ACTIVE MITIGATION CHECKLIST

This checklist provides information necessary to proceed through the design process described in the Design and Implementation Considerations for Vapor Intrusion Mitigation Approaches Fact Sheet. The first portion of this checklist focuses on system design and documentation for active strategies, and the second portion focuses on passive strategies. This checklist assumes the VI conceptual site model includes an assessment of preferential pathways (see the Vapor Intrusion Preferential Pathways Fact Sheet) and is sufficient for designing the mitigation approach (for rapid response or building mitigation see the Preferential Pathway Sealing and Ad Hoc Ventilation Technology Information Sheet). Changes to a building could affect the VI conceptual site model and may require refinement of the mitigation strategy. Not all the information presented below is necessary to document a particular design. For example, some small residential building designs may be completed with very little predesign information and systems may be installed using only a conceptual design. The user should be able to identify which considerations best represent effective design for their specific vapor intrusion mitigation system. If a checklist item is not applicable to the design, select "N/A" for not applicable and consider documenting the rationale as an attachment to this checklist.

Details and types of active mitigation can be reviewed in the Active Vapor Intrusion Mitigation Systems Fact Sheet. The primary active technologies that are the focus of this design checklist are sub-slab depressurization, sub-slab venting, sub-membrane depressurization, and crawl-space venting, and these technologies are detailed in their respective technical information sheets. This section focuses on design checklist considerations for existing buildings where the design needs to accommodate an existing building slab. Some of the considerations in the checklist below may also apply to new construction if an active system such as a sub-slab depressurization system is being installed. This differs from mitigation of new construction that consists of a passive barrier or aerated floor. For the passive mitigation systems, see the Passive Mitigation Checklist.

Active Mitigation System Design and Documentation

- Have all the building's slab areas been fully characterized for contaminants? ☐Yes ☐No ☐N/A
- Has pressure field extension (PFE) testing been completed? ☐Yes ☐No ☐N/A
- Have emissions been calculated and compared to local discharge limits, and have any necessary permits been obtained? ☐Yes ☐No ☐N/A

Selection of System Materials and Methods

- Were total building footprint, foundation type, and under-slab compartments (created by haunches, thickened slab, or elevation changes) considered in the design process? ☐Yes ☐No ☐N/A
- Have monitoring points (i.e., sub-slab differential pressure monitoring points/embedded probes, riser vacuum, and flow monitoring points) been included in the design? ☐Yes ☐No ☐N/A
- Has depth to groundwater been considered (along with management methods as warranted, such as dewatering)? ☐Yes ☐No ☐N/A

- Have system components and locations been included in the system design drawing set? System components may include, for example, the following: ☐Yes ☐No ☐N/A
  - vent piping diagrams provided by the design firm/engineer
  - vent piping secured to the foundation to prevent settlement
  - vent stack piping locations and access
  - pipe diameters based on airflow and velocity-induced drag
  - pipe joints and connections sealed using material manufacturers' approved methods
  - exhaust pipes supported and secured in a permanent manner to the building using spacing intervals that meet code requirements
  - horizontal piping runs that slope downward or are designed to drain condensation into the ground beneath the slab
  - vertical piping runs that drain naturally or can be documented as being able to drain water/moisture
- Have critical motor criteria been considered when selecting a fan or blower? Examples are listed below: ☐Yes ☐No ☐N/A
  - calculations from the PFE processes and pressure drop in the conveyance piping
  - sufficient power (voltage and amperage) in the building to support the motor's electrical requirements
  - ability to adjust blower motor speed (if warranted)
  - intrinsically safe components if explosive gases are present
  - sufficient blower capacity and power to accommodate extra system components if they are needed (e.g., emission controls, filters, knockout tanks)
  - sufficient roof support for the blower
  - wind loading and ballast requirements
- Have all monitoring components and locations been included in the system design drawing set? Examples are listed below: ☐Yes ☐No ☐N/A
  - manometers
  - mechanical differential pressure gauges
  - light and/or audio alarms
  - electronic monitoring/telemetry
  - electromechanically activated control switches
  - electronic sensors with data recording
  - automated electronic fault notification
- Have piping specifications been completed, including exhaust piping? ☐Yes ☐No ☐N/A
- Have exhaust concentrations and primary wind flow direction been considered when selecting exhaust locations, if warranted? ☐Yes ☐No ☐N/A
- Are alarms/telemetry systems on different electrical systems than the system fans/blowers? ☐Yes ☐No ☐N/A

