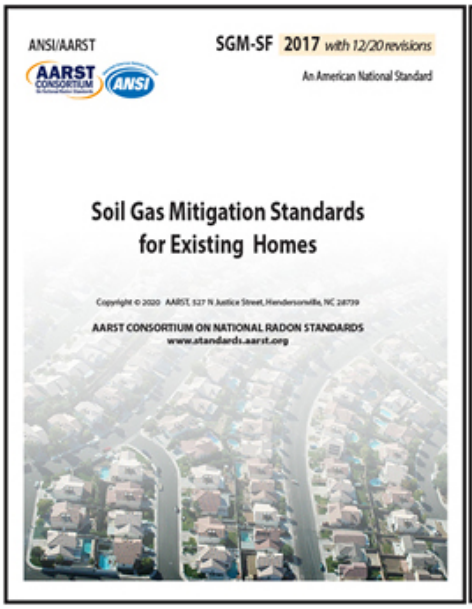
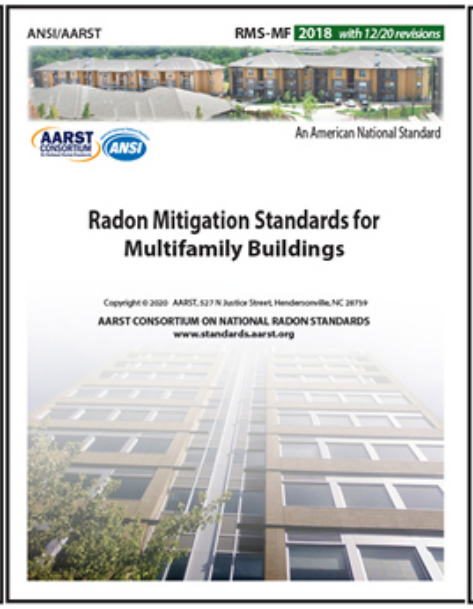
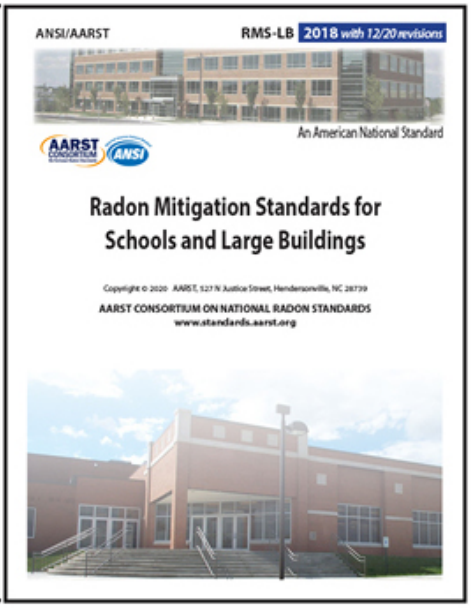
Harmonization effort for

SGM-SF, RMS-MF and RMS-LB Mitigation Standards

Continuous maintenance efforts to improve these standards are currently ongoing.







Read me

The work attached contains a *collection of proposed revisions* for harmonization compared to what is currently published in *rev. 12/20 publications* of: SGM-SF (existing homes); RMS-MF (existing multifamily buildings) and RMS-LB (existing schools and large buildings).

Some revisions, where specifically noted in commentary notes, modify content from previous public review proposals with only the highlighted revisions subject to public review at this time.

The latest published versions of these standards are available for comparison at www.standards.aarst.org where all ANSI/AARST standards can be found for review at no charge and for purchase.

The current mitigation standards committee roster (consensus body) can be linked to from www.standards.aarst.org/public-review. The current work project includes (1) harmonization, where possible, for all portions of these documents to read the same for the same tasks; (2) update based on new experiences, and (3) renderings that are more conductive to stakeholders who are involved in compliance assessment.

Public Review: Collected MIT Revisions *02-22*

COMMENT DEADLINE: **March 21st, 2022**

REQUESTED PROCESS AND FORM FOR FORMAL PUBLIC REVIEW COMMENTS

Submittals (MS Word preferred) may be attached by email to StandardsAssist@gmail.com

1) Do not submit marked-up or highlighted copies of the entire document.

2) If a new provision is proposed, text of the proposed provision must be submitted in writing. If modification of a provision is proposed, the proposed text must be submitted utilizing the strikeout/underline format.

3) For substantiating statements: Be brief. Provide abstract of lengthy substantiation. (If appropriate, full text may be enclosed for project committee reference.)

