



Passive Soil Gas Control System Design and Specifications

Project location:
Norwood Estates
916 Norwood Park Blvd.
Austin, TX

Prepared by:
Keith Hoylman
Protect Environmental

Report Date:
June 14, 2019

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Preparation Date: June 14, 2019

This report was developed specifically for the passive soil gas control system design and specifications for the new construction project located at Norwood Estates, 916 Norwood Park Blvd., Austin, TX. This report is to verify that the passive soil gas control system design and specifications meet the requirements set forth in the American National Standards Institute (ANSI) document *Soil Gas Control Systems in New Construction of Buildings (ANSI/AARST CC-1000 2018)*. The passive soil gas control system design and specifications were developed by Keith Hoylman, a Radon Professional credentialed by the National Radon Proficiency Program (NRPP).



Keith Hoylman
Radon Professional

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Section 1.0 – Introduction

Protect Environmental was engaged to complete a passive soil gas control system design and specifications for the new construction project located at Norwood Estates, 916 Norwood Park Blvd., Austin, TX. This report was prepared to verify that the passive soil gas control system design and specifications meet the requirements set forth in the American National Standards Institute (ANSI) document *Soil Gas Control Systems in New Construction of Buildings (ANSI/AARST CC-1000 2018)*. The project is in an EPA Zone 3 county, which indicates a low potential for radon intrusion.

Section 2.0 – Scope of Work

The scope of work for this phase includes the following components:

1. Using base files provided by the client, develop the passive soil gas control system design.
2. Prepare design specifications for inclusion in the formal project manual.
3. Prepare and submit the new construction report certifying compliance of the passive soil gas control system design and specifications with the applicable standard.
4. Prepare and provide under separate cover, the scope and budget proposal for follow-on phases of the project.
5. Provide phone/email assistance for soil gas control system design-related issues.

Section 3.0 – Passive Soil Gas Control System Design and Specifications

The passive soil gas control system design developed for the client consists of a total of 23 passive soil gas control systems within seven three-story buildings and a clubhouse. The buildings are located on post-tension slab foundations and contain 228 residential units, along with offices and community amenity areas.

Each of the 23 passive soil gas control systems contains the following components: (1) a gas-permeable layer consisting of a 10-mil (per structural) vapor retarder located over compacted select fill; (2) a sub-slab soil gas collection system consisting of vapor mat, designed to allow the lateral flow of soil gases; (3) a 4-inch Schedule 40 PVC vapor conveyance vent system that extends vertically from the sub-slab area to a discharge point above the roof of the building; (4) waterproofing of exterior below-grade foundation walls; (5) sealing of any gaps, openings or joints in contact with the ground, using an appropriate material to provide a permanent airtight

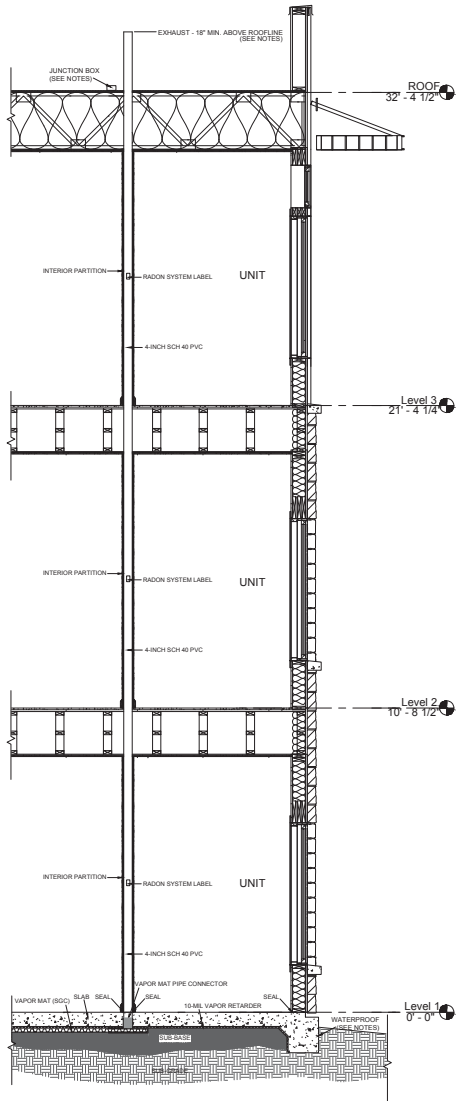
seal; (6) a total of 23 test point locations to facilitate future evaluation of pressure field extension (PFE); (7) an electrical outlet located within six feet of the vertical conveyance vent pipe on the roof; and (8) system labeling in accordance with ANSI/AARST CC-1000.

The passive soil gas control system design for the subject project meets the minimum requirements set forth in the American National Standards Institute (ANSI) document *Soil Gas Control Systems in New Construction of Buildings (ANSI/AARST CC-1000 2018)*. The passive soil gas control system design documentation is included in Appendix A of this report. System specifications documentation is included in Appendix B of this report.

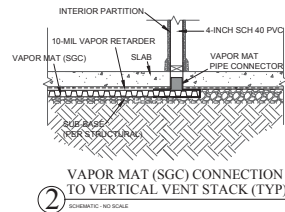
This report does not address follow-on services required for the project. All follow-on services will be conducted by or under the direct supervision of a Radon Professional credentialed by the NRPP and in accordance with the minimum requirements set forth in the American National Standards Institute (ANSI) documents *Soil Gas Control Systems in New Construction of Buildings (ANSI/AARST CC-1000 2018)* or *Protocol for Conducting Radon and Radon Decay Measurements in Multifamily Buildings (AARST/ANSI MAMF-2017)*, as applicable. The passive soil gas control system follow-on services scope and budget documentation will be provided under separate agreement for client approval.

Appendix A

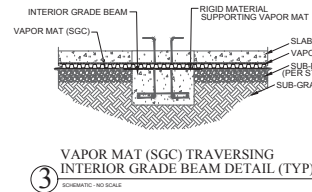
Passive Soil Gas Control System Design



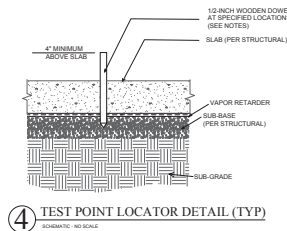
① SOIL GAS VENT STACK DETAIL (TYP)
SCHEMATIC - NO SCALE



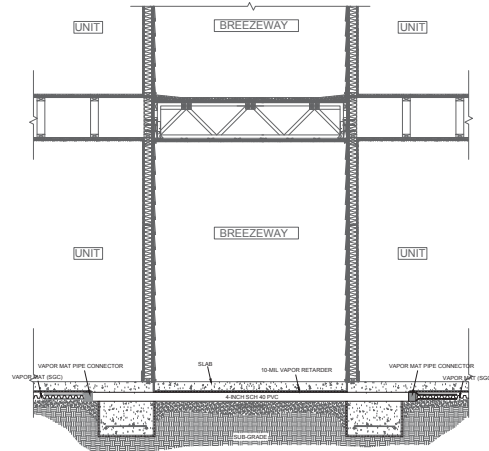
② VAPOR MAT (SGC) CONNECTION TO VERTICAL VENT STACK (TYP)
SCHEMATIC - NO SCALE



③ VAPOR MAT (SGC) TRAVERSING INTERIOR GRADE BEAM DETAIL (TYP)
SCHEMATIC - NO SCALE



④ TEST POINT LOCATOR DETAIL (TYP)
SCHEMATIC - NO SCALE



⑤ SGC BREACH AT BREEZEWAY DETAIL (TYP)
SCHEMATIC - NO SCALE

General Notes and Specifications:

Part A- General:

- These plans depict the details of a Passive Soil Gas Vent System design. The design has been developed in accordance with ANSI/AARST CC-1000 2018, *Soil Gas Control Systems in New Construction of Buildings*, by or under the direct supervision of a Qualified Radon Professional. Building layouts, structural details and other information pertaining to the design was referenced from the available plans supplied to Protect Environmental by the project architect, Kelly Grossman Architects Architecture. The design may be modified by Protect Environmental, as necessary, to accommodate construction restraints.

