HEALTHY GREEN SCHOOLS & COLLEGES

A HEALTHY SCHOOLS CAMPAIGN & GREEN SEAL PARTNERSHIP

GUIDANCE MANUAL: ONGOING MONITORING, EVALUATION, AND TRAINING

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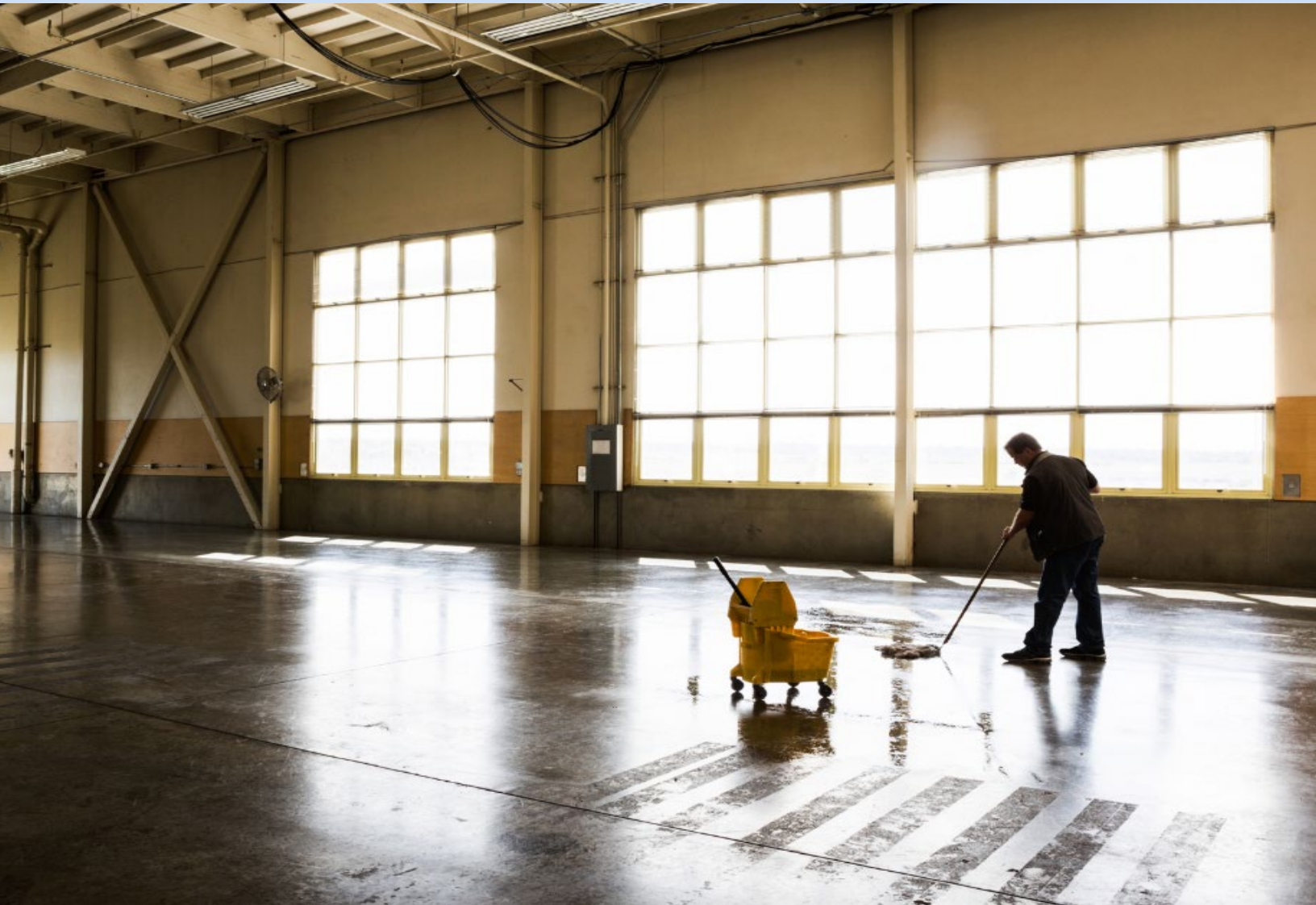


CONTENTS

How to Use This Guidance 5

Section 5: Ongoing Monitoring, Evaluation, and Training 7

5.1 Indoor Air Quality Planning, Monitoring, and Reporting 7
- Criteria Type 7
- Points Available 7

5.1.1.1 Action Planning to Address IAQ Issues: Mold, Moisture, and Humidity Control 8
- Criteria Type 8
- Points Available 8
- Intent 8
- American Rescue Plan Funding Category 8
- Standard Requirements 8
- Documentation Needed 8
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 8
- Submittal Templates Available for Use 8
- Implementation Tips 8
- External Resources 9

5.1.1.2 Action Planning to Address IAQ Issues: Contaminant Reduction 10
- Criteria Type 10
- Points Available 10
- Intent 10
- American Rescue Plan Funding Category 10
- Standard Requirements 10
- Documentation Needed 10
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 10
- Submittal Templates Available for Use 10
- Implementation Tips 11
- External Resources 12

5.1.1.3 Action Planning to Address IAQ Issues: Asbestos Management 13
- Criteria Type 13
- Points Available 13
- Intent 13
- American Rescue Plan Funding Category 13
- Standard Requirements 13
- Documentation Needed 13
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 13
- Submittal Templates Available for Use 13
- Implementation Tips 13
- External Resources 14

CONTENTS

5.1.1.4 Action Planning to Address IAQ Issues: Emergency IAQ Issues 15
- Criteria Type 15
- Points Available 15
- Intent 15
- American Rescue Plan Funding Category 15
- Standard Requirements 15
- Documentation Needed 15
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 15
- Submittal Templates Available for Use 15
- Implementation Tips 15
- External Resources 16

5.1.2.1 Indoor Air Quality Monitoring: CO2 Monitoring 17
- Criteria Type 17
- Points Available 17
- Intent 17
- American Rescue Plan Funding Category 17
- Standard Requirements 17
- Documentation Needed 18
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 18
- Submittal Templates Available for Use 18
- Implementation Tips 18
- External Resources 22

5.1.2.2 Indoor Air Quality Monitoring: Ongoing Monitoring for Contaminants 23
- Criteria Type 23
- Points Available 23
- Intent 23
- American Rescue Plan Funding Category 23
- Standard Requirements 23
- Documentation Needed 23
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 24
- Submittal Templates Available for Use 24
- Implementation Tips 24
- External Resources 26

CONTENTS

5.1.2.3 Indoor Air Quality Monitoring: Building Occupant Engagement 27
- Criteria Type 27
- Points Available 27
- Intent 27
- American Rescue Plan Funding Category 27
- Standard Requirements 27
- Documentation Needed 27
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 27
- Submittal Templates Available for Use 27
- Implementation Tips 28
- External Resources 29

5.1.3 Reporting on IAQ Issues 30
- Criteria Type 30
- Points Available 30
- Intent 30
- American Rescue Plan Funding Category 30
- Standard Requirements 30
- Documentation Needed 30
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 30
- Submittal Templates Available for Use 30
- Implementation Tips 31
- External Resources 32