REQUESTED FORMAT

Title of Public Review Draft: **Collection MIT Revisions 02-22**

- **Name:** Affiliation:
- **Clause or Subclause**:
- **Comment/Recommendation**:
- **Substantiating Statements**:
- [___] Check here if your comment is supportive in nature and does not require substantive changes in the current proposal in order to resolve your comment.

Repeat the five bullet items above for <u>each</u> comment.

Requested registration of your contact information and copyright release.

ONE TIME REGISTRATION
CONTACT INFORMATION AND COPYRIGHT RELEASE

NOTE: AARST Consortium on National Radon Standards encourages original commentary on its standards. Commenters that choose to submit comments without an author's signature (due to difficulties in timeliness, proximity or other) shall be deemed to have done so at their sole discretion and have thereby acknowledged and accepted the copyright release herein. If commenters submit comments authored by others, those comments must also be accompanied by a signed copyright release from the author of the original comment. The original comment author and representing commenters may be asked to engage in dialog supporting their position.

Name: Affiliation:

Address: City: State: Zip:

Telephone: Fax: E-mail:

Copyright Release:
I hereby grant the AARST National Radon Standards Consortium the non-exclusive royalty rights, including non-exclusive royalty rights in copyright, in my proposals and I understand that I acquire no rights in publication of this standard in which my proposals in this or other similar analogous form is used. I hereby attest that I have the authority and am empowered to grant this copyright release.

Author's Signature: _____
Date _____

PLEASE FAX TO (913) 780-2090 or SHIP TO: *StandardsAssist@gmail.com* Commenters are responsible for informing the standards assistant staff a when changing contact information or other preferences.

Notice regarding unresolved objections: While each committee seeks to resolve objections, please notify the committee responsible for an action or inaction if you desire to recirculate any unresolved objections to the committee for further consideration. Notice of right to appeal. (See Bylaws for the AARST Consortium on National Radon Standards - Operating Procedures for Appeals available at www.radonstandards.us, Standards Forum, Bylaws): (2.1) Persons or representatives who have materially affected interests and who have been or will be adversely affected by any substantive or procedural action or inaction by AARST Consortium on National Radon Standards committee(s), committee participant(s), or AARST have the right to appeal; (3.1) Appeals shall first be directed to the committee responsible for the action or inaction.

AARST Consortium on National Radon Standards

Website: www.standards.aarst.org Email: standards@aarst.org

527 N Justice Street, Hendersonville, NC 28739

The Consortium Consensus Process

The consensus process developed for the AARST Consortium on National Radon Standards and as accredited to meet essential requirements for American National Standards by the American National Standards Institute (ANSI) has been applied throughout the process of approving this document.

Continuous Maintenance

This standard is under continuous maintenance by the AARST Consortium on National Radon Standards for which the Executive Stakeholder Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard.

User Tools: User tools are posted online (www.standards.aarst.org/public-review) as they become available (such as templates for field notices, inspection forms, interpretations and approved addenda updates across time).

Notices

Notice of right to appeal: Bylaws for the AARST Consortium on National Radon Standards are available at www.standards.aarst.org/public-review. Section 2.1 of Operating Procedures for Appeals (Appendix B) states, "Persons or representatives who have materially affected interests and who have been or will be adversely affected by any substantive or procedural action or inaction by AARST Consortium on National Radon Standards committee(s), committee participant(s), or AARST have the right to appeal; (3.1) Appeals shall first be directed to the committee responsible for the action or inaction."

2.0 APPLICABILITY

Rational/Commentary: This proposed replacement to Section 2.2 addresses clarity on "repairs" compared to "design alterations" and adds requirements to protect occupants. Experience encountered in states where such protective requirements exist has demonstrated client acceptability.

~~**2.2 Prior systems**~~

~~This standard shall not apply to mitigation systems installed in existing homes prior to its effective date, except when a previously installed system is altered. This standard shall apply to only the aspects of the systems that are altered. For the purposes of this standard, altering a mitigation system does not include activities such as replacing worn out equipment while leaving the remainder of the system unchanged. However, *Contractors* shall recommend to the *Client* in writing that noncompliance items be upgraded or altered to meet current standards.~~

2.2 Prior Systems

This standard shall not apply to *radon* or soil gas *mitigation* systems installed prior to its effective date, except for:

a) Portions of a previously installed system that are altered. For the purposes of this standard, altering a *radon* or soil gas *mitigation* system does not include incidental repair activities, such as replacing worn out fans or other equipment with equivalent components, while leaving the remainder of the system unchanged; and

b) Portions of a previously installed system that are not compliant with Section 6.4 *ASD Exhaust Discharge* and Section 6.5.2 *Safe fan locations.*

Details of incidental repairs and system alterations shall be documented in jobsite logs for each event.

