Work Plan

Waste Management
Soil Vapor Intrusion (SVI) Study
Gaess Site – Site #336018

Harriman, New York

February 3, 2011

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1.0 INTRODUCTION

Weston & Sampson has prepared this work plan to conduct a soil vapor intrusion (SVI) study of the Village of Harriman Department of Public Works (DPW) Maintenance Building adjacent to the Gaess Site – Site #336018 in Harriman New York (See Figure 1 – Site Location Map) based on conversations and correspondence with the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH). The SVI study will be conducted for the Village of Harriman DPW Maintenance Building which includes a five (5) bay garage with bathrooms and a small office (See Figure 2 – Aerial View).

The proposed SVI study work plan is based on and the work will be conducted in accordance with DER-13/Strategy for Evaluating Soil Vapor Intrusion at Remedial Sites in New York, October 2006; the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006 – New York State Department of Health, Center for Environmental Health, Bureau of Environmental Exposure Investigation Division of Environmental Remediation - DER-10; and Technical Guidance for Site Investigation and Remediation - Guidance for Data Deliverables and the Development of Data Usability Summary Reports (DUSR), along with recent associated correspondence with NYSDEC and NYSDOH.

2.0 SITE DESCRIPTION AND HISTORY

The Gaess Site, #336018, is located in the Village of Harriman, Orange County, New York on Meadow Road, approximately one quarter mile west of NYS Highway Route 17 and just southwest of the Ramapo River. Situated just north of the actual 4 acre parcel known as the Gaess Site that extends along the inactive railroad spur is the Village of Harriman property that serves as a recreational park and a DPW facility that includes a pump station for two Village of Harriman public drinking water supply wells, MH-1 and MH-3.

The Gaess Site and associated abutting properties have been subject to the Remedial Investigation/Feasibility Study (RI/FS) process and the results of the investigations are summarized in the Record of Decision (ROD) signed by NYSDEC on March 14, 1997. As noted in the ROD Section 3.1.1 Nature of Contamination, soil, soil gas, groundwater, surface water and sediment samples were collected at the Site to characterize the nature and extent of contamination. The findings from these investigations found the contaminants of concern (COC) to be TCE and TCA transported through the groundwater.

The focus of this SVI Study is the DPW maintenance garage and attached office as shown in Figure 3 – Sampling Locations.

3.0 OBJECTIVE

This work plan to evaluate soil vapor intrusion is dependent upon site-specific conditions as they relate to the Village of Harriman Department of Public Works (DPW) Maintenance Building which includes a five (5) bay garage with bathrooms and a small office.

Based on the understanding of the site, the data gathering and review process is set up to answer the following questions:

1. Evaluate the subsurface vadose zone under the building concrete slab for the potential presence of volatile organic compounds, in particular chlorinated hydrocarbons.
2. Evaluate potential exposure pathways.
3. Determine an economically feasible means of vapor mitigation (if necessary).

4.0 SCOPE OF WORK

Task 1: Pre-sampling Building Inspection and Product Inventory

Weston & Sampson shall perform a pre-sampling inspection of the building prior to the sampling event to identify and minimize conditions that may interfere with the proposed testing. The inspection shall include interviewing building occupants, looking at the type of structure, floor layout, expected air flows, and physical conditions of the building. This information combined with information on sources of potential indoor air contamination shall be identified on a building inventory form. Information on products stored as well as potential interference from activities potentially releasing volatile chemicals shall be documented. Potential interference from products or activities releasing volatile chemicals shall be controlled to the extent practicable during the sampling program.

Items to be included in the building inventory include the following:

a. Construction characteristics, including foundation cracks and utility penetrations or other openings that may serve as preferential pathways for vapor intrusion;
b. Presence of an attached garage;
c. Recent renovations or maintenance to the building (e.g., fresh paint, new carpet, or furniture);
d. Mechanical equipment that can affect pressure gradients (e.g. heating systems, cloths dryers or exhaust fans); note – barometric pressure will affect vapor migration also
e. Use or storage of petroleum products (e.g. fuel containers, gasoline operated equipment and unvented kerosene heaters); and
f. Recent use of petroleum-based finishes or products containing volatile chemicals.

Each room shall be inspected with stored or used products noted as well as the presence and description of odors. Portable vapor monitoring equipment will be used and any associated readings will be noted to help evaluate potential contaminant sources.

The primary objective of the product inventory is to identify potential air sampling interference by characterizing the occurrence and use of chemicals and products throughout the building, keeping in mind the site specific contaminants of concern. The physical survey will be documented by completing the Indoor Air Quality Questionnaire and Building Inventory form found in Appendix B of the Final NYSDOH CEH BEEI Soil Vapor Intrusion Guidance, October 2006.

In addition, the temporary sub-slab sampling locations and soil vapor probes shall be prepared/installed for sampling as outlined in Task 2 (Sub-slab sample locations should be approximately 10 feet away from the exterior walls or footings and floor drains to minimize day lighting of the sample).

Task 2: Sampling Plan

Weston & Sampson shall conduct one round of sampling at four (4) sample locations during the colder heating period of the year (Winter 2010/2011). The four sample locations include;

1. One (1) indoor air sample from office space
2. One (1) outdoor upwind background air sample, and
3. Two (2) sub-slab soil gas samples

Please refer to **Figure 3 – Sample Locations**.