- Are airtight covers installed on the building's sumps (if in high groundwater condition)? ☐Yes ☐No ☐N/A
  - If NO, are Dranjer-type devices installed in floor drains that cannot be sealed? ☐Yes ☐No ☐N/A
- Has a tee cap with screening (for bird and rodent protection) been included on the vent stack? ☐Yes ☐No ☐N/A
  - If YES, is there ice buildup in the screen? If YES, remove ice. ☐Yes ☐No ☐N/A
- To reduce the risk of vent stack blockage, has the point of discharge from vent stack pipes been designed per applicable guidance/regulation to meet the following conditions: ☐Yes ☐No ☐N/A
  - a vertical discharge pipe or not more than 45˚ from vertical
  - outside the building
  - for horizontal or vertical vent stack pipes attached to or penetrating the sides of buildings, the point of discharge is vertical, an appropriate distance above the edge of the roof, and located on the gable end of pitched roofs and/or designed to prevent precipitation or other materials from entering or damaging vent stack pipes
- Are exhaust stacks located at an appropriate distance above the roofline and from any air intake location, opening (door, window, vent, etc.), or occupied spaces (including adjacent buildings)? See NAVFAC fan-stack guidance (USDOD 2024) and ASHRAE 62.1 (ASHRAE 2022) for recommended minimum roof and intake opening setback distances. ☐Yes ☐No ☐N/A
- Have language(s) and location(s) (including prominent locations, such as exterior venting locations) of system labeling been planned? ☐Yes ☐No ☐N/A
- Has notification to occupants been planned? ☐Yes ☐No ☐N/A
- Does signage contain language indicating the mitigation vent may contain vapor-forming chemicals (if warranted)? ☐Yes ☐No ☐N/A

Evaluation of the Building Slab

- Has sealing of cracks, floor openings, or expansion joints been included in the design to address potential preferential pathways or potential system short circuiting? ☐Yes ☐No ☐N/A
- Was a floor sealer for the slab considered based on slab integrity and contaminant concentrations? ☐Yes ☐No ☐N/A
- Have drains, plumbing sleeves, and conduits penetrating the slab been identified and included in the sealing plan? ☐Yes ☐No ☐N/A

Regulatory Confirmation Prior to Installation and Commissioning

- Have applicable codes and permits (e.g., building codes and environmental permits) been addressed in the design? ☐Yes ☐No ☐N/A
- Is regulatory body (federal/state/local) approval required or recommended for the mitigation design prior to construction? ☐Yes ☐No ☐N/A
- Does your state, municipality, and/or governing regulatory body require or recommend approval of an operation, maintenance, and monitoring (OM&M) plan prior to construction? ☐Yes ☐No ☐N/A
- Have stakeholders been notified of the planned system and necessary OM&M plan? ☐Yes ☐No ☐N/A

System Installation and Commissioning

- Does the design provide a schedule for design standards to be inspected by a competent/experienced person during construction? ☐Yes ☐No ☐N/A
- Does the design summarize the design objectives and how the design objectives can be documented as being met during system commissioning (i.e., performance metrics such as sub-slab PFE testing, riser vacuum, flow measurements, and sampling)? ☐Yes ☐No ☐N/A
- Does the design include a method for how changes to the design, if needed, will be communicated to stakeholders during installation? ☐Yes ☐No ☐N/A
- Does the design plan document whether as-built drawings will be warranted at the completion of system installation (note, as- built drawings are typically needed/required)? ☐Yes ☐No ☐N/A
- Has continued monitoring been included in accordance with the OM&M plan? ☐Yes ☐No ☐N/A

Regulatory Confirmation Post-Installation and Commissioning

- Does the design plan include details on how system installation will be documented, reported, and approved as needed by the client and/or regulatory body? ☐Yes ☐No ☐N/A
- Does the design take into account the need for a deed amendment of land use restriction following installation, if applicable? ☐Yes ☐No ☐N/A

REFERENCES

ASHRAE. 2022. "Standards 62.1-2022, Ventilation and Acceptable Indoor Air Quality (ANSI Approved)." https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2.

USDOD. 2024. "Heating, Ventilating, and Air Conditioning Systems." January. https://www.wbdg.org/FFC/DOD/UFC/ufc_3_410_01_2013_c9.pdf.