Part B- Definitions:

- **ACTIVE SOIL DEPRESSURIZATION (ASD)**- A fan-driven system to create a vacuum beneath a structure that is greater in strength than the vacuum applied to the soil by the building above.
- **GAS-PERMEABLE LAYER**- Void space or permeable aggregate that allows *hydraulic conductivity* for soil gas movement into and across a soil gas collection plenum.
- **INLET**- See *Soil Gas Inlet*.
- **INLET PIPING**- Air duct piping that connects one or more soil gas inlets to a vent stack.
- **MITIGATION SYSTEM**- Any system designed to reduce indoor concentrations of radon or other soil gas pollutants.
- **PLENUM**- See *Soil Gas Collection Plenum*.
- **PRESSURE FIELD EXTENSION (PFE)**- The amount of sub-slab vacuum created by active soil depressurization.
- **QUALIFIED RADON PROFESSIONAL**- An individual that has demonstrated a minimum degree of appropriate technical knowledge and skills specific to radon mitigation and/or measurement, as appropriate: a) as established in certification requirements of the National Radon Proficiency Program (NRPP) or the National Radon Safety Board (NRSB); and b) as required by statute, state licensure or certification program, where applicable.
- **SOIL GAS**- Air within soil that can contain radon and/or other hazardous gasses or vapors.
- **SOIL GAS COLLECTION PLENUM**- A three-dimensional enclosure, in whatever shape it may be, constructed for collecting radon and other soil gasses from under slabs, soil gas retarders and from behind walls that surround a void or gas-permeable layer.
- **SOIL GAS COLLECTOR (SGC)**- Vapor mat laid within the soil gas collection plenum, designed to facilitate flow of soil gas to the inlet piping.
- **SOIL GAS INLET**- Air transfer opening to the face of adjoining granular aggregate or soil.
- **SOIL GAS VENT SYSTEM**- Individual and complete configuration for controlled soil gas venting that includes a vent stack(s) extended from gas-permeable materials within a soil gas collection plenum(s) to the system exhaust above the roof.
- **SUB-BASE**- A layer of aggregate or granular fill on top of the subgrade.
- **SUB-GRADE**- Native soil (or improved soil), usually compacted.
- **SYSTEM**- See *Soil Gas Vent System* or *Mitigation System*.
- **TEST POINT**- A predetermined location for later installation of a test port to facilitate *pressure field extension* evaluation.
- **VAPOR RETARDER**- Pliable plastic sheeting that establishes a barrier between soil gas and enclosed spaces within a building. Also commonly referred to as vapor barrier or soil gas retarder.
- **VAPOR MAT**- A pre-manufactured geotextile product designed to create a gas-permeable layer beneath the slab.
- **VENT STACK**- Sometimes referred to as risers, air duct piping that routes the entire system air volume capacity from the soil gas collection plenum(s) to the system exhaust above the roof.

Part C- Construction:

- Create a soil gas collection plenum by sealing any penetrations and waterproofing foundation walls. Emplace the vapor mat soil gas collector (SGC) over 4-inches (minimum) of compacted select fill (per structural). The SGC shall be no less than 12 inches nor further than 10 feet from exterior foundation walls. At points where the SGC must traverse interior structural supports, support vapor mat across trench with a rigid material, such as lengths of 1/2-inch rebar or pan metal roofing, to breach the area prior to pouring the slab. Vapor mat may be moved laterally to accommodate plumbing penetrations or other obstacles.
- At identified locations, connect the SGC across breezeways with 4-inch SCH 40 PVC.
- Install a 10-mil (per structural) vapor retarder over the entire foundation footprint to create an airtight seal below the slab. All seams shall be overlapped a minimum of 12 inches and taped in place. Any penetrations through the vapor retarder shall be sealed with appropriate sealant and taped.
- At points identified as vent stack locations, attach vapor mat pipe connectors per manufacturer instructions. Install 4-inch SCH 40 PVC vertical vent stack pipes per design drawings and connect to SGC inlet, ensuring that piping extends a minimum of 2 feet above slab level. Any joints shall be solvent welded.
- Place 1/2-inch wooden dowels at locations identified as test points to ensure tendons or sub-slab utilities do not obstruct coring the slab to perform the PFE evaluation. Test points may be moved laterally to avoid noted obstacles.
- Pour the slab per structural drawings and specifications.
- Once cured, all gaps and joints in the concrete slab that is, control joints, isolation joints, construction joints, and so forth shall be sealed to prevent air leakage into the soil gas collection plenum. All sump covers shall, likewise, be sealed to prevent air leakage. Waterproof all below-grade exterior foundation walls, consistent with IBC Section 1805. Caulks and sealants shall be applied according to manufacturer instructions.
- Extend vent stack piping vertically through all levels of living space until it reaches the roofline, secured every 10 feet. Any portion of the vent stack that runs through unconditioned space shall be insulated with a material with an R-value of 4 or greater. The vent stack pipe will exit through the roof at least 10 feet above ground level; above the roof surface at least 18 inches; at least 10 feet away and 2 feet above any window, door, or other opening (including mechanical intakes) into conditioned space; and, 10 feet away from any occupied living spaces of adjoining buildings. Final location of vent stacks shall be verified by the General Contractor or Project Architect to ensure compliance.
- Affix labeling identifying items as components of a radon or soil gas vent system. Vent stacks shall be labeled on each floor level of the building and within each room or accessible service area through which it runs. Labels shall be at intervals of not greater than 20 feet and in any area where piping is exposed and not enclosed behind walls, so as to be clearly visible to service personnel. Labels shall meet standards set forth in ANSI/AARST CC-1000 2018.
- Install a watertight switch on the roof, within 6 feet of each potential radon fan location. Outlets and breaker board circuit shall be labeled accordingly. All electrical work shall be completed by a licensed electrical contractor.

Part D- Quality Control:

- All mitigation component inspections and testing shall be conducted by or under the direct supervision of a Qualified Radon Professional. Upon completion of the project, the Qualified Radon Professional shall certify the project as complete.
- Post-construction testing shall be conducted to verify indoor radon concentrations in the buildings are below the EPA action level of 4.0 pCi/L.
- All system design, installation and post-construction verification shall comply with ANSI/AARST CC-1000 2018. All post-construction testing shall comply with ANSI MAMF-2017.

Part E- Post-Construction:

- If post-construction verification testing indicates radon levels at or above the EPA action level, activation of the Soil Gas Vent System shall be conducted by installing a Radon Fan(s) in accordance with ANSI/AARST CC-1000 2018. Upon completion of activation, additional post-construction testing shall be conducted to verify indoor radon concentrations in the buildings are below the EPA action level.