Rational/Commentary: Highlighted text for Quality Management Section 3.3 (now 3.4) indicates proposed substantive changes for public review. The remaining substantive content that has been previously subjected to public review is not subject to review at this time.

3.4 Quality Management

Qualified mitigation professionals shall establish, maintain and follow a written quality management program.

Informative Figure 3.4 Quality Management

Continuous Goals:

a) ***The Quality Objectives.*** Mitigation designs that reduce concentrations attributable to soil gas hazards to below the target action levels, while aspiring to minimize known soil gas hazards; and

b) ***Physical Quality.*** Mitigation systems that are compliant with standards, codes and statutes, while aspiring to achieve customer satisfaction.

Plan.
Implement policies and procedures designed to meet quality goals.

Track successes and failures.
Input: Identify items to track that will help gauge if you are meeting quality goals.

Take action to improve.
Make changes in policies and procedures to better meet quality goals.

Review successes and failures.
Output: Review tracked items for causes of failure in meeting quality goals.

3.4.1 *Quality management programs*

Quality management programs shall include:

a) a means to track jobsite details ~~and *standard operating procedure (SOP)* documents~~, relative to the scope of services the *mitigation contractor* provides, to address important tasks based on commitments to quality goals; and

b) retain records of training and experience for all staff members who participate in physical installation of *mitigation system(s)*.

~~The program shall:~~

~~a) establish at least one *SOP* document that addresses materials and installation procedures applicable to each method and system design installed.~~

~~b) retain records of training and experience for all staff members who participate in physical installation of *mitigation system(s)*.~~

3.4.2 *Quality control oversight*

The quality management program shall identify individuals, as authorized by the *qualified mitigation professional(s)* and as permitted by statute, state licensure or certification program, who are responsible for mitigation activities in accordance with requirements in a) and b) of this Section 3.4.1.

a) Quality of mitigation design

Program records shall include currently valid certifications/licenses for persons identified as *qualified mitigation professionals,* in accordance Sections 3.2 or 3.3, who are to be responsible for the quality of *mitigation* design and effectiveness.

b) Oversight of jobsite activities

For quality management programs that allow subordinate *qualified professionals* or journey level installers to oversee various jobsite activities while working under the responsible charge of a *qualified mitigation professional*, oversight duties shall not be authorized until quality management records include:

1. The identity of the installer and scope of their oversight authority, to include authorization to temporarily stop work if quality or safety is being compromised; and
2. Currently valid certifications/licenses, related experience and educational benchmarks, as established by authorities identified in Sections 3.2 or 3.3, that demonstrate a minimum degree of technical knowledge and skills specific to the tasks being conducted.

3.4.2 *Jobsite records*

Quality control (QC) records, specific to each individual mitigation effort and system design, installation and modification, shall be retained in jobsite tracking forms, logs, diagrams or photographs that include:

a) Details desired by the contractor for tracking quality and those otherwise required in this standard;

b) Solutions derived during design or installation that are custom to the building and not ~~and therefore are not addressed or applied in program *SOPs* as~~ the same basic design feature for every building;

c) The identity of the *qualified mitigation professional* responsible for design and effectiveness; and

d) The identity of the *qualified mitigation professional* or authorized journey level installer physically present at each jobsite event who is responsible for quality oversight of the event.

3.4.3 *Managing quality*

The quality management program shall include a written commitment to quality goals and identify a *qualified mitigation professional* who, in coordination with management, is responsible to:

a. update ongoing program changes they deem necessary to better meet quality goals, and

b. review QC records and efforts to improve *quality control* no less than annually to ensure program changes ~~and SOPs~~ are updated, effective, documented and disseminated to affected staff members.

Note—See https://www.iso-9001-checklist.co.uk/9.3-management-review.htm

~~3.4.3 *Compliance*~~

~~Where a credentialing or licensing authority has established policies for review of quality management programs that include related confidentiality provisions (deemed acceptable when agreeing to accept terms of the credential or license), the quality management program and requested jobsite logs shall be made available to the authority as required.~~

Rational/Commentary: This proposal addresses clarity on minimum requirements.