The two sub-slab soil gas samples will be collected from separate locations below the building slab. All samples (indoor air, outdoor upwind background air and sub-slab soil gas) will be collected concurrently over an 8-hour time period and be analyzed for volatile organic compounds (VOCs) using EPA Method TO-15. Sample analysis is further described below.

Sample Log

When sampling, field personnel shall maintain a sample log sheet summarizing the following:

1. sample identification,
2. date and time of sample collection,
3. sampling height (or depth i.e. thickness of slab),
4. identity of samplers,
5. sampling methods and devices,
6. purge volumes,
7. volume of air sampled,
8. vacuum of canisters before and after samples collected,
9. apparent moisture content (dry, moist, saturated, etc.) of the sampling zone, and
10. chain of custody protocols and records used to track samples from sampling point to analysis.

In addition, all locations will be photo documented.

Sample Analysis

Samples shall be sent to NYSDOH ELAP certified lab for TO-15 analysis (TestAmerica Laboratories Inc). The reporting level (RL) for all analysis will be 1 microgram per cubic meter (ug/m^3) with the exception of trichloroethene (TCE), vinyl chloride and carbon tetrachloride which will be reported to a RL of 0.25 ug/m^3 for both indoor and outdoor air samples. All SVI samples shall be third party validated as further outlined in Task 3.

Indoor Air Sampling

1. Prior to collecting the indoor air sample, a pre-sampling inspection will be performed to evaluate the physical layout and conditions of the building to identify conditions that may affect or interfere with the proposed sampling and/or analytical results (See Task 1).
2. The indoor air sample will be taken during colder months when the heating system is operating to maintain normal indoor air temperatures.
3. The sampling port shall be located approximately 3 – 5 feet off the ground to replicate breathing zone within the office (a sub-slab sample will be located nearby as feasible).
4. The sample will be collected over an 8 hour period of time consistent with typical work hours (See Figure 4).
5. The sample will be collected using a certified clean 6 liter summa canister with a regulator set at or below 0.2 L/minute.
6. Include all the above field notes.

Outdoor Air Sampling

1. The outdoor ambient air sample will be collected from an upwind location simultaneously with the indoor air sample to evaluate the potential influence of outdoor air on indoor air quality.
2. The sampling port shall be located approximately 3 feet off the ground surface.
3. The sample will be collected using a certified clean 6 liter summa canister with a regulator set at or below 0.2 L/minute.
4. Sample shall be collected simultaneously over the same 8 hour period of time as the indoor air sample.

Temporary Sub Slab Vapor Sampling

Temporary sub-slab sampling ports (See Figure 5) shall be installed (Installed under Task 1 – Pre-sampling Building Inspection and Product Inventory) (Sub-slab sample locations should be approximately 10 feet away from the exterior walls or footings and floor drains to minimize day lighting of the sample) using the following procedure:

1. Any large cracks or penetrations in slab shall be sealed prior to sampling to limit daylighting effect.
2. Drill a one-half (½) inch hole in slab with hammer drill, extending the bit 2" below the slab.
3. Remove drill cuttings with broom, not vacuum
4. Fill space below slab with glass beads
5. Insert inert tubing into hole (e.g., polyethylene, stainless steel, nylon, Teflon, etc., typically 1/8 inch to ¼ inch diameter, and of laboratory or food grade quality)
6. Tubing should not extend further than 2 inches into the sub-slab material
7. Seal around tubing with non-VOC putty or similar non-shrinking products (e.g., permagum grout, melted beeswax, putty, etc.)
8. Insert the threaded plug until sampling starts so as not to contaminate the indoor air

Temporary sub-slab sampling port integrity shall be verified as follows prior to sampling:

1. Once the seal has cured around the tubing (time to cure will depend on product used) connect the Teflon tubing to the sampling port, purge 2-3 volumes of the sampling train into a tedlar bag via personal air pump at a flowrate of <0.2 L/minute.
2. Use a bucket or shroud to create a helium enriched environment around the sampling port and use the personal air pump to fill a tedlar bag to determine if there is an ambient air leak.
3. Use a real time helium detector to determine if there is helium in the sample, if greater than 10% reseal the sample port and repeat helium tracer procedure.
4. Once the sampling ports have been determined to be tight, plug the ports until sampling starts

Temporary sub-slab sampling

1. The sub-slab vapor samples shall be taken simultaneously with the indoor and outdoor air samples while the heating system has been operating to maintain normal indoor air temperatures for at least 24 hours prior to and during the scheduled sampling time.
2. Remove plug from sample port tubing and purge by removing one to three volumes of the sample probe and tube prior to collecting sample.
3. Connect the tubing to a certified clean 6 liter summa canister with a regulator set at or below 0.2 L/minute.
4. Sample shall be collected simultaneously over the same 8 hour period of time as the indoor/outdoor air samples.

Task 3: Reporting

Weston & Sampson will prepare the necessary NYSDEC reports to evaluate the data and compare the results to regulatory guidelines, decision matrices, and human health risks to put the results into perspective. The reporting shall review the need for action and if necessary, suggest reasonable/practical actions to reduce exposures.

