage is present in the sampling train or around the vapor extraction point seal, the soil gas sample will be collected.

The canisters valve will be opened and allowed to fill until the canister vacuum reaches -5 inches of mercury. Once sample collection is complete, the cannister valve will be closed and the pressure recorded as the final pressure. All measurements taken in the field will be recorded in a field log book.

A.3. Sample Identification

Sample locations will be recorded on a site map, described in field notes, and photographed at the time of sampling. Samples will be assigned a consistent nomenclature with a prefix of IA for indoor air, AA for ambient air, and SSG for sub-slab soil gas, followed by a number that corresponds to a location, and the date of sample collection.

A.4. Laboratory Methods

Indoor air, ambient air, and soil gas samples will be submitted to ALS in Seattle, Washington for laboratory analysis in accordance with Ecology's guidance for evaluating vapor intrusion risk from petroleum hydrocarbons:

- Air Phase Hydrocarbons using Massachusetts Department of Environmental Protection (MDEP) Method Air Phase Hydrocarbons (APH).
- Benzene, toluene, ethylbenzene, xylenes (BTEX), and naphthalene using US Environmental Protection Agency (EPA) Method TO-15.

If possible, low-level analysis or Selective Ion Mode (SIM) analysis will be used to obtain the lowest achievable detection and reporting limits. The analytical results for air and soil gas sampling will be compared against applicable MTCA Method B cleanup and screening levels for commercial (worker) use for petroleum mixtures.

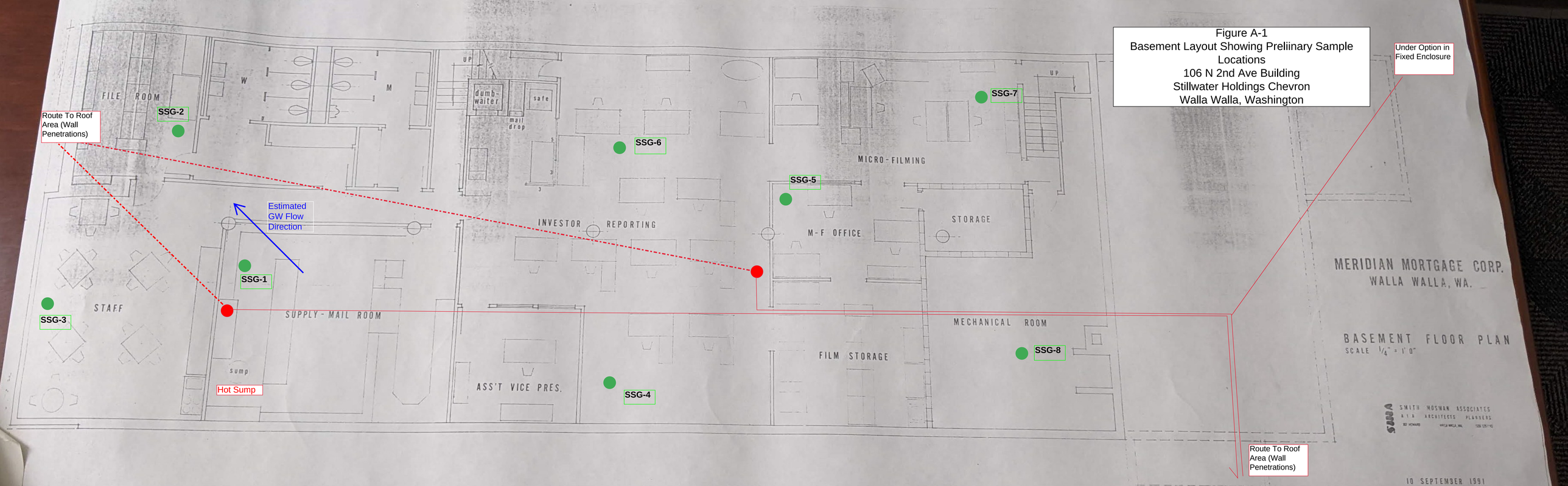
Figure A-1
Basement Layout Showing Preliinary Sample Locations
106 N 2nd Ave Building
Stillwater Holdings Chevron
Walla Walla, Washington
Under Option in Fixed Enclosure
Route To Roof Area (Wall Penetrations)
SSG-1
SSG-2
SSG-3
SSG-4
SSG-5
SSG-6
SSG-7
SSG-8
Estimated GW Flow Direction
Hot Sump
Route To Roof Area (Wall Penetrations)
FILE ROOM
W
M
UP
dumb-waiter
safe
mail drop
MICRO-FILMING
INVESTOR REPORTING
M-F OFFICE
STORAGE
STAFF
SUPPLY-MAIL ROOM
sump
ASS'T VICE PRES.
FILM STORAGE
MECHANICAL ROOM
MERIDIAN MORTGAGE CORP.
WALLA WALLA, WA.
BASEMENT FLOOR PLAN
SCALE 1/4" = 1'0"
SMITH MOSMAN ASSOCIATES
A I A ARCHITECTS PLANNERS
10 SEPTEMBER 1991

Standard Operating Procedure

Installation and Extraction
Vapor Pin® Sampling Device

Scope & Purpose

Scope

This standard operating procedure describes the installation and extraction of the Vapor Pin® Sampling Device for use in sub-slab soil-gas sampling.