4.2 Proposals

Contractors shall provide *clients* the following written information prior to initiation of the work:

a) The Qualified Mitigation Professional's name, address and phone number; relevant *radon mitigation* certification and/or licensing number; and signature (manual or electronic in conformance with the Electronic Signatures in Global and National Commerce [E-SIGN] Act);

b) A description of the proposed *mitigation* system(s) and the elements of the long-term *operation, maintenance, and monitoring plan (OM&M)* applicable for the proposed *mitigation* design.

c) A statement that describes options for initial post-*mitigation* testing, including the option of third-party testing;

d) The conditions of a warranty concerning workmanship and defects in materials;

~~e) The conditions of any warranty or guarantee including whether the contractor warrants that the proposed system(s) will or will not reduce the radon or soil gas concentrations below a specified threshold.~~

e) A statement on whether the contractor guarantees that the proposed system(s) will or will not reduce radon or soil gas concentrations below a specified threshold, to include conditions or limitations of the guarantee; and

g) Any other limitations that the contractor places on the scope of work and any limitations on professional obligations.

~~d) An estimate of total ownership costs including installation costs and the annual operating costs with the understanding that costs for energy, replacement and repair items, labor, and testing may change in the future; and~~

For certain Non-ASD mitigation methods, as required in Section 12, *contractors* shall provide *clients* an estimate of total ownership costs including installation and annual operating costs.

Rational/Commentary: Full replacement for Section 5.1 with related content now moved to new Section 13.

5.0 SYSTEM DESIGN

5.1 Appropriate Systems

5.1.1 *General principles*

In judging appropriate characteristics of a *mitigation* system or method, considerations such as the following shall be evaluated:

a) Safety

The *mitigation* system shall not create health or safety hazards. The building shall not be altered such that the building becomes less safe than its existing condition, to include, but not limited to, maintaining the existing level of fire protection and level of protection provided by means of egress.

b) Ease of service

Equipment installed that requires routine inspection and maintenance, such as fans, system controls and system monitors, shall be accessible to individuals responsible for system maintenance without destructive or significant disassembly of building components or finishes.

c) Durability

Materials or methods not specified herein that are used in *mitigation* efforts should be capable of retaining functional integrity for the life of the system. Serviceable mechanical and control equipment should have designed life spans that are comparable to other similar mechanical system equipment.

d) Unnecessary Noise

Choices and actions that minimize objectionable *unnecessary noise* should be part of design and installation of each system. Where noise is both objectionable and unnecessary, actions should be taken to reduce *unnecessary noise* to the extent practicable. *Unnecessary noise* shall be defined as noise generated by system vibration or air rushing sounds at air intakes or exhausts that can be reduced by:

1. Reducing the transfer of vibration from system components that come in contact with building materials; or
2. Reducing air velocity at the point of exhaust or at air intakes, such as those within non-habitable spaces or under membranes.

5.1.3 *Other building systems*

The *mitigation* system design and installation:

a) shall not compromise the functionality of mechanical, groundwater control or drainage systems;

b) shall not compromise the functional integrity of roofs, guttering, siding or other structural systems;

c) shall not obstruct doorways or operable windows; and

d) shall not obstruct accessibility to switches, controls, electrical service panels or junction boxes and other equipment, such as HVAC components, that require maintenance over time.

5.1.4 *Permanent systems required*

Mitigation systems shall be designed and installed as an integral, permanent addition to the building. Time limits on use of temporary *mitigation* efforts shall comply with **Section 13.1** for optimizing system design or methods, including for uncontrollable logistics or rapid response situations.

5.1.5 *Collateral mitigation*

Where a *mitigation* system might impact adjoining *dwellings* or *units* in a shared building, *contractors* shall:

a) comply with **Section 13.2** when designing *intentional collateral mitigation;* and

b) provide disclosures, in accordance with **Section 10.6**, where a *mitigation* system might result in *inadvertent collateral mitigation*.

10.0 DOCUMENTATION—ALL SYSTEMS AND METHODS

Rational/Commentary: Highlighted text indicates proposed changes for public review. The remaining content that has been previously subjected to public review is not subject to review at this time.

10.2 Owner-Occupied Maintenance

The *contractor* shall provide an *information package* that contains a plan for *OM&M* ~~*plan*~~ that includes essentials for *ASD* systems installed where the *dwelling* or *unit* is both individually owned and occupied by the person(s) responsible for *OM&M*. The information package shall be:

a) labeled "Radon Reduction System," "Soil Gas Reduction System" or as otherwise labeled to describe the purpose of the *information package*; and

b) ~~securely~~ attached to the system piping in a visible location within interior spaces.