NORWOOD ESTATES
916 NORWOOD PARK BLVD.
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SOIL GAS CONTROL PLAN

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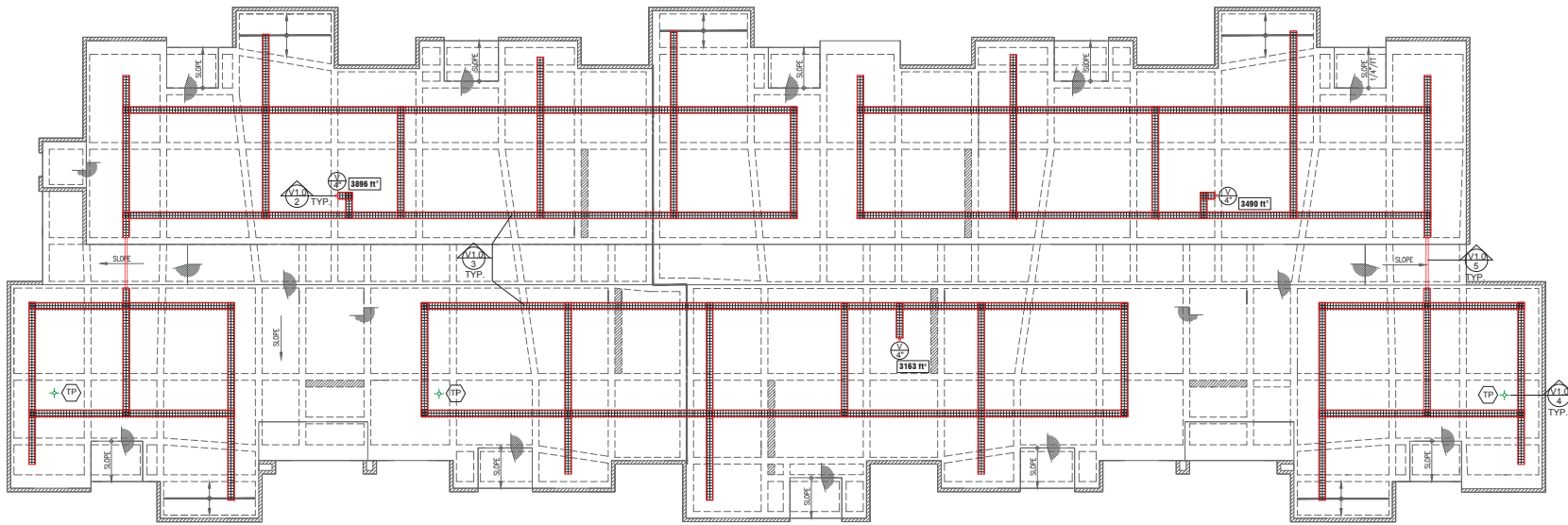
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06/12/2019

SHEET
V1.0

Certified by Keith Hoylman,
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ID# RMT-109309

Keith Hoylman



BLDG TYPE I FOUNDATION SOIL GAS CONTROL PLAN
NO SCALE

SOIL GAS CONTROL SYSTEM LEGEND
 12-INCH VAPOR MAT SGC
 BREZEWAY BREACH
 4-INCH VERTICAL VENT
 TEST POINT
 SEE CONSTRUCTION DETAILS ON SHEET V1.0

NORWOOD ESTATES
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SOIL GAS CONTROL PLAN
 HUD PROJECT #051-38028

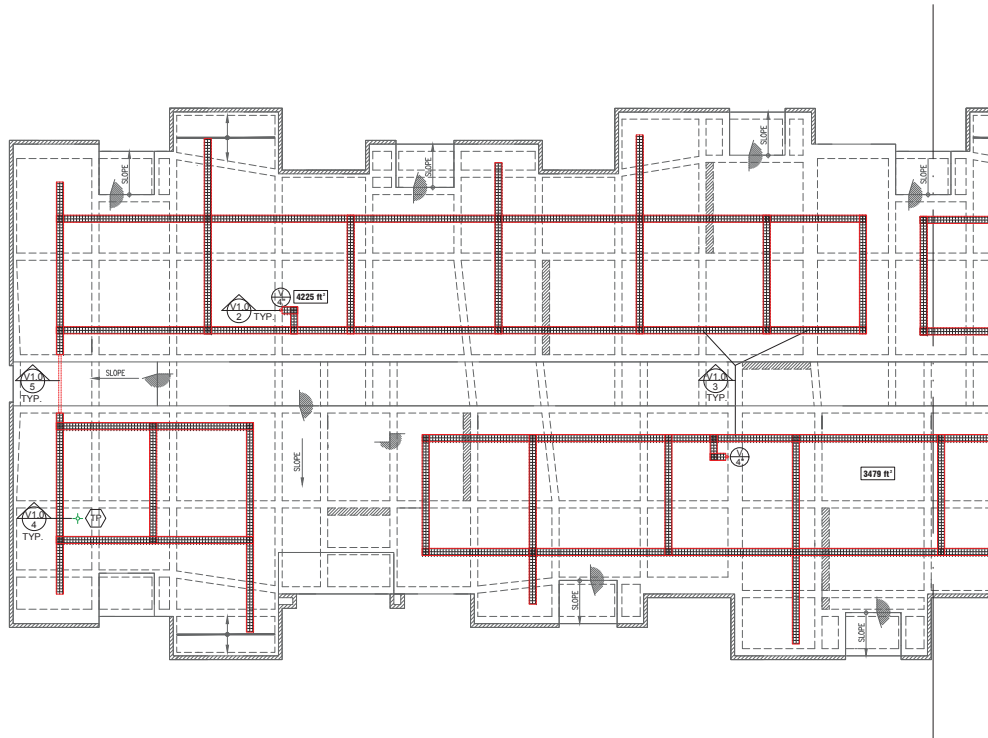
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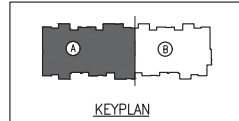
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Keith Hoylman
 RTR



BLDG TYPE II, AREA A FOUNDATION SOIL GAS CONTROL PLAN
NO SCALE

SOIL GAS CONTROL SYSTEM LEGEND	
	12-INCH VAPOR MAT SGC
	BREEZEWAY BREACH
	4-INCH VERTICAL VENT
	TEST POINT
SEE CONSTRUCTION DETAILS ON SHEET V1.0	



NORWOOD ESTATES
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SOIL GAS CONTROL PLAN
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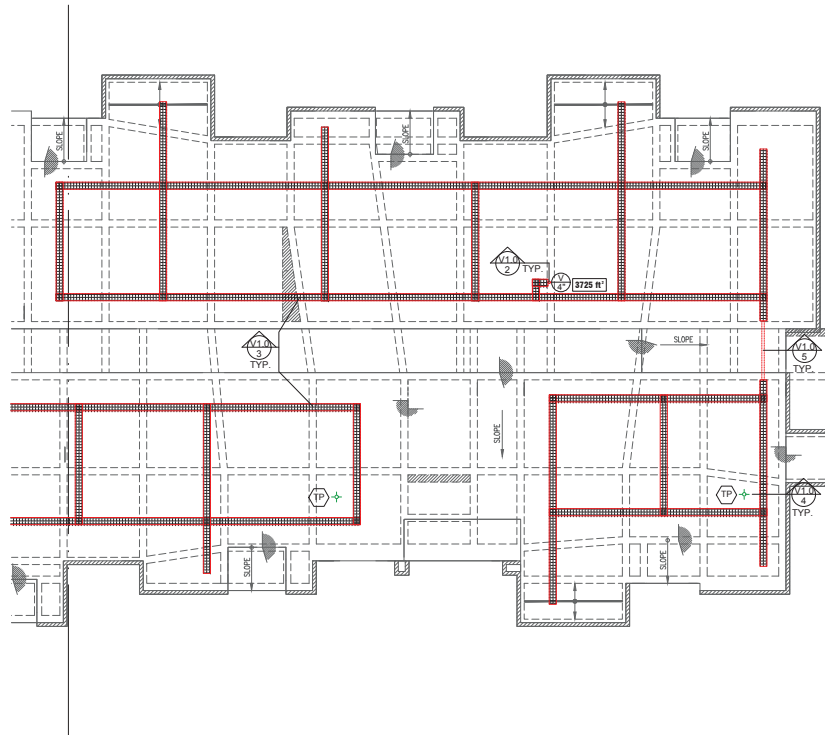
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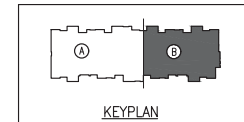
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RTR



