This checklist provides information necessary to proceed through the design process described in the ***Design Considerations Fact Sheet***. This checklist focuses on system design and documentation for active strategies (first portion of checklist) and passive strategies (second portion of checklist). Before completing this checklist, review and complete the ***Vapor Intrusion Mitigation Conceptual Site Model (CSM) Checklist***. 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 (VIMS). If a checklist item is not applicable to the design, select "NA" for not applicable and consider documenting the rationale as an attachment to this checklist.

Active Mitigation Checklist for Existing Buildings and New Construction

Details and types of active mitigation can be reviewed in the ***Active Mitigation 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 crawlspace 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 (SSD) system is being installed. This is different than mitigation of new construction that consists of a passive barrier or aerated floor. For the passive mitigation systems, see the passive mitigation checklist below.

1. ACTIVE MITIGATION SYSTEM DESIGN AND DOCUMENTATION

- Have all the building slab areas been fully characterized for contaminants? ☐ Yes ☐ No ☐ NA
- Has pressure field extension (PFE) testing been completed? ☐ Yes ☐ No ☐ NA

1.1. 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 ☐ NA

- Have monitoring points (i.e., sub-slab differential pressure monitoring points/embedded probes, riser vacuum, and flow monitoring points) been included in design? ☐ Yes ☐ No ☐ NA
- Has depth to groundwater been considered (along with management methods as warranted, such as dewatering)? ☐ Yes ☐ No ☐ NA
- Have system components and locations been included in the system design drawing set? System components may include, for example: ☐ Yes ☐ No ☐ NA
  - vent piping diagrams provided by the design firm/engineer
  - vent stack piping
  - 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
  - horizontal piping runs sloped downward or designed to drain condensation into the ground beneath the slab
  - vertical piping runs that drain naturally or can be documented to be able to drain water/moisture.
- Have critical motor criteria been considered when selecting a fan or blower? ☐ Yes ☐ No ☐ NA
  For example:
  - calculations from the pressure field extension processes and pressure drop in the conveyance piping
  - sufficient power (voltage and amperage) in building to support electrical requirements in motor
  - sufficient 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? ☐ Yes ☐ No ☐ NA
  For example:
  - 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 ☐ NA
- Have exhaust concentrations and primary wind flow direction been considered when selecting exhaust locations, if warranted? ☐ Yes ☐ No ☐ NA

- Has a screened cap (for bird and rodent protection) been included on the vent stack? ☐ Yes ☐ No ☐ NA
- To reduce the risk of vent stack blockage, has the point of discharge from vent stack pipes been designed per applicable guidance/regulation: ☐ Yes ☐ No ☐ NA
  - a vertical discharge pipe or not more than 45˚ from vertical
  - outside the structure
  - an appropriate distance above the edge of the roof
  - an appropriate distance away from any air intake location, opening (door, window, vent, etc.), or occupied spaces (including adjacent structures)
  - 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 is located and/or designed to prevent precipitation or other materials from entering vent stack pipes
- Have language(s) and location(s) (including prominent locations, such as exterior venting locations) of system labeling been planned? ☐ Yes ☐ No ☐ NA
- Has notification to occupants been planned? ☐ Yes ☐ No ☐ NA
- Does signage contain language indicating the mitigation vent may contain volatile organic compounds (if warranted)? ☐ Yes ☐ No ☐ NA

1.2. Buildings slab evaluation

- 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 ☐ NA
- Was a floor sealer for the slab considered based on slab integrity and contaminant concentrations? ☐ Yes ☐ No ☐ NA
- Have drains, plumbing sleeves, and conduits penetrating the slab been identified and included in the sealing plan? ☐ Yes ☐ No ☐ NA

1.3. 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 ☐ NA
- Is regulatory body (federal/state/local) approval required or recommended for the mitigation design prior to construction? ☐ Yes ☐ No ☐ NA
- 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 ☐ NA
- Have stakeholders been notified of the planned system and necessary OM&M plan? ☐ Yes ☐ No ☐ NA

1.4. 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 ☐ NA
- 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 pressure field extension testing, riser vacuum, and flow measurements, sampling)? ☐ Yes ☐ No ☐ NA
- Does the design include a method for how changes to the design, if needed, will be communicated to stakeholders during installation? ☐ Yes ☐ No ☐ NA
- Does the design plan document if as-built drawings will be warranted at the completion of system installation (note, as-built drawings are typically needed/required)? ☐ Yes ☐ No ☐ NA
- Has continued monitoring been included in accordance with the OM&M plan? ☐ Yes ☐ No ☐ NA

1.5. 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 ☐ NA
- Does the design taken into account the need for a deed amendment of land use restriction following installation, if applicable? ☐ Yes ☐ No ☐ NA

Passive Mitigation Checklist for New Construction and Existing Buildings

Details and types of passive mitigation can be reviewed in the ***Passive Mitigation Fact Sheet***. The primary passive technologies that are the focus of this design checklist are aerated floors, epoxy floor coatings, passive barrier systems, and passive sub-slab venting systems. These technologies are detailed in their respective technical information sheets. This section focuses mainly on design checklist considerations for new construction. Passive mitigation systems are most commonly used within new building construction. Passive mitigation systems can also be implemented within existing buildings. For existing buildings, removal of the floor slab may be necessary to allow installation of some passive mitigation systems. Alternatively, some passive mitigation systems can be installed above existing floor slabs, such as an aerated floor, EFC, or vapor barrier membrane.