Exception 1: If no portion of the system is visually accessible within interior spaces, the *information package* shall be securely mounted in another interior location where it is visually and physically accessible, such as in a mechanical room.

Exception 2: Where the *information package* is electronically available on a website for a period of not less than 6 years at no additional cost to current or future person(s) responsible for *OM&M*. When exercising this exception, the primary system labeling, required in Section 8.4.2.1, shall include instructions for how to electronically obtain the *information package*. If requested, the contractor shall similarly provide the *information package* in paper or electronic media per the request.

10.2.1 *Information package*

The *information package* shall include content that complies with a), b), c), d) and e) of this Section 10.2.1.

Rational/Commentary: This proposal addresses a missed component during harmonization processes.

a) Essentials

Consistent with owner-occupied labels in Section 8.4.2.1, the information package shall include:

b. A recommendation to verify continued system effectiveness over time, such as either:

— a recommendation to conduct a radon test at least every 2 years and to check system monitors quarterly to ensure the system is still functioning; or

— other monitoring procedures as specified in a ~~an comprehensive~~ *OM&M manual,* as required herein, such as required for *chemical vapor intrusion* and non-ASD *mitigation* methods;

Rational/Commentary: This proposal results from public comments on system operating cost.

b) System descriptions

A description of the *mitigation system(s)* as installed shall be provided to include:

1. System components labeled on a floor plan sketch or portrayed in narrative that describes system components and locations.
2. Basic operating principles;
3. An ~~approximation~~ estimation of ~~the~~ annual operating costs

Rational/Commentary: This proposal addresses consistency with new bid proposal requirements above in Section 4.2.

d) Warranty/Guarantees

Information shall be provided regarding warranties, guarantees and related conditions or limitations that are consistent with proposals, as required in Sections 4.2 e, f and g.

13.0 NORMATIVE ANNEXES

Rational/Commentary: Harmonized topics for review being moved to a Section 13 with few changes.

13.1 Temporary Systems/ Rapid Response

13.1.1 *Temporary systems limits*

All *contractor* correspondence shall indicate that use of a *mitigation* system that is not fully installed or not designed as an integral, permanent addition to the building is limited to no longer than 30 days for *occupied* buildings except with the following requirements for specific cases:

a) The use of such temporary system is limited to no longer than 90 days when diagnostics for optimizing final design can be justified to necessitate delay in the installation of a permanent system; or

b) The use of such temporary system is limited to no longer than 90 days subsequent to completion of major renovation, change in building use, or building permit requirements that necessitate delay in the installation of a permanent *mitigation* system; or

c) The use of such temporary *mitigation* system shall be extended only to a point that is necessary to allow multiple parties or jurisdictions of authority to individually and collectively design, fund and approve the installation plan and the logistics of such approval process thereby necessitates a delay in the installation of a permanent *mitigation* system.

Where the purpose of mitigation is chemical vapor intrusion, non-ASD *mitigation* methods that are not integral, permanent additions to the building but are maintained by an independent party under a plan for *OM&M* are considered permanent up until *OM&M* monitoring ends.

13.1.2 *Label Temporary Systems*

The *contractor* shall place label(s) in a conspicuous location on the system or system components stating the words "Temporary Soil Gas Mitigation System" and the date of implementation. The label(s) shall also include a description of the temporary system and an estimated date for completion of a permanent system that shall not exceed the time limits in this Normative Appendix A, Section A-1.1. The label, such as provided for example in Exhibit D, shall include the *responsible party* or representative, phone number, and applicable certification number and certifying agency.

13.1.3 *Risk Communication (Temporary Systems)*

The *contractor* shall notify the *client* in writing of labeling requirements and its content upon implementation of the temporary system.

13.1.3.1 Radon

When the purpose of the *mitigation* includes radon, the *contractor* shall provide the *client* in writing with risk information relative to concentrations measured in the *dwelling(s), such* as portrayed in EPA's publication "Citizens Guide to Radon" or similar current literature published by the federal, provincial, tribal, or state authority.

Note—The *contractor* should inform the *client* in writing that the standard of care requires action for timely completion of a permanent *mitigation* system and that the *client* is responsible for the health and safety of occupants. Where measured concentrations exceed those rendered in EPA's "Citizens Guide to Radon" (e.g., > 20 *pCi/L* [740 *Bq/m*^{3}]), an extrapolation of the risk indicated, as provided in Exhibit C, should be included.