BLDG TYPE II, AREA B FOUNDATION SOIL GAS CONTROL PLAN
NO SCALE

SOIL GAS CONTROL SYSTEM LEGEND	
	12-INCH VAPOR MAT SGC
	BREEZEWAY BREACH
	4-INCH VERTICAL VENT
	TEST POINT

SEE CONSTRUCTION DETAILS ON SHEET V1.0



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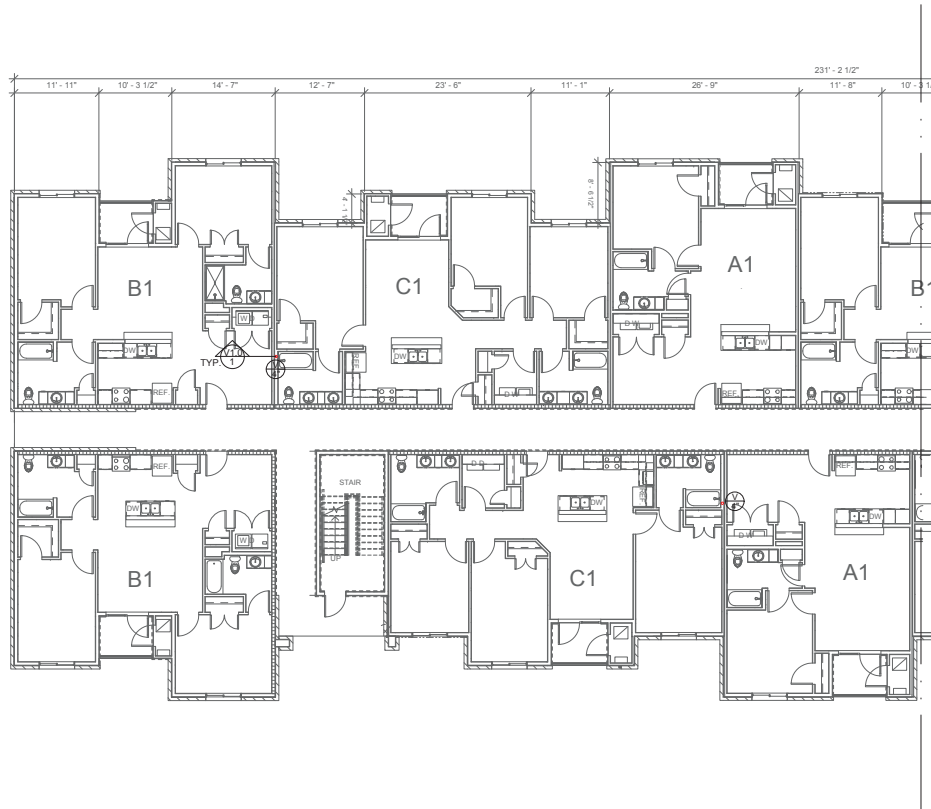
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V2.1B

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Keith Hoyman

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BLDG TYPE II, AREA A FIRST FLOOR SOIL GAS CONTROL PLAN
NO SCALE

SOIL GAS CONTROL SYSTEM LEGEND
 • 4-INCH VERTICAL VENT
 SEE CONSTRUCTION DETAILS ON SHEET V1.0

NORWOOD ESTATES
 916 NORWOOD PARK BLVD.
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SOIL GAS CONTROL PLAN
 HUD PROJECT #051-38028

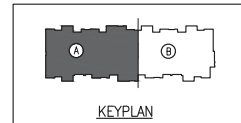
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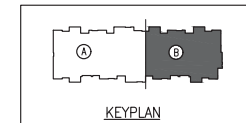
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SOIL GAS CONTROL SYSTEM LEGEND

• ⊕ 4-INCH VERTICAL VENT

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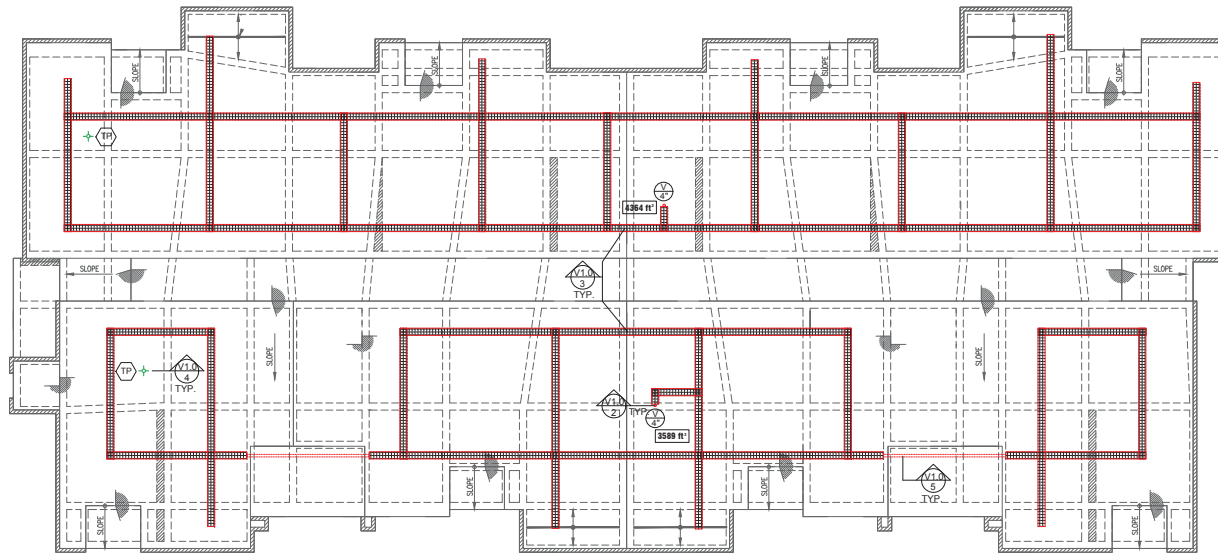
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RTRM Radon Testing & Remediation



SOIL GAS CONTROL SYSTEM LEGEND	
	12-INCH VAPOR MAT SGC
	BREEZEWAY BREACH
	4-INCH VERTICAL VENT
	TEST POINT
SEE CONSTRUCTION DETAILS ON SHEET V1.0	