5.2 Performance Measurement, Metrics, and Data Tracking 33
- Criteria Type 33
- Points Available 33
- Intent 33
- American Rescue Plan Funding Category 33
- Standard Requirements 33
- Documentation Needed 33
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 33
- Submittal Templates Available for Use 33
- Implementation Tips 33
- External Resources 34

CONTENTS

5.3 Staffing Formulas 35
- Criteria Type 35
- Points Available 35
- Intent 35
- American Rescue Plan Funding Category 35
- Standard Requirements 35
- Documentation Needed 35
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 35
- Submittal Templates Available for Use 35
- Implementation Tips 35
- External Resources 37

5.4 Ongoing Training 38
- Criteria Type 38
- Points Available 38
- Intent 38
- American Rescue Plan Funding Category 38
- Standard Requirements 38
- Documentation Needed 39
- Streamlined Documentation Options for Programs Certified to Green Seal, GS-42 40
- Submittal Templates Available for Use 40
- Implementation Tips 40
- External Resources 41

HOW TO USE THIS GUIDANCE

This guidance manual is designed to help you meet the criteria of the Healthy Green Schools & Colleges Standard for K–12 School Districts and Higher Education Institutions. This manual includes all criteria from Section 2 of the standard. The manual does not replace the standard in defining the requirements for certification and does not guarantee certification.

Each subsection in this manual contains the following parts:

CRITERIA TYPE
A categorization of each criterion as either required or optional, or a combination of both.

POINTS AVAILABLE
For optional criteria, the number of points that can be earned toward a certification tier. All required criteria will show 0 available points.

INTENT
A brief statement of the purpose of the requirement and how it reduces impacts to human health and the environment.

AMERICAN RESCUE PLAN FUNDING CATEGORY
The section of H.R.1319, American Rescue Plan Act of 2021, under which funding for each criterion may be available through state education agencies.

STANDARD REQUIREMENTS
The complete standard requirements for each criterion, as found in the Healthy Green Schools & Colleges Standard for K–12 School Districts and Higher Education Institutions, dated September 22, 2022.

DOCUMENTATION NEEDED
The documentation required to verify compliance with each criterion. In general, documents consist of narrative explanations or descriptions, established policies, copies of purchasing orders or receipts, photographic evidence, or information provided in a template developed by Healthy Schools Campaign and Green Seal. Electronic documents (e.g., PDF, Word, JPEG, Excel, scanned originals) are preferable to paper copies.

STREAMLINED DOCUMENTATION OPTIONS FOR PROGRAMS CERTIFIED TO GREEN SEAL, GS-42
A reduced set of documentation necessary to demonstrate compliance with criteria for programs that meet an eligible scope for the Healthy Green Schools & Colleges Standard and are certified to Green Seal, GS-42, Standard for Commercial and Institutional Cleaning Services.

SUBMITTAL TEMPLATES AVAILABLE FOR USE

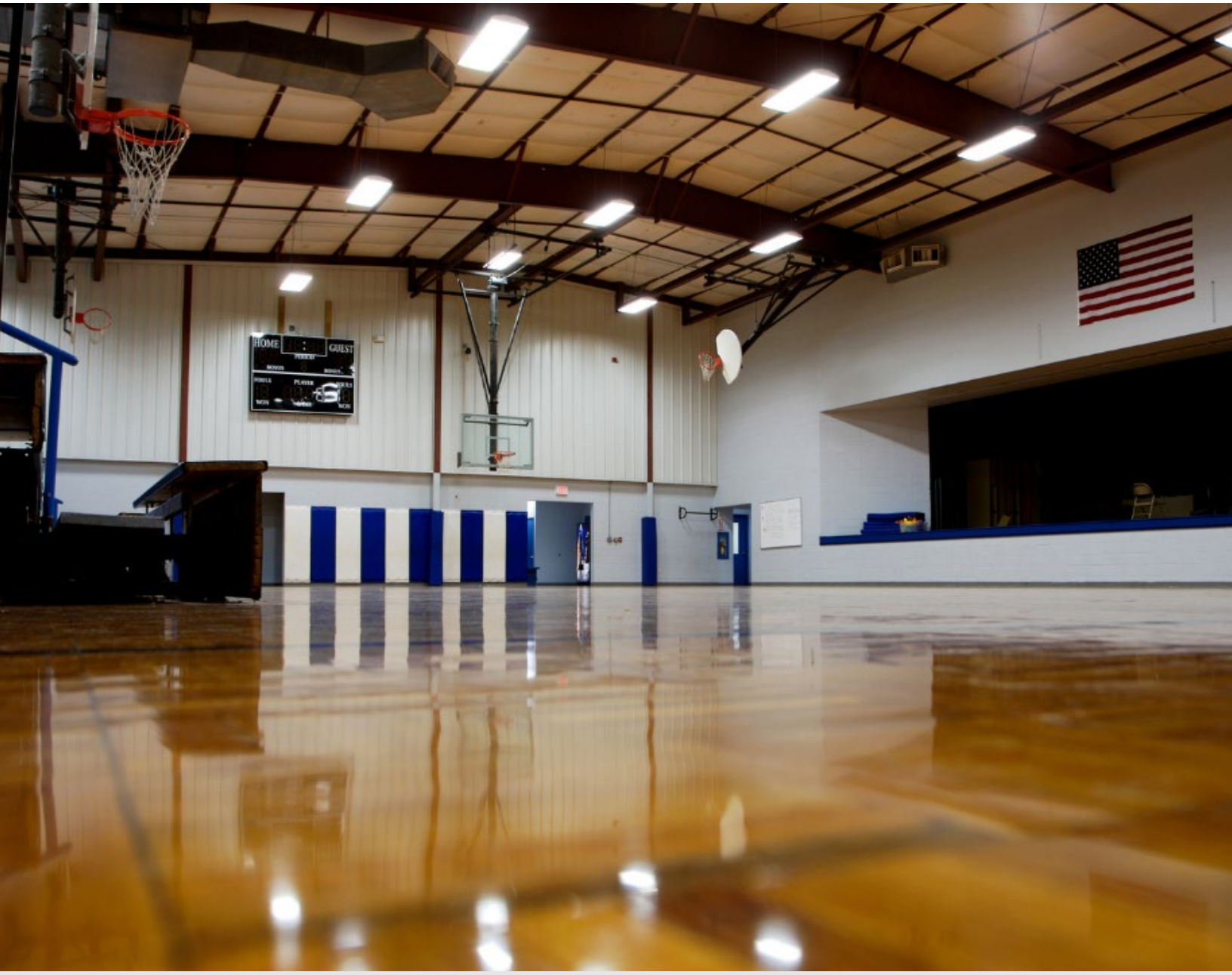
Documents developed by Healthy Schools Campaign and Green Seal to assist educational institutions in tracking data, collecting necessary documentation, and ensuring all necessary information is included in an institution's submission.