For this project, the laboratory data will meet NYSDEC Analytical Services Protocol Category B Data Deliverable, which is comprised of the information provided in the Category A Data Deliverable plus related QA/QC information and documentation. The reporting and deliverables requirements for Categories A and B are comprised of:

> Category A: Sample Delivery Group Narrative; Contract Lab Sample Information Sheets; NYSDEC Data Package Summary Forms; Chain-of-Custody Forms; and Test Analyses Results.
>
> Category B: Standards; Surrogates; Blanks; Spikes; Recoveries; Confirmation Samples; Calibration; Chromatograms; Raw Data Files; and other specific information as described in current NYSDEC ASP exhibit B, "Reporting and Deliverables Requirements".

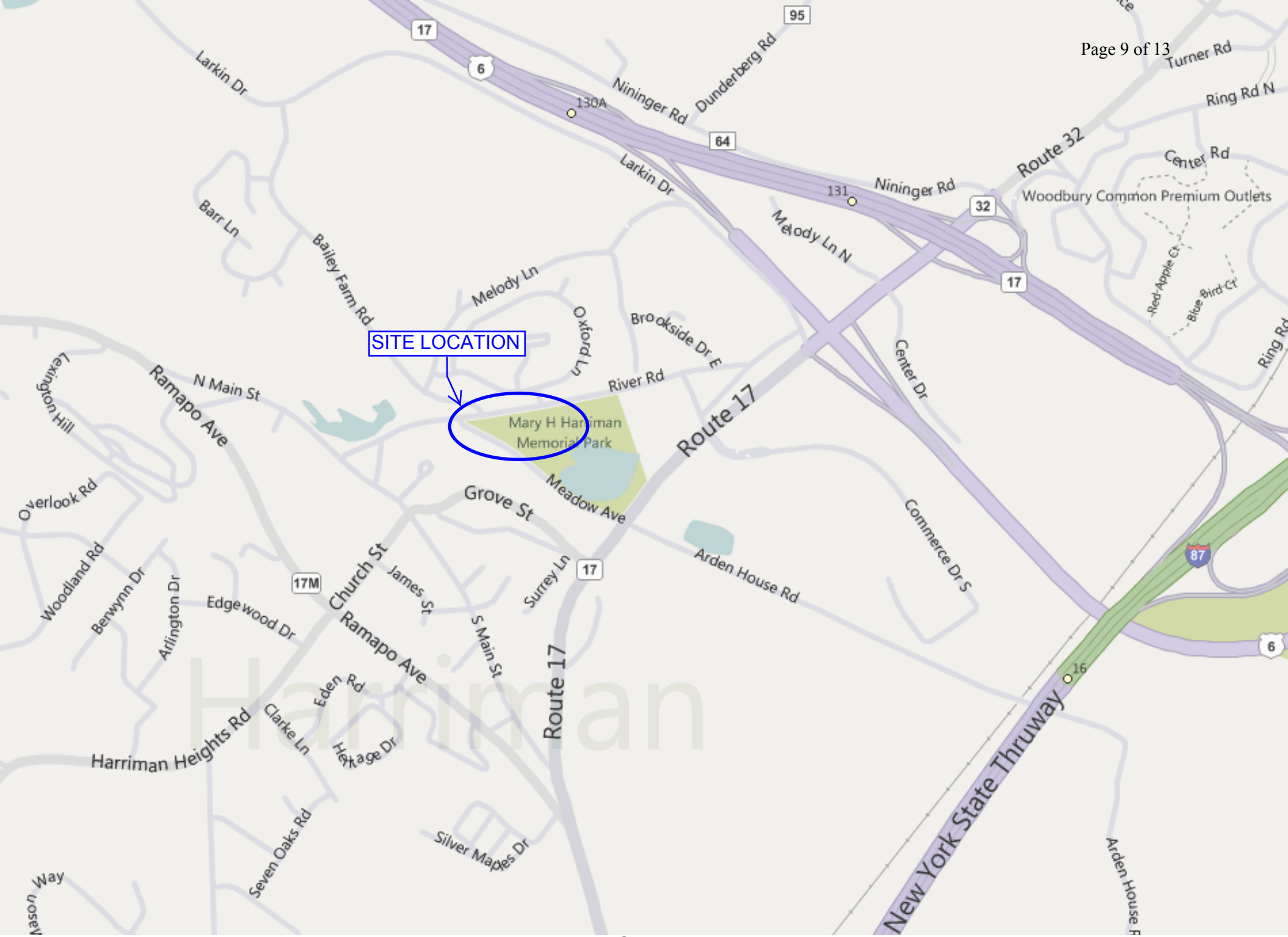
A NYSDEC ASP Category B Data Deliverable will be provided by a NYSDOH ELAP accredited laboratory that also is CLP Tier accredited for the relevant category of analytes. The Category B Data Deliverable will be used for the development of a Data Usability Summary Report (DUSR).

The DUSR shall provide an evaluation of analytical data with the primary objective to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use. The development of the DUSR shall be carried out by an experienced environmental scientist/engineer who is capable of conducting such data validation. The preparation of a DUSR shall be based on reviewing and evaluating the analytical data package for completeness, holding times, QC data, proper analytical protocols, raw data confirmation and the use of correct data qualifiers, and any quality control exceedances. The DUSR shall include any noted data deficiencies and if re-sampling/reanalysis is recommended.