BLDG TYPE III, FOUNDATION SOIL GAS CONTROL PLAN
NO SCALE

NORWOOD ESTATES
916 NORWOOD PARK BLVD.
AUSTIN, TX

SOIL GAS CONTROL PLAN
HUD PROJECT #051-38028

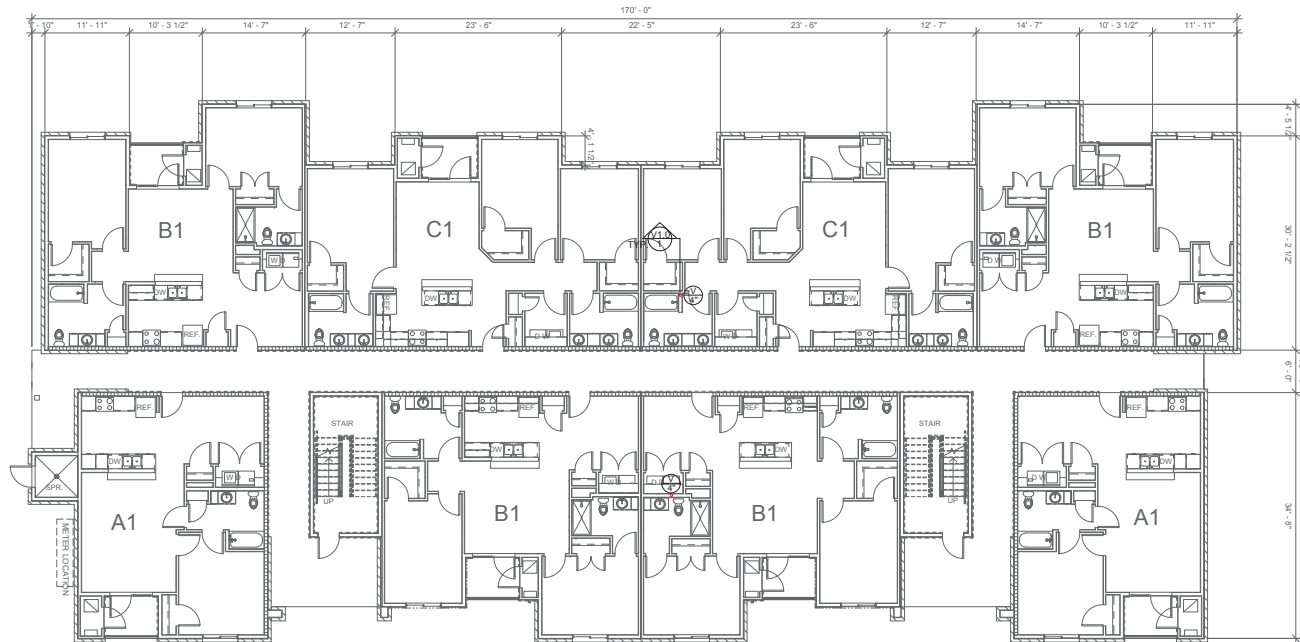
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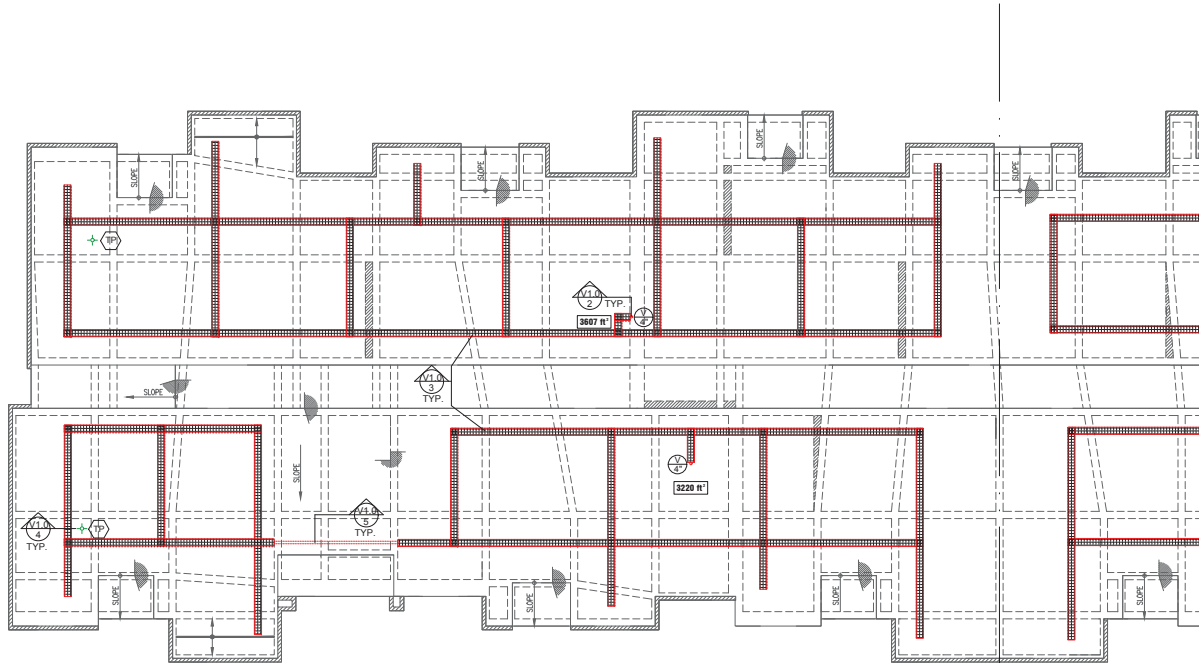
SOIL GAS CONTROL SYSTEM LEGEND
 • 4-INCH VERTICAL VENT
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BLDG TYPE III, FIRST FLOOR SOIL GAS CONTROL PLAN
 NO SCALE

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SOIL GAS CONTROL PLAN
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<p>PROTECT ENVIRONMENTAL</p> <p>9822 BLUEGRASS PKWY LOUISVILLE, KY 40299 PHONE: 502-410-8850 TOLL FREE: 877-508-8850</p>
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<p>SHEET V3.3</p>
<p>Certified by Keith Hoylman, Radon Mitigation Professional ID# RMT-109309</p> <p><i>Keith Hoylman</i> RTRF</p>