IMPLEMENTATION TIPS

Suggestions for how institutions can successfully implement the required and optional criteria, including special cases and considerations. This information can help institutions meet criteria within the standard but is not the only path to achievement and is not necessary to meet the required or optional criteria in the standard.

EXTERNAL RESOURCES

Links to referenced standards or resources within each criterion, as well as educational resources that may help participants successfully implement the criteria.



SECTION 5: ONGOING MONITORING, EVALUATION, AND TRAINING

5.1 Indoor Air Quality Planning, Monitoring, and Reporting

Criteria Type
Optional for all projects.

Points Available
Up to 17 points available. Points are awarded according to the following table.

Points for Indoor Air Quality (IAQ) Planning, Monitoring, and Reporting

Activity	Points
Action planning to address IAQ issues: mold, moisture, and humidity control	1
Action planning to address IAQ issues: contaminant reduction	2
Action planning to address IAQ issues: asbestos management	1
Action planning to address IAQ issues: emergency IAQ issues	1
Indoor air quality monitoring: CO2 monitoring	4
Indoor air quality monitoring: ongoing monitoring for contaminants	3
Indoor air quality monitoring: building occupant engagement	2
Reporting on IAQ issues	3

5.1.1.1 Action Planning to Address IAQ Issues: Mold, Moisture, and Humidity Control

Criteria Type
Optional for all projects.

Points Available
1 point available.

Intent
To ensure procedures are in place to monitor indoor air quality and help identify opportunities to improve indoor air quality.

American Rescue Plan Funding Category
HR 1319-18 (O), HR 1319-18 (P), and HR 1319-18 (Q)

Standard Requirements
> Create and implement an action plan for addressing mold and mildew consistent with U.S. EPA Tools for Schools, Appendix H, Mold and Moisture. Monitor relative humidity at least quarterly to maintain industry-accepted standards, as described in U.S. EPA Tools for Schools.

Documentation Needed
Provide the Mold, Moisture, and Humidity Control Plan consistent with U.S. EPA's Tools for Schools: Appendix H, Mold and Moisture; internal records demonstrating the implementation of the plan during the performance period within a representative sample of buildings; and a summary table of issues identified and the status of remediation.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips
According to the U.S. EPA, uncontrolled moisture indoors can cause major damage to the building structure, as well as to furnishings and finish materials such as floors, walls, and ceilings. Uncontrolled moisture can trigger mold growth, which not only can damage the school facility but also can lead to health and performance problems for students and staff.
In "Reference Guide for Indoor Air Quality Tools for Schools, Appendix H: Mold and Moisture," the U.S. EPA recommends the following activities:

- taking steps to reduce mold and moisture by responding to water damage within 24–48 hours to prevent mold growth, which depends on moisture,
- reducing vapor pressure–dominated mold growth by using source control (e.g., direct venting of moisture-generating activities such as showers to the exterior), diluting moisture-laden indoor air with outdoor air at a lower absolute humidity, and dehumidifying the indoor air,

- reducing surface pressure–dominated mold growth by raising the temperature of the air near room surfaces, raising the thermostat setting, improving air circulation, decreasing heat loss from room surfaces, adding insulation, and closing cracks in the exterior wall, and
- identifying and correcting common mold and moisture problems, including the following:
  - exterior corners and walls,
  - set-back thermostats,
  - air-conditioned spaces,
  - thermal bridges,
  - window, and
  - concealed condensation.

Follow *U.S. EPA's Indoor Air Quality Tools for Schools: Preventive Maintenance Guidance* to assist with conducting routine inspections for reducing mold and moisture.

External Resources

- U.S. EPA, *Indoor Air Quality Tools for Schools: Preventive Maintenance Guidance*, https://www.epa.gov/sites/default/files/2019-03/documents/epa_oria_iaq-tfs_preventive-maintenance-guidance_2019_final-508.pdf
- U.S. EPA, "Reference Guide for Indoor Air Quality Tools for Schools, Appendix H: Mold and Moisture," https://www.epa.gov/iaq-schools/reference-guide-indoor-air-quality-schools#IAQRG_AppendixH

5.1.1.2 Action Planning to Address IAQ Issues: Contaminant Reduction

Criteria Type
Optional for all projects.

Points Available
2 points available.

Intent
To ensure procedures are in place to monitor indoor air quality and help identify opportunities to improve indoor air quality.

American Rescue Plan Funding Category
HR 1319-18 (O), HR 1319-18 (P), and HR 1319-18 (Q)

Standard Requirements

Create and implement an action plan for reducing radon, volatile organic compounds (VOCs), formaldehyde, particulate matter (PM2.5 and/or PM10), ozone, and other elements that affect IAQ, such as bus diesel exhaust, sewer gas, and natural gas venting. Document the achieved reductions in contaminants during the performance period.

Documentation Needed
Provide the following:

- baseline test data for the following contaminants taken in the representative sample of buildings, including the date, time, location, and occupancy present at testing, which informed the action plan:
  - radon,
  - VOCs,
  - formaldehyde,
  - particulate matter (PM2.5 or PM10), and
  - ozone.
- action plan for reducing contaminants, including maximum thresholds and steps required when thresholds are exceeded,
- results of air testing conducted during the performance period, and
- summary of how implemented actions resulted in achieved reductions.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips

Before an action plan to reduce contaminants can be developed, the first step is to measure the levels of target pollutants within buildings. This can be done by hiring professional services or selecting monitoring devices to measure contaminants over time.

Selecting Monitoring Devices

Ongoing monitoring of contaminants requires technical devices to perform air testing and determine contaminant levels. Consider at least the following factors when selecting a technology for monitoring:

- *Accuracy and reliability:* The devices should provide accurate readings and be reliable over time. Look for devices that have been independently tested and validated for accuracy.
- *Range of measurement:* Different devices may be designed to measure different ranges of a contaminant concentration. Ensure the devices chosen can measure the expected levels across buildings.
- *Ease of use:* Easy-to-use, intuitive devices that require little technical knowledge can enable more personnel to use them, reduce the potential for errors in readings and recordings, and reduce the amount of time spent on training.
- *Data-logging capability:* If the institution will use the devices for an ongoing monitoring program, choose devices that can log data for later analysis. Some devices store data internally, while others transmit data to an external system for storage and analysis.
- *Integration with other systems:* If the institution plans to integrate the monitors with the HVAC or a building management system, ensure the selected devices are capable.
- *Maintenance requirements:* Some devices might require regular calibration or other maintenance to ensure accurate readings. Consider the resources available and additional training necessary for maintaining the devices.
- *Cost:* While the initial investment in purchasing the devices is a direct cost, consider that cheaper devices might not provide the necessary accuracy, reliability, or other features and may involve more indirect costs, such as time spent recalibrating the devices, more time for training, and additional maintenance costs.