5.0 SCHEDULE

Upon NYSDEC and NYSDOH acceptance of this work plan, the SVI sampling will be conducted subsequent to completing the pre-sampling building inspection and product inventory as well as the installation of the temporary probes (installation to be conducted a minimum of 72hrs prior to sampling). The SVI sampling is anticipated to be conducted a day in the coming winter months of the latter part of January or a time in February.

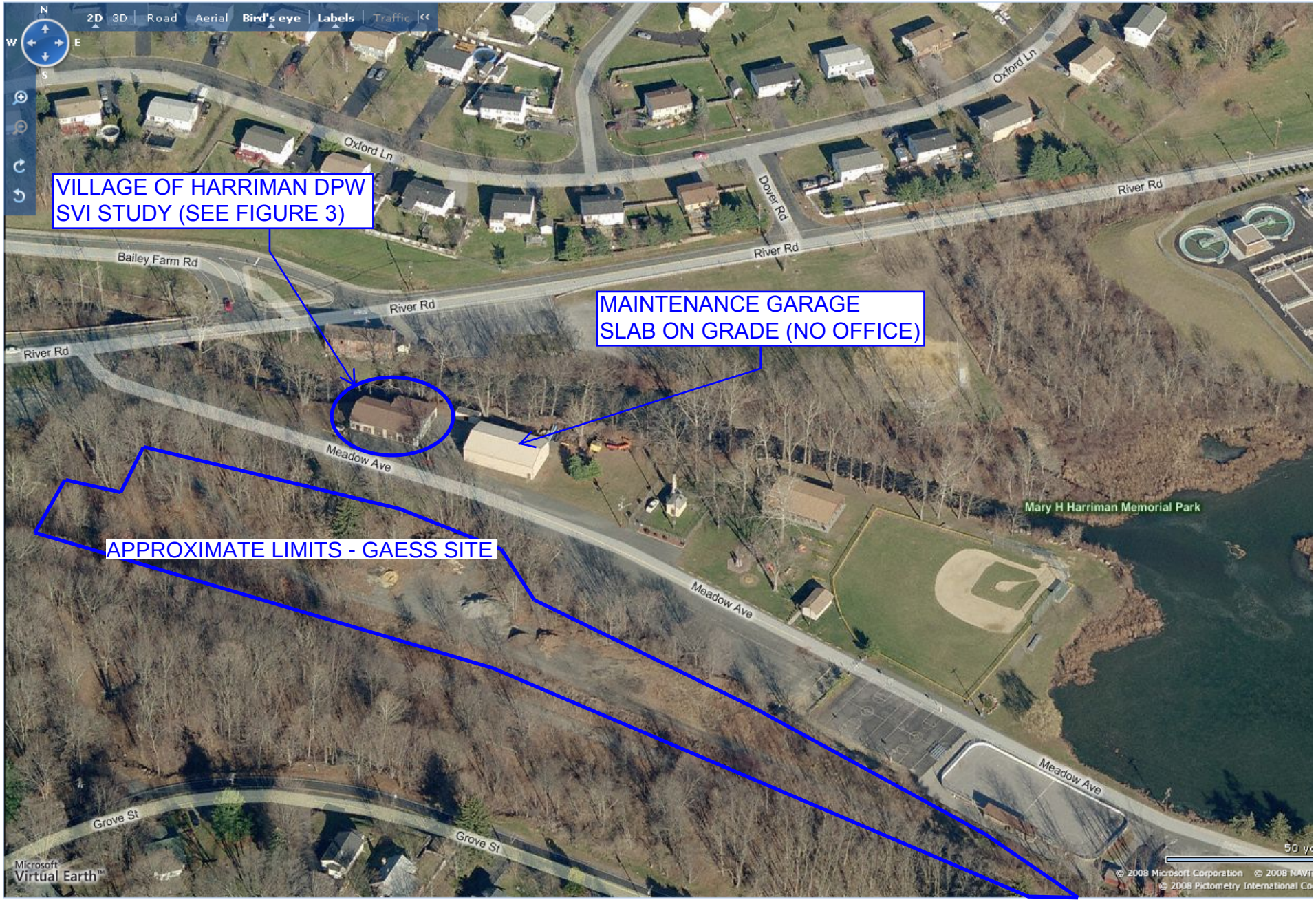
FIGURES



PREPARED BY: WESTON & SAMPSON PE, LS, LA, PC