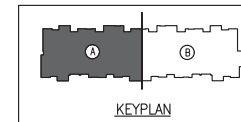


BLDG TYPE IV. AREA A FOUNDATION SOIL GAS CONTROL PLAN
NO SCALE

SOIL GAS CONTROL SYSTEM LEGEND

- 12-INCH VAPOR MAT SGC
- BREEZEWAY BREACH
- 4-INCH VERTICAL VENT
- TEST POINT

SEE CONSTRUCTION DETAILS ON SHEET V1.0



NORWOOD ESTATES
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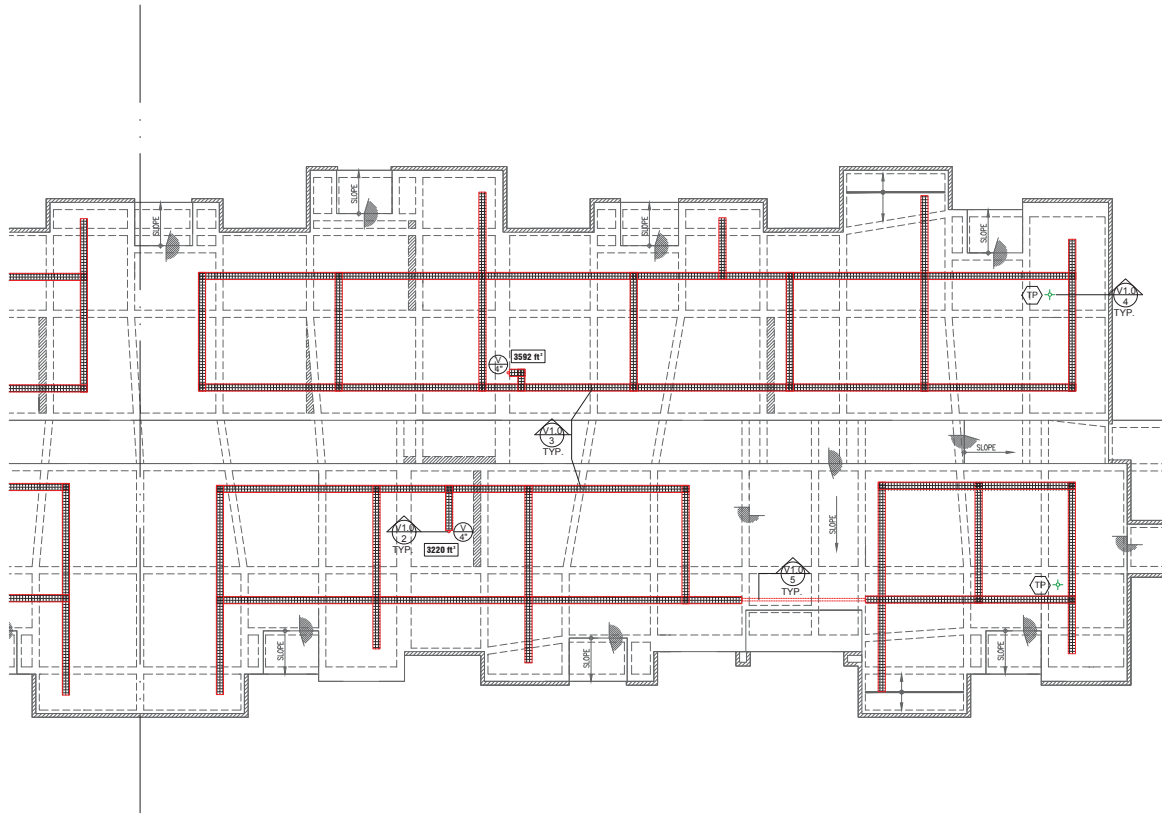
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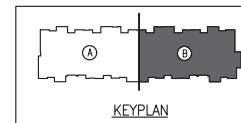
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RTEP



BLDG TYPE IV, AREA B FOUNDATION SOIL GAS CONTROL PLAN
NO SCALE

SOIL GAS CONTROL SYSTEM LEGEND	
---	12-INCH VAPOR MAT SGC
----	BREEZEWAY BREACH
+	4-INCH VERTICAL VENT
+	TEST POINT

SEE CONSTRUCTION DETAILS ON SHEET V1.0



NORWOOD ESTATES
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SOIL GAS CONTROL PLAN
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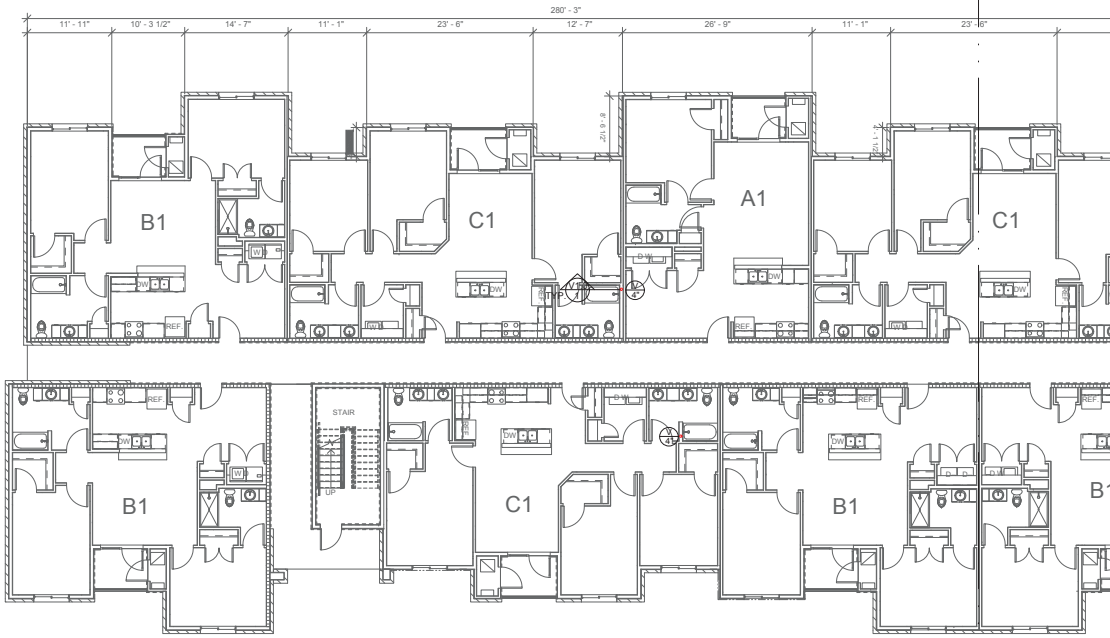
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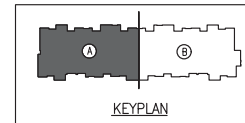
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BLDG TYPE IV, AREA A FIRST FLOOR SOIL GAS CONTROL PLAN
NO SCALE

SOIL GAS CONTROL SYSTEM LEGEND
• 4-INCH VERTICAL VENT
SEE CONSTRUCTION DETAILS ON SHEET V1.0



NORWOOD ESTATES
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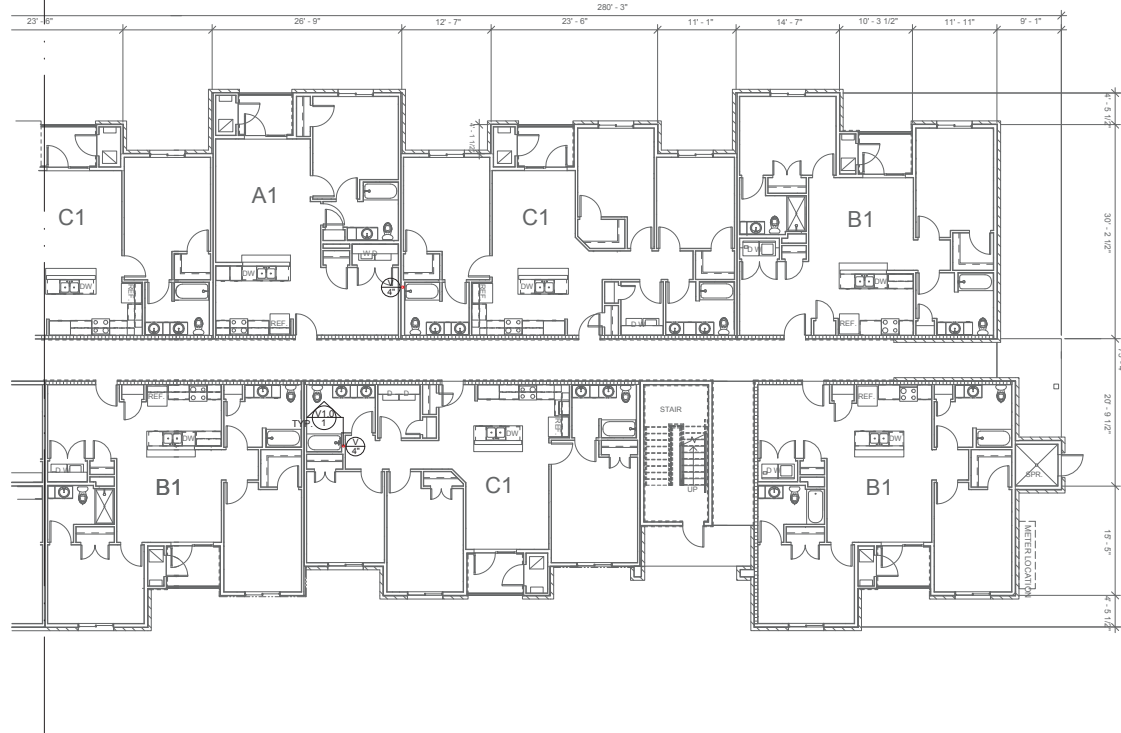
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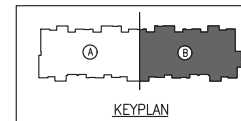
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BLDG TYPE IV, AREA B FIRST FLOOR SOIL GAS CONTROL PLAN
NO SCALE