13.1.4 *Request Notification to Occupants*

The *contractor* shall request in writing that the *client* assign a designated party to make all appropriate notifications to occupants and facilitating staff about the temporary nature of the system and related health risk.

13.1.5 *Rapid response (informative)*

For the purposes of this document, "Rapid Response" denotes situations where action is required quickly or immediately due to hazards present. *Subchronic* or *acute* risk exposures to *chemical vapors* are examples of situations where excessively hazardous conditions can warrant immediate action. Options that may be considered can include:

a) Vacating the Property
Where acute safety concerns are present and cannot be immediately mitigated, occupants and workers should be evacuated from the building until safe conditions can be established;

b) Enhanced Ventilation
Ventilation with outside air is normally the first consideration as a temporary means to enhance safety. However, care must be exercised for any temporary effort. The amount of ventilation immediately achieved may not be adequate to achieve safe conditions. In addition, ventilation with outside air is seldom viable as a permanent solution;

c) Mechanical Solutions
A variety of mechanical systems can often be temporarily augmented or installed to enhance safety. Care must be exercised for all temporary efforts since the amount of reduced hazard achieved may not be adequate for achieving safety. Rapid response options include:
   1. A temporary *ASD* system not necessarily conforming with all requirements of Section 6; or
   2. Enhanced Mechanical Ventilation: The addition of temporary blowers and/or manipulation of *HVAC* air handler controls; or

d) Other methods might be applicable such as carbon filtration of indoor air or methods with less certainty of protection, such as sealing large openings to soil.

13.2 Intentional Collateral Mitigation

13.2.1 *Electrical (collateral mitigation)*

When a single *mitigation* system is intentionally designed to satisfy *mitigation* needs in more than one *unit*, *dwelling* or area within a shared building, power provided to the system shall be from a source that is electrically metered independent from individual *units* unless the meter is common to all *units* or *dwellings*.

Exception: In the absence of a common or independently metered power source for the system, as a result of *client* choices or other conditions, requirements within one of the options a), b) or c) of this Section B-1 shall be met.

a) For ASD or non-ASD methods that manipulate air pressures between soil air and *ground-contact* portions of the building, a stand-alone *mitigation* system shall be installed in each *ground-contact* unit or *dwelling* determined to require mitigation that is independently electrically metered; or

b) For non-ASD methods that are not dependent upon manipulating air pressures between soil air and *ground-contact* portions of the building, a stand-alone *mitigation* system shall be installed in each unit or *dwelling* determined to require mitigation that is independently electrically metered; or

c) Prior to installation the *contractor* shall:
   1. Provide the *client* a written notice that includes the system's annual electrical costs (specifically calculated for each system based upon current local rates) and the following statement:

      > "During future renovations, sales or vacancy of individual *dwellings*, the health and safety provided to occupants by the *mitigation* system may cease to exist without the occupant's

> knowledge. It is incumbent upon the *client* to inform the building owner(s) of their obligation in this regard for ensuring long-term operation and maintenance for the system and full disclosure of this possibility to future owners."; and

2. Receive written communications to be included with *OM&M* documentation that includes:
    a. a statement from the *client* that provides the *client's* justification for why it is truly not viable to achieve independent or common electrical metering or multiple stand-alone systems); and
    b. a statement from the owner of the *dwelling(s)* or unit(s) that indicates: (1) acknowledgment of the electrical cost information provided by the *contractor*; (2) acceptance of obligations for long-term operation and maintenance of the system(s); (3) agreement with the *client's* justification; and (4) permission to proceed with the installation.

13.2.1 *System monitors (collateral mitigation)*

In accordance with Section 8.2 for system monitoring, one of the following options is required:

a) Fan monitors are installed in each *ground-contact* area divided for separate occupancy use that is served by this system for ASD or non-ASD methods that manipulate air pressures between soil air and *ground-contact* portions of the building; or

b) Fan monitors are installed in each area divided for separate occupancy use that is served by this system for non-ASD methods that are not dependent upon manipulating air pressures between soil air and *ground-contact* portions of the building; or

c) A program is instituted for routine inspection onsite or by remote telemetric management system regardless of monitor locations and in accordance with Section 12; or

d) A fan monitor is installed in a location that is accessible and visible or audible for occupants of the building.