FIGURE 1
SITE LOCATION

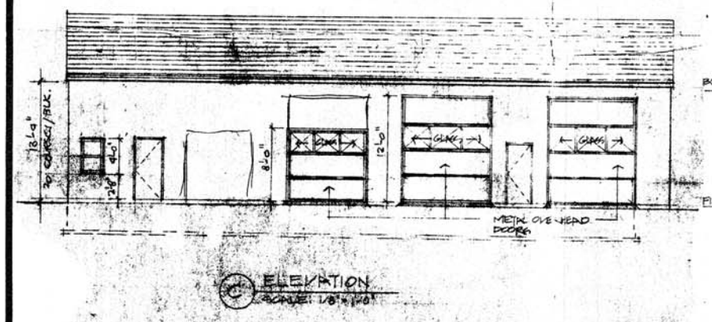
WASTE MANAGEMENT - SVI STUDY
GAESS SITE # 336018
HARRIMAN, NY



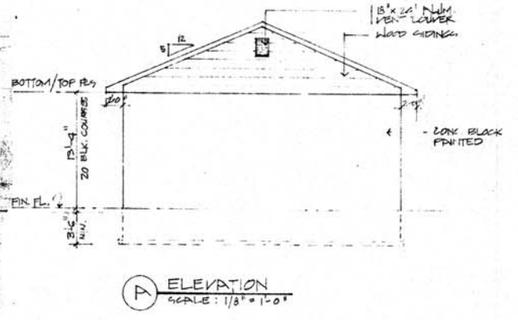
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FIGURE 2
AERIAL SITE VIEW

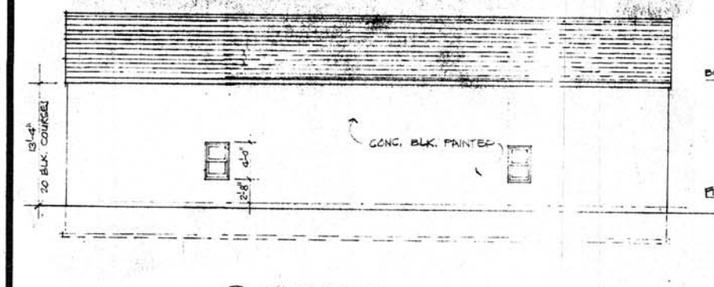
WASTE MANAGEMENT - SVI STUDY
GAESS SITE # 336018
HARRIMAN, NY



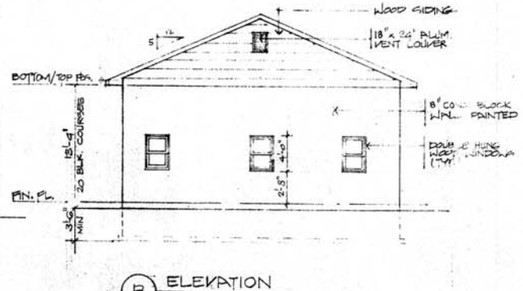
C ELEVATION
SCALE: 1/8" = 1'-0"



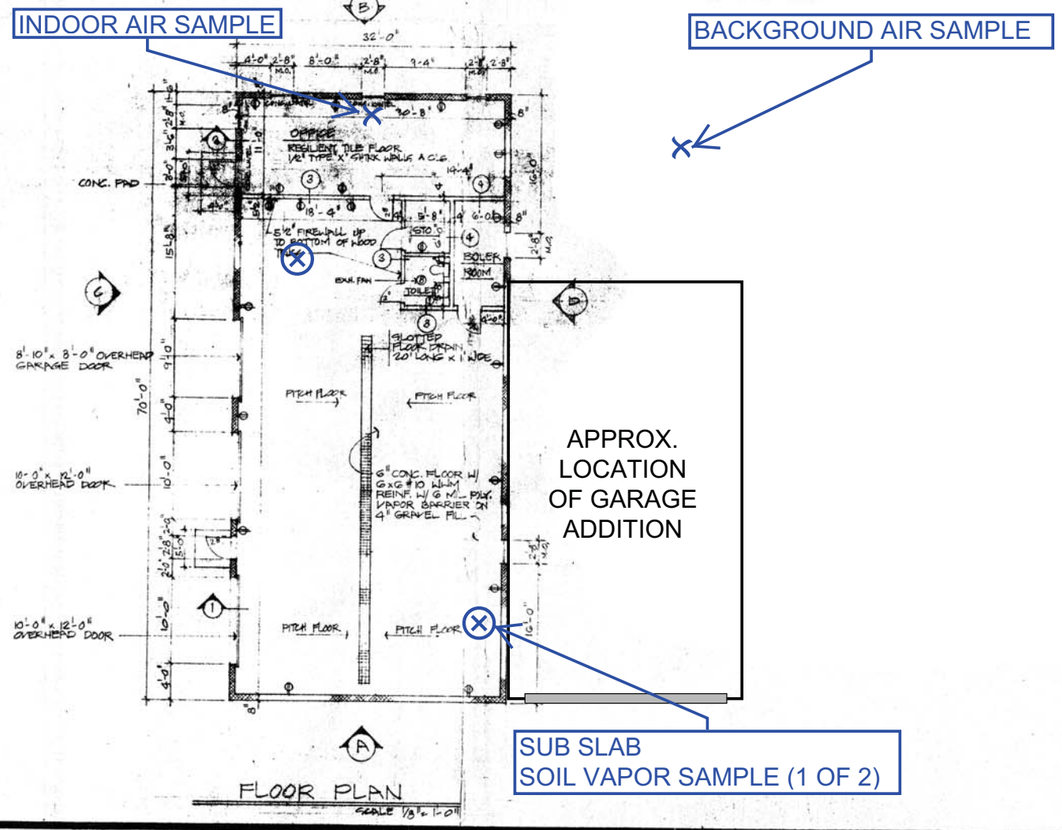
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SCALE: 1/8" = 1'-0"