Purpose

The purpose of this procedure is to assure good quality control in field operations and uniformity between field personnel in the use of the Vapor Pin® Sampling Device.

Equipment Needed

- Vapor Pin® Sampling Device
- Vapor Pin® Sleeves
- Vapor Pin® Cap
- Installation/Extraction Tool
- Rotary Hammer Drill
  - ⅝-Inch (16mm) diameter hammer bit
  - 1½-Inch (38mm) diameter hammer bit for flush mount applications
- ¾-Inch (19mm) diameter bottle brush
- Wet/Dry Vacuum with HEPA filter (optional)
- Dead Blow Hammer
- VOC-free hole patching material (hydraulic cement) and a putty knife or trowel
  - This is for repairing the hole following the extraction of the Vapor Pin® Sampling Device

Installation Procedure

1. Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.
2. Set up wet/dry vacuum to collect drill cuttings.
3. For a temporary installation, drill a ⅝-inch (16mm) diameter hole through the slab and approximately 1-inch (25mm) into the underlying soil to form a void. The hole must be ⅝-inch (16mm) in diameter to ensure a seal.
   - If a flush mount installation is required, drill a 1½-inch (38mm) diameter hole at least 1¾-inches (45mm) into the slab. We highly recommend using the Stainless Steel Drilling Guide and to reference the Standard Operating Procedure Drilling Guide & Secure Cover.
4. Remove the drill bit, brush the hole with the bottle brush and remove the loose cuttings with the vacuum.
5. Assemble the Vapor Pin® Sampling Device and Vapor Pin® Sleeve (Figure 1).
6. Place the lower end of the Vapor Pin® Sampling Device assembly into the drilled hole. Place the small hole located in the handle of the Installation/Extraction Tool, over the Vapor Pin® to protect the barb fitting and tap the Vapor Pin® into place using a dead blow hammer (Figure 2). Make sure the Installation/Extraction Tool is aligned parallel to the Vapor Pin® to avoid damaging the barb.
   - During installation, the Vapor Pin® Sleeve may form a slight bulge between the slab and the Vapor Pin® Sampling Device shoulder.
7. Place the Vapor Pin® Cap on the Vapor Pin® to prevent vapor loss prior to sampling (Figure 3).
8. For flush mount installations, cover the Vapor Pin® with a flush mount cover, using either the plastic cover or the optional Stainless Steel Secure Cover (Figure 4).
9. Allow 20 minutes or more (consult applicable guidance for your situation) for the sub-slab soil-gas conditions to re-equilibrate prior to sampling.

Figure 1.

Figure 2.

Figure 3.

Figure 4.

Sampling

1. Remove the Vapor Pin® Cap and connect your sample tubing to the barb fitting of the Vapor Pin® Sampling Device.
2. Create a connection by using a short piece of Tygon™ tubing to join the Vapor Pin® Sampling Device with the Nylaflow tubing (Figure 5). Put the Nylaflow tubing as close to the Vapor Pin® Sampling Device as possible to minimize contact between soil gas and Tygon™ tubing. You do not **have** to use Nyflaflow tubing, any stiff tubing will suffice.
3. Prior to sampling, conduct a leak test in accordance with applicable guidance. If a leak test is not specified, refer to the SOP Leak Testing the Vapor Pin® Sampling Device, via Mechanical Means (Figure 6). For flush-mount installations, distilled water can be poured directly into the 1½ inch (38mm) hole.

Figure 5.

Figure 6.

Figure 7.

Extraction Procedure & Reuse Notes

1. Remove the protective cap, and thread the Installation/Extraction Tool onto the Vapor Pin® Sampling Device (Figure 7). Turn the tool clockwise continuously, don't stop turning, the Vapor Pin® Sampling Device will feed into the bottom of the Installation/Extraction Tool and will extract from the hole like a wine cork, **DO NOT PULL!**
2. Fill the void with hydraulic cement and smooth with a trowel or putty knife.
3. Prior to reuse, remove the silicon Vapor Pin® Sleeve and Vapor Pin® Cap and discard. Decontaminate the Vapor Pin® Sampling Device in a Alconox® solution, then heat in an oven to a temperature of 265° F (130°C). For Stainless – ½ hour, Brass 8 minutes.