SOIL GAS CONTROL SYSTEM LEGEND
 • 4-INCH VERTICAL VENT
 SEE CONSTRUCTION DETAILS ON SHEET V1.0



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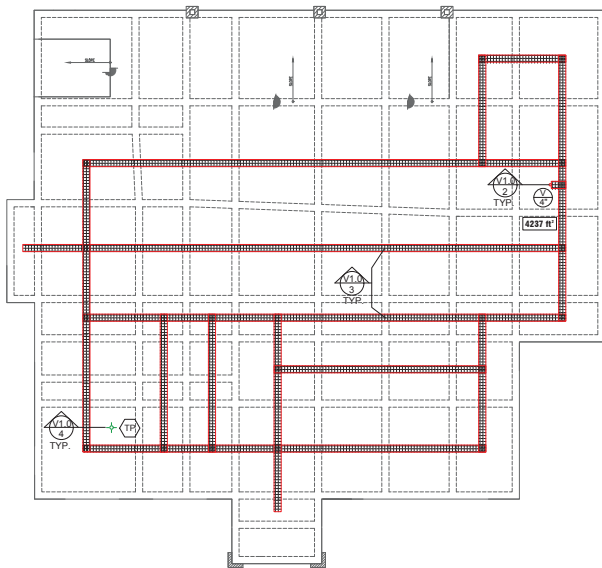
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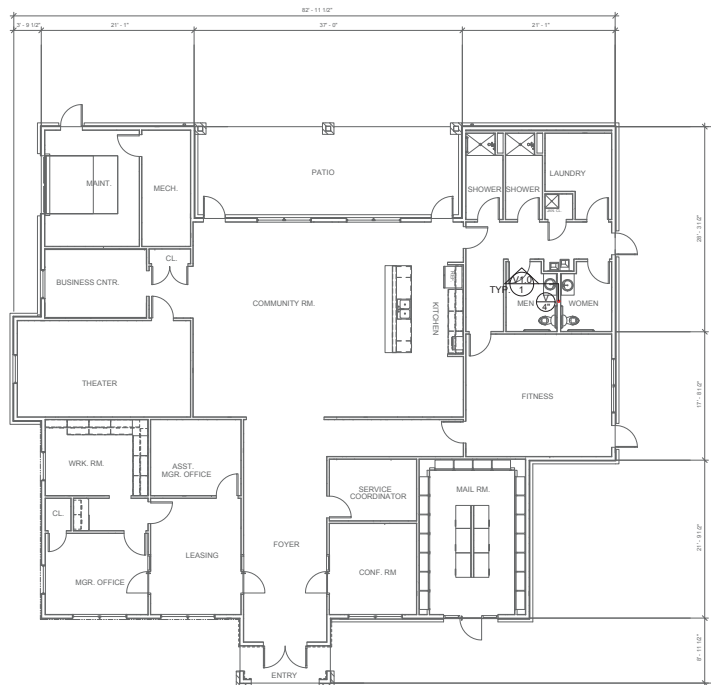
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CLUBHOUSE FOUNDATION SOIL GAS CONTROL PLAN
NO SCALE



CLUBHOUSE FIRST FLOOR SOIL GAS CONTROL PLAN
NO SCALE

SOIL GAS CONTROL SYSTEM LEGEND	
	12-INCH VAPOR MAT SGC
	4-INCH VERTICAL VENT
	TEST POINT

SEE CONSTRUCTION DETAILS ON SHEET V1.0

NORWOOD ESTATES
916 NORWOOD PARK BLVD.
AUSTIN, TX

SOIL GAS CONTROL PLAN
HUD PROJECT #051-38028

PROTECT
ENVIRONMENTAL

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DRAWING DATE
06/12/2019

SHEET
V5.1

Certified by Keith Hoyman,
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Appendix B

Passive Soil Gas Control System Specifications

PASSIVE SOIL GAS CONTROL SYSTEM SPECIFICATIONS

PART 1 – GENERAL

1.1 SUMMARY

- 1.1.1 Provide all work necessary to install passive soil gas control systems in all buildings to maintain indoor radon concentrations below the EPA action level of 4.0 pico Curies per liter (pCi/L), as specified herein.
- 1.1.2 Perform the required pressure field extension (PFE) evaluation to verify adequate sub-slab depressurization prior to installing vertical conveyance piping. This shall include installation of pre-manufactured fittings at locations designated in design drawings.
- 1.1.3 Perform post-construction testing to verify that indoor radon concentrations are below the EPA action level prior to occupancy, as specified herein.
- 1.1.4 If post-construction testing indicates indoor radon concentrations at or above the EPA action level, provide all work necessary to activate the passive soil gas control systems to reduce indoor radon concentrations in the building to below the EPA action level, as specified herein.
- 1.1.5 Provide a written operations and maintenance plan for the soil gas control systems that is suitable for distribution to maintenance personnel and other appropriate parties to provide tools for operating and maintaining systems.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/AARST CC-1000 (2018) Soil Gas Control Systems in New Construction of Buildings

ANSI/AARST MAMF-2017 (2017) Protocol for Conducting Radon and Radon Decay Measurements in Multifamily Buildings

1.3 DEFINITIONS

- ACTIVE SOIL DEPRESSURIZATION (ASD)- A fan-driven system to create a vacuum beneath a structure that is greater in strength than the vacuum applied to the soil by the building above.
- GAS-PERMEABLE LAYER- Void space or permeable aggregate that allows hydraulic conductivity for soil gas movement into and across a soil gas collection plenum.
- INLET- See Soil Gas Inlet.
- INLET PIPING- Air duct piping that connects one or more soil gas inlets to a vent stack.
- PLENUM- See Soil Gas Collection Plenum
- PRESSURE FIELD EXTENSION (PFE)- The amount of sub-slab vacuum created by active soil depressurization.
- QUALIFIED RADON PROFESSIONAL- An individual that has demonstrated a minimum degree of appropriate technical knowledge and skills specific to radon mitigation and/or measurement, as appropriate: a) as established in certification requirements of the National Radon Proficiency Program (NRPP) or the National Radon Safety Board (NRSB); and b) as required by statute, state licensure or certification program, where applicable.
- SOIL GAS- Air within soil that can contain radon and/or other hazardous gasses or vapors.