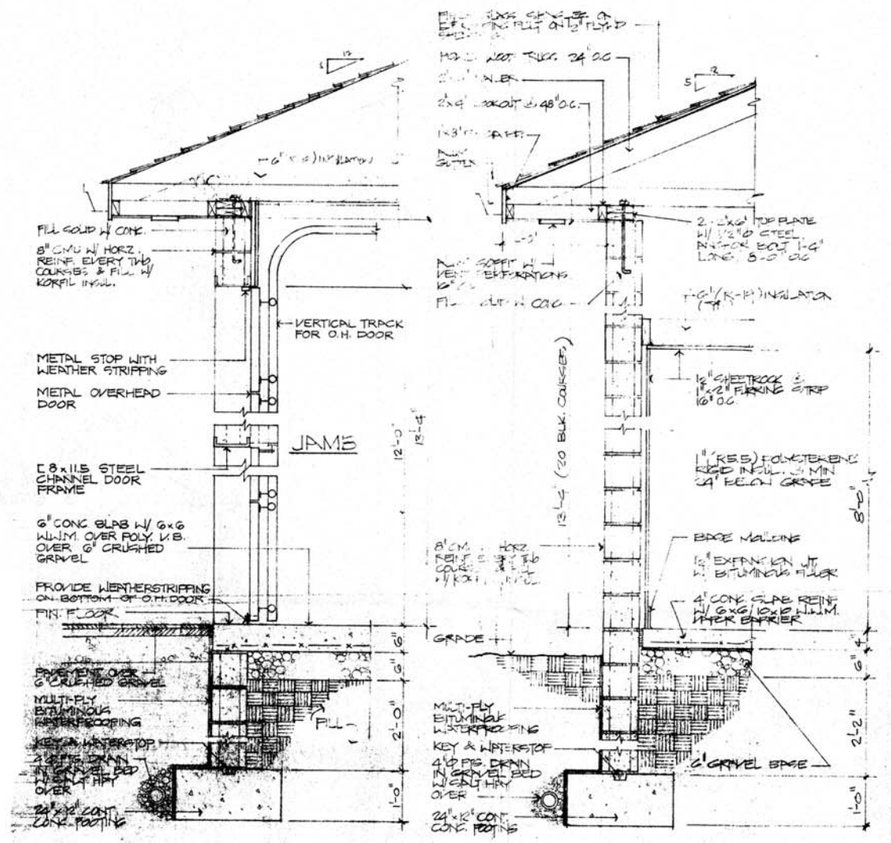
D ELEVATION
SCALE: 1/8" = 1'-0"



B ELEVATION
SCALE: 1/8" = 1'-0"

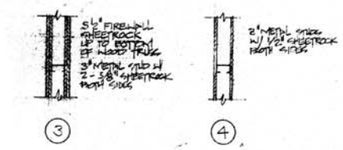


FLOOR PLAN
SCALE 1/8" = 1'-0"



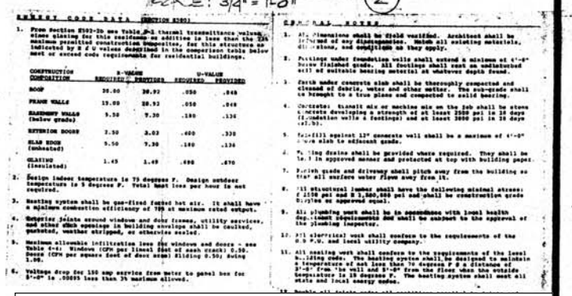
SECTION 1
SCALE: 3/4" = 1'-0"

WALL TYPES



3 4

SECTION 2
SCALE: 3/4" = 1'-0"



BUILDING CODE DATA (SECTION R305)

1. From Section R302-2b use Table 24-1 thermal transmittance values, glass glazing for this residence in addition to less than the 15% maximum permitted construction temperature, for this structure as indicated by a 2.0 value published in the comparison table below meet or exceed code requirements for residential buildings.

CONSTRUCTION	R-VALUE REQUIRED	R-VALUE PROVIDED	U-VALUE REQUIRED	U-VALUE PROVIDED
ROOF	30.00	30.92	.050	.048
FRAME WALLS	19.00	20.92	.050	.048
MASONRY WALLS (below grade)	9.50	9.30	.100	.134
EXTERIOR DOORS	2.50	2.02	.400	.330
SLAB EDGE (insulated)	9.50	9.30	.100	.134
GLAZING (insulated)	1.45	1.49	.690	.670

2. Design indoor temperature is 70 degrees F. Design outdoor temperature is 9 degrees F. Total heat loss per hour is not required.

3. Heating system shall be gas-fired forced hot air. It shall have a minimum combustion efficiency of 78% at maximum rated output.

4. Exterior joints around windows and door frames, utility services, and other which openings in building envelope shall be caulked, gasketed, weather stripped, or otherwise sealed.

5. Maximum allowable infiltration loss for windows and doors - see Table 4-4: Windows (CFM per linear foot of each crack) 0.50. Doors (CFM per square foot of door area): Sliding 0.50; Swing 1.00.