2. PASSIVE MITIGATION SYSTEM DESIGN AND DOCUMENTATION

- Will the building of interest have an effective venting layer to install perforated piping within, or equivalent sub-slab ventilation plenum system? ☐ Yes ☐ No ☐ NA
- Does the system design incorporate an open aerated floor ventilation plenum? ☐ Yes ☐ No ☐ NA
- Has the aerated floor structure been approved by a structural engineer? ☐ Yes ☐ No ☐ NA

2.1. 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 when selecting under slab ventilation and aeration materials and methods? ☐ Yes ☐ No ☐ NA
- Have monitoring points (i.e., embedded probes and flow monitoring points) been included in design? ☐ Yes ☐ No ☐ NA
- Has depth to groundwater been considered (along with management methods as warranted, such as dewatering)? ☐ Yes ☐ No ☐ NA
- If waterproofing is required, is the selected waterproofing product also designed to mitigate VOCs and is it included in the design? ☐ Yes ☐ No ☐ NA
- Have system and monitoring components and locations been included in the system design drawing set? ☐ Yes ☐ No ☐ NA
  For example:
  - vent piping diagrams
  - vent stack piping

  - exhaust pipes supported and secured in a permanent manner
  - horizontal piping runs are sloped downward or designed to drain condensation into the ground beneath the slab
  - Quality assurance/quality control checks required by manufacturer or recommended for passive barriers (Note: A smoke test, pressure test, or other test may be recommended).

- Have manufacturer-approved methods been considered for pipe joints and connections? ☐ Yes ☐ No ☐ NA
- Do vertical piping runs terminate in a location that can drain naturally or can be documented to be able to drain water/moisture? ☐ Yes ☐ No ☐ NA
- Have piping specifications been included for exhaust piping? ☐ Yes ☐ No ☐ NA
- Have exhaust concentrations and primary wind flow direction been considered when selecting exhaust locations? ☐ Yes ☐ No ☐ NA
- To reduce the risk of vent stack blockage, has the point of discharge from vent stack pipes been designed per applicable guidance/regulation: ☐ Yes ☐ No ☐ NA
  - a vertical discharge pipe or not more than 45˚ from vertical
  - outside the structure
  - an appropriate distance above the edge of the roof
  - an appropriate distance away from any air intake location, opening (door, window, vent, etc.), or occupied spaces (including adjacent structures)
  - 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 is located and/or designed to prevent precipitation or other materials from entering vent stack pipes
- Have language(s) and location(s) (including prominent locations, such as exterior venting locations) of system labeling been planned? ☐ Yes ☐ No ☐ NA
- Has notification to occupants been planned? ☐ Yes ☐ No ☐ NA
- Does signage contain language indicating the mitigation vent may contain volatile organic compounds, if warranted? ☐ Yes ☐ No ☐ NA
- Has notice been provided to all tenants that will be occupying the structure? ☐ Yes ☐ No ☐ NA
- Have construction quality assurance/quality control and third-party oversite protocols been put in place for the installation of the passive barrier and ventilation system? ☐ Yes ☐ No ☐ NA

2.2. Selection of a passive barrier

- Was an evaluation conducted to determine if this mitigation system is a pre-emptive or precautionary measure (i.e., investigation through multiple lines of evidence did not suggest that a current vapor intrusion pathway is complete)? ☐ Yes ☐ No ☐ NA
- When selecting a passive barrier were membrane thickness, chemical resistance, adhesion to concrete, transmission rates and/or diffusion coefficients for contaminants of potential concern, puncture resistance, tensile strength, and elongation considered?
  Note: These parameters should be documented in design specifications and plan. ☐ Yes ☐ No ☐ NA
- Has a warranty from the passive barrier manufacturer been included in the design? ☐ Yes ☐ No ☐ NA

2.3. Regulatory confirmation prior to installation and commissioning

- Have all applicable codes and permits been identified and included in design? ☐ Yes ☐ No ☐ NA
- Is regulatory body (federal/state/local) approval required for the mitigation design prior to construction? ☐ Yes ☐ No ☐ NA
- Does your state, municipality, and/or governing regulatory body require approval of an OM&M plan prior to construction? ☐ Yes ☐ No ☐ NA
- If the goal of the passive mitigation system design is to allow for conversion to an active system, are mechanical and electrical provisions included in the design to activate the system, if needed? ☐ Yes ☐ No ☐ NA
- Have all stakeholders been notified of the planned system and necessary OM&M plan? ☐ Yes ☐ No ☐ NA

2.4. System installation and commissioning

- Is there a schedule for system installation to be inspected by a competent/experienced person during construction? ☐ Yes ☐ No ☐ NA
- After completion of installation, are there procedures planned to verify components are operating in accordance with design criteria? ☐ Yes ☐ No ☐ NA
- Have post-system installation verification performance metrics (e.g., sampling) been considered and included in the design plan, if needed? ☐ Yes ☐ No ☐ NA
- Has continued monitoring been considered during the design phase either in the work plan or as part of an OM&M plan? ☐ Yes ☐ No ☐ NA

2.5. Regulatory confirmation post-installation and commissioning

- Have system installation and commissioning specifications been included in the design plan? ☐ Yes ☐ No ☐ NA

- Have stakeholders been notified of the system to be installed and the OM&M plan requirements? ☐ Yes ☐ No ☐ NA
- Does the system require a deed amendment or land use restriction? ☐ Yes ☐ No ☐ NA