- SOIL GAS COLLECTION PLENUM- A three-dimensional enclosure, in whatever shape it may be, constructed for collecting radon and other *soil gases* from under slabs, *soil gas retarders* and from behind walls that surround a void or *gas-permeable layer*.
- SOIL GAS COLLECTOR (SGC)- *Vapor mat* laid within the *soil gas collection plenum*, designed to facilitate flow of *soil gas* to the *inlet piping*.
- SOIL GAS CONTROL SYSTEM- Individual and complete configuration for controlled soil gas venting that includes a vent stack(s) extended from gas-permeable materials within a soil gas collection plenum(s) to the system exhaust above the roof.
- SOIL GAS INLET- Air transfer opening to the face of adjoining granular aggregate or soil.
- SUB-BASE- A layer of aggregate or granular fill on top of the sub-grade.
- SUB-GRADE- Native soil (or improved soil), usually compacted.
- SYSTEM- See *Soil Gas Vent System* or *Soil Gas Control System*.
- TEST POINT- A predetermined location for later installation of a pre-manufactured fitting to facilitate pressure field extension evaluation.
- VAPOR RETARDER- Pliable plastic sheeting that establishes a barrier between *soil gas* and enclosed spaces within a building. Commonly referred to as vapor barrier or soil gas retarder.
- VAPOR MAT- A pre-manufactured geotextile product designed to act as a *soil gas collector* within the *gas-permeable layer* beneath the slab.
- VENT STACK- Sometimes referred to as risers, air duct piping that routes the entire system air volume capacity from the *soil gas collection plenum(s)* to the system exhaust above the roof. Also referred to as vertical conveyance piping.

1.1 MITIGATION REQUIREMENTS

- 1.1.1 Passive soil gas control systems must meet the requirements specified in ANSI/AARST CC-1000 (2018) and must be conducted under the direct supervision of the Qualified Mitigation Professional.

1.2 TESTING REQUIREMENTS

- 1.2.1 Post-construction testing must meet the requirements specified in ANSI/AARST MAMF 2017 and must be conducted under the direct supervision of the Qualified Measurement Professional.
- 1.2.2 Perform the PFE evaluation following slab pour and prior to installation of vertical system components, as required, and under direct supervision of the Qualified Mitigation Professional.

1.3 QUALITY ASSURANCE

- 1.3.1 Direct Supervision
All radon mitigation and testing work must be conducted under the direct supervision of the Qualified Mitigation or Measurement Professional, as applicable.
- 1.3.2 Soil Gas Control System Verification
The performance of each passive soil gas control system must be verified under the direct supervision of the Qualified Mitigation Professional, to include a pressure field extension (PFE) test. Such verification shall include installation of pre-manufactured fittings at pre-designated locations by or under direct supervision of a Qualified Mitigation Professional. Any deficiencies must be corrected by the contractor responsible for the scope of work determined to be deficient.
- 1.3.3 Post-Construction Testing
Prior to building occupancy, post-construction testing must be conducted under the direct supervision of the Qualified Measurement Professional in all buildings.
- 1.3.4 Passive Soil Gas Control System Activation
Activation of the passive soil gas control systems in any building determined to contain indoor radon

concentrations above the EPA action level at the time of post-construction testing must be conducted under the direct supervision of the Qualified Mitigation Professional. Follow-up post-activation testing is required to verify indoor radon concentrations are below the EPA action level.

1.3.5 Project Completion Certification

Upon acceptable completion of the project to referenced standards, the Qualified Mitigation Professional must certify the project as complete.

1.4 SUBMITTALS

1.4.1 Pre-Construction Documentation

- Worker Health and Safety Plan
- Soil Gas Control System Design

1.4.2 Certifications

- Mitigation Professional Credentials
- Project Completion Certification

1.4.3 Closeout Documentation

- Post-Construction Report, to include test results
- As-built design documentation
- Manufacturer instructions for soil gas control system components
- Written Operation and Maintenance Plan

PART 2 – PRODUCTS

2.1 PERFORMANCE

- 2.1.1 Passive soil gas control systems must maintain indoor radon concentrations below the EPA action level. Activation of passive soil gas control systems in buildings containing indoor radon concentrations at or above the EPA action level at the time of post-construction testing is required.

2.2 COMPONENTS

- 2.2.1 Base Course: Compacted select fill (per structural) covering the sub-grade foundation envelope (Table 5.5.3, ANSI/AARST CC-1000)
- 2.2.2 Soil-Gas Collector: Vapor mat laid within the foundation area and connecting any separate plenums, as may be required (Section 5.7.5, ANSI/AARST CC-1000)
- 2.2.3 Soil-Gas Collector Pipe Connection: Installed per Manufacturer instructions (Section 5.8, ANSI/AARST CC-1000)
- 2.2.3 Vapor Retarder: 10-mil (per structural) poly membrane, overlapped 12-inches, taped and sealed at all seams (Section 6.4.1, ANSI/AARST CC-1000)
- 2.2.4 Vertical Vent Pipe: 4-inch SCH 40, ASTM D2665 (Section 8.7, ANSI/AARSTCC-1000)
- 2.2.5 Sealants: ASTM C920 Class 25 or higher polyurethane
- 2.2.6 Test Point: An identified location for installation of a pre-manufactured fitting prior to PFE evaluation (Section 7.2, ANSI/AARSTCC-1000)
- 2.2.7 System Labels: Labels conforming to ANSI/AARST CC-1000 standard (Section 10.1)
- 2.2.8 Electrical: Watertight junction box to be installed on the roof (Section 8.9.4, ANSI/AARSTCC-1000)
- 2.2.9 Hardware: Appropriate type and size necessary for installation requirements

PART 3 – EXECUTION

3.1 PASSIVE SOIL GAS CONTROL SYSTEM INSTALLATION

3.1.1 Install passive soil gas control systems as specified herein and in accordance with ANSI/AARST CC-1000 using workers skilled in the trades involved. Passive soil gas control systems shall be installed in accordance with the following:

- Sub-Slab Fill: Section 5.5, ANSI/AARST CC-1000, Table 5.5.3
- Ground Cover: Section 6.2, ANSI/AARST CC-1000
- Foundation Walls: Sections 5.2 through 5.4, ANSI/AARST CC-1000
- Gas-Permeable Layer: Section 5.5, ANSI/AARST CC-1000
- Soil Gas Inlets: Section 5.7, ANSI/AARST CC-1000, Table 5.7.1
- Soil Gas Control System Piping: Sections 8.1 through 8.8, ANSI/AARST CC-1000
- Test Point Locations: Section 7.2, ANSI/AARST CC-1000
- Electrical: Section 8.9, ANSI/AARST CC-1000
- System Labeling: Section 10.1, ANSI/AARST CC-1000

3.2 POST-CONSTRUCTION TESTING

3.2.1 Conduct post-construction testing prior to building occupancy as specified herein and in accordance with ANSI/AARST MAMF 2017.

3.3 PASSIVE SOIL GAS CONTROL SYSTEM ACTIVATION

3.3.1 If post-construction testing indicates indoor radon concentrations at or above the EPA action level, activate the passive soil gas control systems in the buildings containing concentrations at or above the EPA action level in accordance with Section 10.3 of ANSI/AARST CC-1000. Follow-up post-activation testing is required to verify indoor radon concentrations are below the EPA action level.

3.4 OPERATION AND MAINTENANCE

3.4.1 Provide an operation and maintenance program plan in accordance with Section 12.1-12.3 of ANSI/AARST CC-1000, and instruct designated personnel in the proper maintenance of installed passive and active soil gas control systems.

- END OF SECTION -

Appendix C

Credential Documentation



AARST ARP Measurement Professional
NRPP Measurement ID: RT-109193 valid thru 2019-08-31
NRPP Mitigation ID: RMT-109309 valid thru 2019-08-31



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Appendix D

EPA Radon Zone Map

Zone 3