6. Voltage drop for 150 amp service from meter to panel box for 3'-0" is .00625 less than 3% maximum allowed.

7. All plumbing work shall be in accordance with local health dept. requirements and shall be subject to the approval of the plumbing inspector.

8. All electrical work shall conform to the requirements of the N.E.C. and local utility company.

9. All structural lumber shall be #2 grade fir or hemlock with the following minimum allowable stresses: f_b 1250 psi and E 1,500,000 psi and shall be construction grade D.Fir/L or approved equal.

10. All insulation shall conform to the requirements of the local energy code. Insulation shall be installed in exterior walls to obtain temperatures of not less than 70 degrees F @ a distance of 3'-0" from the wall and 5'-0" from the floor when the outside temperature is 10 degrees F. The heating system shall meet all state and local energy codes.

11. Smoke and carbon monoxide detectors shall be installed in accordance with the manufacturer's instructions and NFPA 72 and NFPA 720.

GENERAL NOTES

1. All dimensions shall be field verified. Architect shall be notified of any discrepancies. Match all existing materials, finishes, and conditions as they apply.

2. Footings under foundation walls shall extend a minimum of 4'-0" below finished grade. All footings shall rest on undisturbed soil or suitable bearing material at whatever depth found.

3. Finish under concrete slab shall be thoroughly compacted and cleaned of debris, water and other matter. The sub-grade shall be brought to a true plane and compacted to solid bearing.

4. Concrete: Ultimate mix or machine mix on the job shall be steel concrete developing a strength of at least 3000 psi in 28 days (unless noted otherwise) and at least 3000 psi in 7 days (w/ 2% salt).

5. Foundation against 12" concrete wall shall be a minimum of 4'-0" below slab to adjacent grade.

6. Vapor Barrier shall be provided where required. They shall be in the approved manner and protected at top with building paper.

7. Finish grade and driveway shall pitch away from the building so that all surface water flows away from it.

8. All structural lumber shall have the following minimal stress: f_b 1250 psi and E 1,500,000 psi and shall be construction grade D.Fir/L or approved equal.

9. All plumbing work shall be in accordance with local health dept. requirements and shall be subject to the approval of the plumbing inspector.

10. All electrical work shall conform to the requirements of the N.E.C. and local utility company.

11. All insulation shall conform to the requirements of the local energy code. Insulation shall be installed in exterior walls to obtain temperatures of not less than 70 degrees F @ a distance of 3'-0" from the wall and 5'-0" from the floor when the outside temperature is 10 degrees F. The heating system shall meet all state and local energy codes.

12. Smoke and carbon monoxide detectors shall be installed in accordance with the manufacturer's instructions and NFPA 72 and NFPA 720.