Contaminant	Monitoring options
Maintenance equipment	Carbon monoxide (CO) detectors will sound an alarm if they detect a certain level of CO within a certain timeframe. These can be stand-alone devices or may be integrated with a building's security or fire alarm system.
Mold and mildew	Monitoring mold and mildew can involve visual inspection and moisture detection or the use of handheld devices. Mold tests, which involve taking air or swab samples, can also be conducted.
Total volatile organic compounds (VOCs)	VOC detectors, also known as gas detectors, can measure the levels of various VOCs. Some of these devices provide an overall VOC reading, while others can identify and quantify specific compounds.
Formaldehyde	Air quality monitors that can specifically detect formaldehyde work by drawing in a sample of air and passing it over a chemical test strip or sensor that changes color or electrical resistance in the presence of formaldehyde.
Radon	Radon testing kits are available for both short- and long-term testing. These kits involve collecting an air sample in a specialized container or onto a specialized material, then sending the sample to a lab for analysis. Continuous radon monitors, which can provide real-time readings of radon levels, are also available.

Contaminant	Monitoring options
PM2.5 and PM10	Particulate matter (PM) detectors are used to measure these substances. These detectors work by drawing in air and using a light-scattering method to measure the amount and size of particles in the air.
Ozone	Ozone monitors work by drawing in a sample of air and detecting the presence and concentration of ozone.

For a comprehensive solution, multipurpose indoor air quality monitors can monitor several air quality parameters, including CO, VOCs, formaldehyde, radon, PM2.5/PM10, and ozone. Some models also include humidity and temperature sensors, as these factors can influence pollutant levels and occupant comfort.

Ongoing monitoring can also take place through professional air quality assessment services. These services may involve a more thorough analysis than what consumer-grade devices can provide, using high-grade equipment that can detect, measure, and record various indoor air pollutants over time. They also interpret the data and provide recommendations for improving air quality.

Action Planning

Determine the actions that will reduce contaminants throughout the institution's buildings. Measures could include the following:

- *Improved ventilation:* Ventilation can significantly reduce the levels of indoor pollutants by bringing in more outdoor air and improving the filtration of the air that is recirculated.
- *Maintenance and upgrades:* Regularly maintain HVAC systems to ensure they are working efficiently, including cleaning and replacing filters.
- *Integrated pest management:* Pesticides can be a significant source of indoor pollutants when used for pest management. An integrated pest management approach can reduce the need for these chemicals within and surrounding the building.
- *Cleaning practices:* Use cleaning and maintenance products that are confirmed to be low in chemicals and VOCs.
- *Source control:* Eliminate or reduce the sources of outdoor pollutants. For example, use radon-resistant techniques for renovations, and reduce vehicle idling to decrease exposure to diesel exhaust.

Additional action steps can be determined using the U.S. EPA's "Indoor Air Quality Problem Solving Tool."

External Resources

- U.S. EPA, "Indoor Environmental Contaminants in Schools," https://www.epa.gov/iaq-schools/indoor-environmental-contaminants-schools
- U.S. EPA, IAQ Reference Guide: Indoor Air Quality Tools for Schools, https://nepis.epa.gov/Exe/ZyPDF.cgi/P1009QR0.PDF?Dockey=P1009QR0.PDF
- U.S. EPA, "Indoor Air Quality Problem Solving Tool," https://www.epa.gov/iaq-schools/indoor-air-quality-problem-solving-tool

5.1.1.3 Action Planning to Address IAQ Issues: Asbestos Management

Criteria Type
Optional for all projects.

Points Available
1 point available.

Intent
To ensure procedures are in place to monitor indoor air quality and help identify opportunities to improve indoor air quality.

American Rescue Plan Funding Category
HR 1319-18 (O), HR 1319-18 (P), and HR 1319-18 (Q)

Standard Requirements
Develop an Asbestos Hazard Emergency Response Act (AHERA) management plan for asbestos remediation. Implement the management plan as necessary during the performance period.

Documentation Needed
Provide the Asbestos Management Plan and a list of all remediation activities underway throughout the institution during the performance period.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips
According to the U.S. EPA, most of the nation's primary, secondary, and charter schools have asbestos-containing materials. Asbestos is most commonly found in schools as insulation and in building materials. It has also been used in floor and ceiling tile, cement asbestos pipe, corrugated paper pipe wrap, acoustic and decorative insulation, pipe and boiler insulation, and spray-applied fireproofing.

The U.S. EPA also notes that most asbestos-containing material can be properly managed where it is. In fact, asbestos that is managed properly and maintained in good condition appears to pose relatively little risk to students and school employees.
Proper asbestos management begins with a comprehensive inspection by qualified, trained, and experienced inspectors, accredited through a U.S. EPA or state-approved training course. Inspecting the condition of asbestos materials—initially with inspectors accredited under the Asbestos Hazard Emergency Response Act (AHERA) and at least semiannually with trained custodial or maintenance staff—is extremely important so that changes in the material's condition, such as damage or deterioration, can be detected and corrected before the condition worsens.

Create a compliant management plan following the U.S. EPA's *Model AHERA Asbestos Management Plan for Local Education Agencies*. This guide provides step-by-step instructions for developing an asbestos management plan under AHERA. It includes ready-to-use forms for inspection and reinspection, response actions, operations and maintenance, and other AHERA activities.

External Resources

- U.S. EPA, The ABCs of Asbestos in Schools, https://www.epa.gov/asbestos/abcs-asbestos-schools
- U.S. EPA, Model AHERA Asbestos Management Plan for Local Education Agencies, https://www.epa.gov/asbestos/model-ahera-asbestos-management-plan-local-education-agencies

5.1.1.4 Action Planning to Address IAQ Issues: Emergency IAQ Issues

Criteria Type
Optional for all projects.

Points Available
1 point available.

Intent
To ensure procedures are in place to monitor indoor air quality and help identify opportunities to improve indoor air quality.

American Rescue Plan Funding Category
HR 1319-18 (O), HR 1319-18 (P), and HR 1319-18 (Q)

Standard Requirements
Create a written action plan for emergency air quality problems. Implement the action plan as needed during the performance period. Provide justification for any deviations from the written action plan.

Documentation Needed
Provide the Emergency Air Quality Action Plan, a list of all instances of implementing the plan during the performance period, and justifications for any deviations from the written action plan.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips
A well-developed emergency response plan for IAQ issues should include the following:

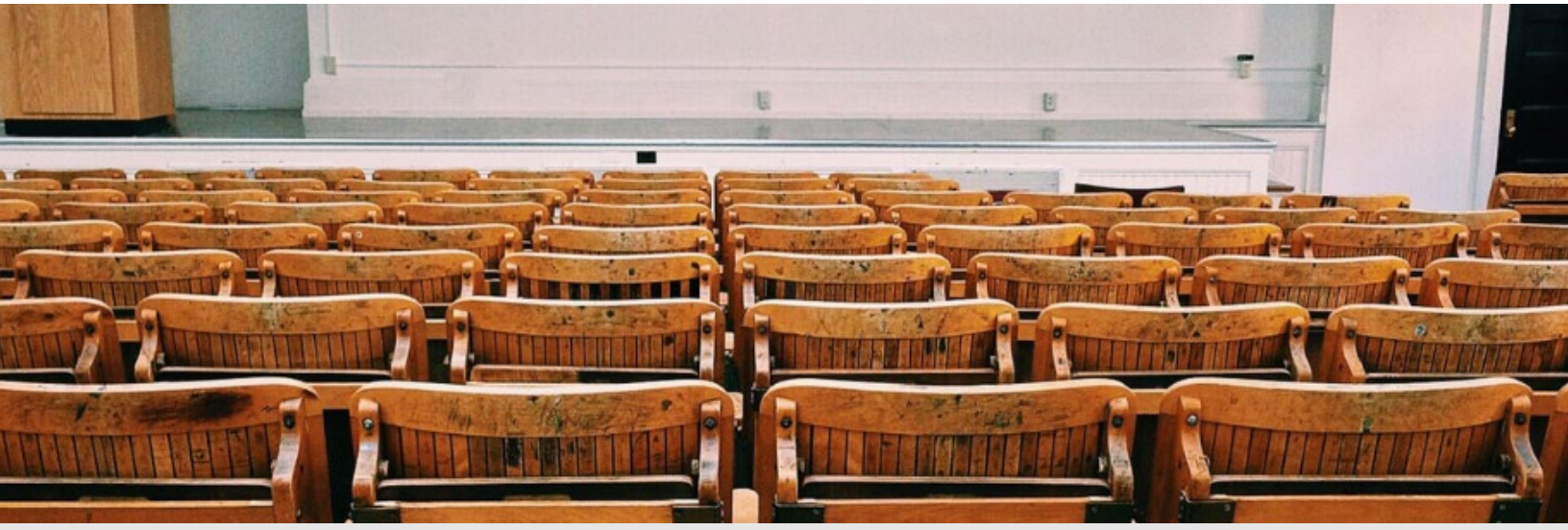
- regular checks of equipment,
- clear evacuation plans,
- notification to the appropriate local and state health departments, including their contact information,
- proper communication channels to inform stakeholders promptly about emergency situations,
- policy and procedures for personnel to handle media inquiries during severe emergencies or properly escalate media requests, and
- if appropriate, training and drills to help ensure everyone knows what to do when an emergency arises.

Consider the following types of IAQ issues, among others, that could create an emergency in buildings throughout the institution:

- *HVAC system failure*: A sudden failure of the HVAC system could quickly lead to poor air quality; extremely warm or cold rooms, depending on the season; and excessive humidity.
- *Carbon monoxide (CO) leak*: CO is a colorless, odorless gas that can be deadly at high concentrations. It is produced by burning fuel, so any appliance or system that uses fuel, such as a gas furnace or generator, could potentially develop a CO leak. Early symptoms of CO poisoning can resemble the flu, but it can quickly become a life-threatening emergency for building occupants.
- *Mold outbreak*: Mold spores can spread rapidly under the right conditions, such as when there is a leak or other source of excess moisture. If left unchecked, this could lead to a significant mold problem within a short period of time, potentially causing allergic reactions or other health issues.
- *Chemical spill or gas leak*: An accident involving chemicals, such as in a science lab or storage room, or a gas leak from a broken pipe or malfunctioning equipment can quickly lead to hazardous conditions.
- *Fire and smoke*: Fires, whether large or small, can create significant air quality issues due to smoke and other by-products of combustion. Even after the fire is extinguished, the cleanup process can continue to impact air quality.
- *Pest infestations*: Rapid infestations of pests such as rodents, insects, or other vermin can pose immediate IAQ issues. These pests can produce allergens, introduce diseases, or even die within the building, leading to foul odors and further air quality issues. Moreover, some pests can damage HVAC systems and building structures, which can indirectly affect air quality.
- *Sewage or septic system backup*: If a building's sewage or septic system backs up, it can release hazardous gases, such as methane and hydrogen sulfide, and cause unpleasant odors. Moreover, if the backup leads to flooding, it can create ideal conditions for mold growth.
- *Construction or renovation activities*: Any kind of construction or renovation work can disrupt building materials, potentially releasing pollutants such as asbestos, lead dust, or mold spores. It can also generate dust and other particulates that can worsen air quality.

External Resources

None.



5.1.2.1 Indoor Air Quality Monitoring: CO2 Monitoring

Criteria Type
Optional for all projects.

Points Available
Up to 4 points available. Points are additive and awarded according to the following table.

Points for Buildings Included in CO2 Monitoring

Buildings Monitored	Points
3 buildings, as part of an institutional pilot program	1
25 percent of all buildings	2
50 percent of all buildings	3
100 percent of all buildings	4

Intent
To ensure procedures are in place to monitor indoor air quality and help identify opportunities to improve indoor air quality.

American Rescue Plan Funding Category
HR 1319-18 (O), HR 1319-18 (P), and HR 1319-18 (Q)

Standard Requirements

K–12 School Districts
Monitor CO2 levels during times of peak occupancy, at least once per calendar quarter while school is in session and during the performance period, across a sample of buildings in the following building locations:

- cafeteria,
- gymnasium,
- library, and
- two classrooms.

Higher Education Institutions
Establish and implement a plan to monitor CO2 and specify the building spaces to be tested. Conduct testing at least once per quarter, including periods of peak occupancy, during the performance period across a sample of buildings.

All Projects
The buildings selected for monitoring must be a representative sample (see Section 1.2). At the institution level, create a written action plan for situations when CO2 levels exceed 900 ppm. Document all instances of CO2 levels in excess of 900 ppm during occupancy throughout the performance period identified through monitoring, and provide a summary of the remediation action implemented.

For institutions pursuing one point by conducting CO2 monitoring in three buildings, the testing must be part of an overall effort to expand testing across the institution. Provide monitoring results, a summary of trends identified, ongoing remediation actions implemented to address issues identified through monitoring, and a narrative description of how the monitoring results will inform upcoming budget requests and resource spending to expand CO2 monitoring.

Documentation Needed

For institutions pursuing one point by conducting CO2 monitoring in three buildings, the testing must be part of an overall effort to expand testing across the institution. Provide monitoring results, a summary of trends identified, ongoing remediation actions implemented to address issues identified through monitoring, and a narrative description of how the monitoring results will inform upcoming budget requests and resource spending to expand CO2 monitoring.

For institutions pursuing 2+ points, provide the results of CO2 testing conducted during the performance period, a list of all instances when CO2 levels were found to be more than 900 parts per million (ppm) during occupancy throughout the performance period identified through monitoring, and a summary of the remediation actions implemented. Provide the written action plan for situations when CO2 levels exceed 900 ppm.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42

None.

Submittal Templates Available for Use

None.

Implementation Tips

Selecting CO2 Monitoring Technology

Many types of CO2 monitors are available, ranging from simple handheld devices to sophisticated systems that can be integrated with a building's HVAC system. Factors to consider when selecting a technology for monitoring include the following:

- *Accuracy and reliability*: The devices should provide accurate readings and be reliable over time. Look for devices that have been independently tested and validated for accuracy.
- *Range of measurement*: Different devices may be designed to measure different ranges of CO2 concentration. Ensure the devices chosen can measure the expected levels across buildings.
- *Ease of use*: Easy-to-use, intuitive devices that require little technical knowledge can enable more personnel to use them, reduce the potential for errors in readings and recordings, and reduce the amount of time spent on training.
- *Data-logging capability*: If the institution will use the devices for an ongoing monitoring program, choose devices that can log data for later analysis. Some devices store data internally, while others transmit data to an external system for storage and analysis.
- *Integration with other systems*: If the institution plans to integrate the CO2 monitor with the HVAC or a building management system, ensure the selected devices are capable.
- *Maintenance requirements*: Some devices might require regular calibration or other maintenance to ensure accurate readings. Consider the resources available and additional training necessary for maintaining the devices.

- *Cost:* While the initial investment in purchasing the devices is a direct cost, consider that cheaper devices might not provide the necessary accuracy, reliability, or other features and may involve more indirect costs, such as time spent recalibrating the devices, more time for training, and additional maintenance costs.

Type of Device	Description	Considerations	Estimated cost per unit
Handheld monitors	Portable devices that are easy to use and relatively inexpensive. They typically display the current CO2 level and might also log data for later analysis. Some have features such as an alarm for high CO2 levels.	• Typically the least expensive option. • Usually do not require professional installation, so there may be no installation costs. • May require regular calibration to maintain accuracy, which could involve purchasing calibration gas and possibly paying for a technician's time.	$100–$500
Wall-mounted monitors	Devices installed in a fixed location and continuously monitoring CO2 levels. Often have data-logging capabilities, and some have features such as an alarm for high CO2 levels.	• May be additional costs for installation, especially if electrical wiring needs to be installed or modified. • May require regular calibration, which could involve purchasing calibration gas and possibly paying for a technician's time.	$200–$1000
Integrated systems	Sophisticated systems that can be integrated with a building's HVAC system or management system. They can continuously monitor CO2 levels and adjust ventilation in response. Typically include robust data-logging and analysis features.	• Likely the most expensive option but also the most sophisticated. • Installation costs could be significant, especially if the system needs to be integrated with the HVAC system or building management system. • Ongoing costs might include software licenses for data management and analysis, as well as regular maintenance and calibration.	Several hundred to a few thousand dollars

Costs associated with purchasing, installing, and maintaining CO2 monitoring equipment can vary significantly, depending on the specific type and model of the equipment, as well as the size and number of buildings in which they will be installed.

Designing a Pilot Program

For institutions that are beginning to incorporate CO2 monitoring through a pilot program, taking an intentional approach to designing the program with the goal to expand is critical for long-term success. Implement the following steps to create a minimally viable and scalable program:

1. *Identifying goals*: Clearly outline what the institution hopes to achieve with the CO2 monitoring pilot program. For example, will there be a period of simply monitoring CO2 levels before beginning to take steps to mitigate high levels? Any goals set should be realistic, measurable, and directly related to the program.

2. *Choosing the right buildings*: Carefully select which buildings to include in the pilot program. Consider factors like the building's age, size, ventilation system, and typical occupancy levels. (*See Selecting Buildings for the CO2 Pilot Program below.*)
3. *Determining the required technology*: Select which technology is best suited to effectively monitor CO2 levels in the pilot, and consider how that might influence the type of system that gets scaled across the institution. (*See Selecting CO2 Monitoring Technology above.*)
4. *Evaluating costs*: Carefully evaluate costs associated with purchasing, installing, and maintaining equipment. (*See Selecting CO2 Monitoring Technology above.*)
5. *Determining responsibility for installation and maintenance*: Determine who will install and maintain the monitoring equipment. Ensure that the selected personnel have the necessary skills and resources to properly handle the equipment.
6. *Collecting and analyzing data*: A system for data collection and analysis needs to be in place. Determine how often data will be collected, where it will be stored, and how it will be analyzed. (*See Collecting and Analyzing Data below.*)
7. *Training staff*: Staff directly involved with the program need adequate training. This could include training on how to install and maintain the equipment, interpret the data, and respond to high CO2 levels.
8. *Communicating*: Create a plan for communicating about the program, including informing staff and students about the program's goals, updating them on progress, and letting them know what actions are being taken based on the data collected.
9. *Reviewing and revising*: The pilot program should be considered a living project, open to revisions based on the results obtained and feedback received. Periodically assess the pilot to determine whether further refinements need to be made or if the program is ready for expansion.
10. *Planning for expansion*: Consider how the program might be scaled up to include all buildings, including any necessary changes in technology, personnel, or procedures. This might also include consideration of how to phase in the expansion to minimize disruption.

Selecting Buildings for the CO2 Pilot Program

One of the primary purposes of the pilot program is to learn as much as possible about how to implement CO2 monitoring on a larger scale across the institution. By choosing a diverse range of buildings for the pilot, the institution can gather a wide range of data and learn how to adapt the program to a variety of conditions. This ensures that the lessons learned from the pilot can be applied more broadly when the program is expanded. Consider at least the following parameters when selecting buildings to be part of the pilot program:

- *Age*: Older buildings might have different ventilation systems than newer buildings, as well as more issues with air quality due to factors such as deteriorating building materials or outdated HVAC systems. Including a mix of older and newer buildings in the pilot can provide insight into how these factors affect CO2 levels and whether there are trends in high CO2 levels.
- *Size*: A building's size can affect how air circulates and how CO2 accumulates. Larger buildings might require more sensors or more complex ventilation systems. Including buildings of various sizes in the pilot can aid understanding of these challenges.
- *Ventilation system*: The type and condition of a building's ventilation system can significantly impact CO2 levels. Buildings with modern, well-maintained systems might have fewer issues than those with older or poorly maintained systems. Including buildings with a range of ventilation systems in the pilot can provide insight into how to tailor the program to different situations.

Collecting and Analyzing Data

When preparing to collect and analyze the CO2 data, consider the following parameters:

- *Data collection frequency*: Depending on the available resources, data can be collected at different intervals. Real-time monitoring would provide the most comprehensive data but might require more resources. Alternatively, data could be collected at regular intervals.
- *Data accuracy*: The reliability of the data will directly impact the decisions made based on that data. The institution must use the pilot to ensure that the CO2 monitors are properly calibrated and maintained to obtain accurate data and that the plan for maintaining proper calibration is scalable.
- *Data storage*: The system for storing data needs to be robust and secure. Depending on the volume of data and IT resources, data could be stored on local servers or in the cloud. The system should be easily accessible to those who need to use the data, while also addressing any security needs.
- *Data management*: Establish clear protocols for data management. This includes determining who has access to the data, how it is backed up, and how long it is kept.
- *Data analysis*: To turn raw data into actionable information, it needs to be analyzed for trends. This could be as simple as tracking averages and identifying trends or as complex as correlating CO2 levels with other factors, such as occupancy or outside temperature. Determine who will perform this analysis, what tools the personnel will use, and whether these activities will take place during the pilot or in future program iterations.
- *Data reporting*: Determine clear protocols for reporting the data. This includes deciding what data will be reported, to whom, and how often. The reports should be easy to understand and tie back to the program goals.
- *Using data for decision-making*: Once the data is collected, analyzed, and reported, it can be used to inform future decisions. This could include decisions about ventilation, building maintenance, or occupancy scheduling.
- *Pilot evaluation and revision*: After a certain period of data collection, the institution should evaluate the pilot program. This evaluation should assess both the data collection process and the use of the data.