FIGURE 3 - SAMPLE LOCATIONS

WASTE MANAGEMENT SVI STUDY
VILLAGE OF HARRIMAN, NY DPW BUILDING

PREPARED BY: WESTON & SAMPSON PE, LS, LA, PC

REVISIONS

REVISED 2/3/88	RENE

WATER DEPARTMENT MAINTENANCE BUILDING
VILLAGE OF HARRIMAN

ARCHITECT
KARL HESS
254 SUNLETON RD
KEY MAP

DRAWN IGM
CHECKED
DATE 1-18-88
SCALE AS SHOWN
JOB NO. 88-102
SHEET 1
OF SHEETS

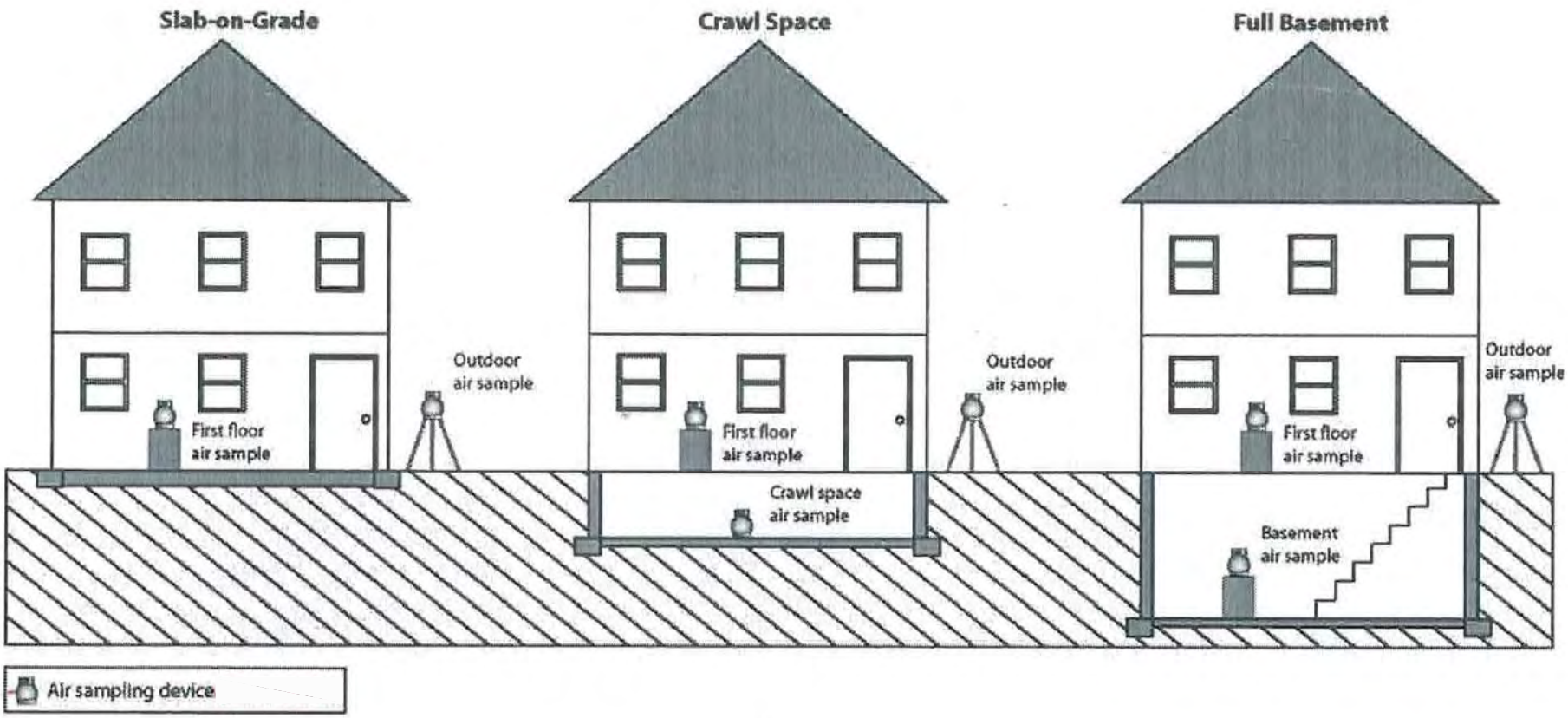


FIGURE 4 - TYPICAL INDOOR & OUTDOOR AIR SAMPLING CANISTER SET-UP

WASTE MANAGEMENT SVI STUDY
VILLAGE OF HARRIMAN, NY DPW BUILDING

PREPARED BY: WESTON & SAMPSON PE, LS, LA, PC

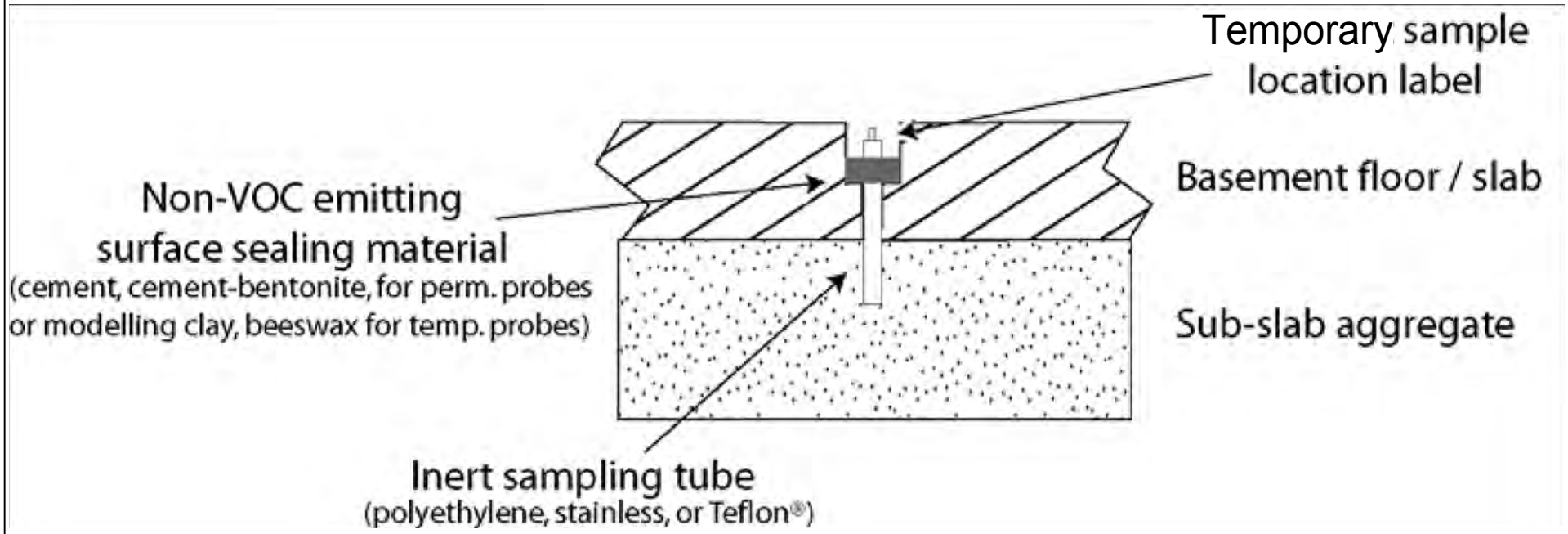


FIGURE 5 - TYPICAL SUB-SLAB SOIL VAPOR PROBE INSTALLATION

WASTE MANAGEMENT SVI STUDY
VILLAGE OF HARRIMAN, NY DPW BUILDING

PREPARED BY: WESTON & SAMPSON PE, LS, LA, PC