Action Planning for Excessive CO2 Levels

Analyzing CO2 data could reveal a number of trends, such as the following:

- *Occupancy patterns*: CO2 levels rise and fall with the number of people in a room. These levels can reveal when a room is occupied, how many people likely are in a room, and whether a room consistently contains too many people to maintain acceptable levels of CO2.
- *Ventilation effectiveness*: High CO2 levels can indicate that the ventilation system is not effectively removing the CO2. This could be due to issues such as blocked vents, insufficient airflow, or problems with the HVAC system. Further follow-up is necessary.
- *Variations among buildings or rooms*: Monitoring in multiple buildings may identify differences in CO2 levels and patterns. For example, one building might consistently have higher CO2 levels than others. This could be due to factors such as different occupancy levels, differences in HVAC systems, or proximity to outdoor sources of CO2.
- *Time-based trends*: Patterns may occur at certain times of the day or on certain days of the week. For example, CO2 levels might spike during lunchtime, when the cafeteria is full, and be lower on weekends, when the building has fewer occupants.

If CO2 levels in a space are consistently high, it could indicate that the ventilation is insufficient or that the space is overcrowded. When CO2 levels exceed 900 ppm, the following strategies could be used to bring levels back down to an acceptable threshold:

- *Improve ventilation*: This might involve increasing the rate of air exchange in the HVAC system, opening windows or doors to let in fresh air, or installing exhaust fans.
- *Reduce occupancy*: This could involve limiting the size of classes or meetings, clearing a room temporarily, or finding a larger space for rooms with consistently elevated CO2.
- *Maintain HVAC systems*: Regular maintenance of HVAC systems can ensure they are functioning properly and providing adequate ventilation. This involves tasks such as cleaning or replacing air filters, checking for blocked vents, and repairing any issues with the system.

Making the Case for CO2 Monitoring Program Expansion

The purpose of the CO2 monitoring pilot program is to serve as a learning tool with the goal of eventually scaling the program across the institution. Expanding the program will involve significant investment; it is crucial to effectively communicate the value and benefits of the program to budget holders. The following points may help build the case for expanding the program:

- *Improved indoor air quality*: High levels of CO2 can negatively impact health and cognitive function, potentially leading to symptoms such as headaches, fatigue, and difficulty concentrating. Monitoring and managing CO2 levels helps create a healthier, more comfortable environment for students and staff.
- *Increased learning effectiveness*: Studies have indicated that high CO2 levels can impair cognitive function, potentially reducing students' ability to concentrate, learn, and perform well on tests. Ensuring adequate ventilation and managing CO2 levels can potentially improve learning outcomes.
- *Cost savings:* Although implementing a CO2 monitoring program requires an upfront cost, it can lead to cost savings in the long term. By identifying issues with the institution's HVAC systems or building use, targeted improvements can be made that increase energy efficiency, reduce maintenance costs, and extend the life of the systems and equipment.
- *Regulatory compliance*: Depending on the jurisdiction, regulations or guidelines may exist regarding indoor air quality in schools. A CO2 monitoring program can help ensure that the institution follows these requirements.
- *Transparency and trust*: By openly monitoring and managing CO2 levels, the institution can demonstrate to students, staff, and parents that it has made a real commitment to providing a safe and healthy environment. This can increase trust and occupant satisfaction.
- *Proactive response to future challenges*: The monitoring system could also be used in the future to respond to other challenges related to indoor air quality.

To strengthen the case, present data from the pilot program. This might include demonstrating how the program has improved indoor air quality, showing how it has uncovered issues, and describing how it has been received by students and staff. Present this data in a clear, visually appealing way, such as in a graph or infographic. Also address potential concerns, such as the cost of the program and the logistics of implementation.

External Resources

- National Education Association, "How to Evaluate Building Ventilation Using Carbon Dioxide Monitors," https://www.nea.org/resource-library/how-evaluate-building-ventilation-using-carbon-dioxide-monitors

5.1.2.2 Indoor Air Quality Monitoring: Ongoing Monitoring for Contaminants

Criteria Type
Optional for all projects.

Points Available
3 points available.

Intent
To ensure procedures are in place to monitor indoor air quality and help identify opportunities to improve indoor air quality.

American Rescue Plan Funding Category
HR 1319-18 (O), HR 1319-18 (P), and HR 1319-18 (Q)

Standard Requirements

In all institution buildings, establish and implement a plan to monitor IAQ, including monitoring frequency, contaminants to be monitored, acceptable levels, and building spaces tested. Monitor, at minimum, the following contaminants:

- CO2,
- carbon monoxide,
- mold,
- mildew,
- total VOCs
- formaldehyde,
- radon,
- PM2.5 and/or PM10,
- ozone, and
- other elements that affect IAQ, such as bus diesel exhaust, sewer gas, and natural gas venting.

Conduct air quality testing in each building at least once during the performance period, during times of peak occupancy. Document the results and remediation actions.

Documentation Needed
Provide the following documentation:

- IAQ monitoring plan, including monitoring frequency, contaminants monitored, acceptable levels, and building spaces to be tested,
- results of all air testing conducted during the performance period,
- list of all instances when contaminant levels were found to be in excess of established acceptable levels during occupancy throughout the performance period identified through monitoring, and
- summary of the remediation action implemented for each instance where contaminant levels were found to be in excess of established acceptable levels during occupancy throughout the performance.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42

None.

Submittal Templates Available for Use

None.

Implementation Tips

Creating an IAQ Monitoring Plan

Implement the following steps to develop an IAQ monitoring plan.

1. *Identify potential contaminants*: The plan must minimally monitor CO2, carbon monoxide, mold, mildew, total VOCs, formaldehyde, radon, PM2.5 and PM10, and ozone. Identify any other contaminants that may be relevant for the school buildings. Potential additional contaminants could depend on a building's location, age, and condition, as well as any specific activities (e.g., science labs or art studios) that might introduce additional pollutants.
2. *Define acceptable levels*: Define what constitutes an acceptable level for each contaminant. Consult the U.S. EPA's "Indoor Environmental Contaminants in Schools" for guidance on determining acceptable levels.
3. *Determine monitoring frequency*: Consider the ages of buildings, history of IAQ problems, and types of contaminants when determining monitoring frequency. Some issues, such as mold or humidity, might require more frequent monitoring, especially during certain seasons.
4. *Identify spaces to be tested*: Not all areas of a building will have the same risk for IAQ problems. Areas to prioritize might include older parts of the building, areas with poor ventilation, high-occupancy spaces (e.g., classrooms and gymnasiums), places with a history of IAQ issues, and areas where there are specific sources of contaminants (e.g., science labs or art studios).
5. *Develop a response plan*: The IAQ monitoring plan should include steps for what to do if an issue is identified and contaminant thresholds are exceeded, including immediate actions to protect health, communication to stakeholders, and longer-term strategies for addressing the underlying issue.
6. *Keep records*: It is important to keep thorough records of all IAQ monitoring activities, including the date of testing, who conducted the test, the results, any actions taken in response, and any follow-up testing.
7. *Review and update the plan regularly*: The plan should be reviewed and updated regularly (e.g., annually) to ensure it continues to meet the needs of the institution.

Selecting Monitoring Devices

Ongoing monitoring of contaminants requires technical devices to perform air testing and determine contaminant levels. Factors to consider when selecting a technology for monitoring include the following:

- *Accuracy and reliability*: The devices should provide accurate readings and be reliable over time. Look for devices that have been independently tested and validated for accuracy.
- *Range of measurement*: Different devices may be designed to measure different ranges of a contaminant concentration. Ensure the devices chosen can measure the expected levels across buildings.

- *Ease of use*: Easy-to-use, intuitive devices that require little technical knowledge can enable more personnel to use them, reduce the potential for errors in readings and recordings, and reduce the amount of time spent on training.
- *Data-logging capability*: If the institution will use the devices for an ongoing monitoring program, choose devices that can log data for later analysis. Some devices store data internally, while others transmit data to an external system for storage and analysis.
- *Integration with other systems*: If the institution plans to integrate the monitors with the HVAC or a building management system, ensure the selected devices are capable.
- *Maintenance requirements*: Some devices might require regular calibration or other maintenance to ensure accurate readings. Consider the resources available and additional training necessary for maintaining the devices.
- *Cost*: While the initial investment in purchasing the devices is a direct cost, consider that cheaper devices might not provide the necessary accuracy, reliability, or other features and may involve more indirect costs, such as time spent recalibrating the devices, more time for training, and additional maintenance costs.

Contaminant	Monitoring options
Carbon monoxide	Carbon monoxide (CO) detectors will sound an alarm if they detect a certain level of CO within a certain timeframe. These can be stand-alone devices or may be integrated with a building's security or fire alarm system.
Mold and mildew	Monitoring mold and mildew can involve visual inspection and moisture detection or the use of handheld devices. Mold tests, which involve taking air or swab samples, can also be conducted.
Total volatile organic compounds (VOCs)	VOC detectors, also known as gas detectors, can measure the levels of various VOCs. Some of these devices provide an overall VOC reading, while others can identify and quantify specific compounds.
Formaldehyde	Air quality monitors that can specifically detect formaldehyde work by drawing in a sample of air and passing it over a chemical test strip or sensor that changes color or electrical resistance in the presence of formaldehyde.
Radon	Radon testing kits are available for both short- and long-term testing. These kits involve collecting an air sample in a specialized container or onto a specialized material, then sending the sample to a lab for analysis. Continuous radon monitors, which can provide real-time readings of radon levels, are also available.
PM2.5 and PM10	Particulate matter (PM) detectors are used to measure these substances. These detectors work by drawing in air and using a light-scattering method to measure the amount and size of particles in the air.
Ozone	Ozone monitors work by drawing in a sample of air and detecting the presence and concentration of ozone

For a comprehensive solution, multipurpose indoor air quality monitors can monitor several air quality parameters, including CO, VOCs, formaldehyde, radon, PM2.5/PM10, and ozone. Some models also include humidity and temperature sensors, as these factors can influence pollutant levels and occupant comfort.

Ongoing monitoring can also take place through professional air quality assessment services. These services may involve a more thorough analysis than what consumer-grade devices can provide, using high-grade equipment that can detect, measure and record various indoor air pollutants over time. They also interpret the data and provide recommendations for improving air quality.

Synthesizing Data and Diagnosing IAQ Problems

Review the U.S. EPA's IAQ Reference Guide: Indoor Air Quality Tools for Schools, Section 5 – Diagnosing IAQ Problems, to understand spatial and timing patterns of contaminant levels. Further diagnostic and action steps can be determined using the U.S. EPA's "Indoor Air Quality Problem Solving Tool."

External Resources

- U.S. EPA, "Indoor Environmental Contaminants in Schools," https://www.epa.gov/iaq-schools/indoor-environmental-contaminants-schools
- U.S. EPA, IAQ Reference Guide: Indoor Air Quality Tools for Schools, https://nepis.epa.gov/Exe/ZyPDF.cgi/P1009QR0.PDF?Dockey=P1009QR0.PDF
- U.S. EPA, "Indoor Air Quality Problem Solving Tool," https://www.epa.gov/iaq-schools/indoor-air-quality-problem-solving-tool

5.1.2.3 Indoor Air Quality Monitoring: Building Occupant Engagement

Criteria Type
Optional for all projects.

Points Available
2 points available.

Intent
To ensure procedures are in place to monitor indoor air quality and help identify opportunities to improve indoor air quality.

American Rescue Plan Funding Category
HR 1319-18 (O), HR 1319-18 (P), and HR 1319-18 (Q)

Standard Requirements

Option 1: Building Occupant Interviews
At least quarterly and during the performance period, interview building occupants in schools with frequent IAQ issues to help identify problem areas. Include the school nurse and other staff members who regularly engage with students and staff to identify any trends in health complaints.

OR

Option 2: Ongoing Feedback Solicitation
Establish an ongoing communications channel for all building occupants across the institution to identify IAQ issues, problem areas, and health complaints that may be related to indoor air quality. At least annually and during the performance period, remind building occupants of the communications channel and the submission process. During the performance period, track the messages received, follow up actions, and the status of each issue identified.

Documentation Needed
Provide the following documentation:

- compilation of all data collected from the building occupant interviews or ongoing communications channel collected during the performance,
- summary of the trends, issues, and problem areas identified, and
- status of any remediation activities planned, underway, or completed as a result of the interviews.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips

Building Occupant Interviews

When interviewing building occupants about indoor air quality (IAQ), it is important to ask questions that can help identify potential issues. Consider the following:

- *Do you notice any unusual odors in the building?* Odors can be a sign of mold growth, chemical leaks, inadequate ventilation, or other issues.
- *Do you experience symptoms such as headaches, fatigue, coughing, or eye irritation while in the building?* These can be symptoms of poor IAQ, and it is especially notable if they improve when the person leaves the building.
- *Have you noticed any signs of moisture or water damage in the building, such as water stains, mold, or a musty smell?* Signs of mold, mildew, or excessive moisture can indicate high humidity levels or water damage, both of which can significantly impact IAQ.
- *Do you feel that the temperature and humidity in the building are generally comfortable?* Issues with temperature or humidity can indicate problems with the HVAC system.
- *Do you notice any dust accumulation in the building, especially around vents or on surfaces?* Excessive dust can indicate poor filtration or other issues with the HVAC system.
- *Do you notice a difference in air quality in different parts of the building?* This can help identify specific areas or systems that are causing problems.
- *Are there any activities or times of day when air quality seems to worsen?* This could indicate specific sources of pollutants, such as cleaning activities or peak occupancy times.
- *Is the air in the building generally fresh, or does it seem stale or stuffy?* Stale or stuffy air can indicate inadequate ventilation.
- *Have you noticed any signs of pests in the building, such as droppings or damage to materials?* Pests can contribute to IAQ issues by introducing allergens and other pollutants.
- *Does the building contain any materials or equipment that you think might be affecting air quality, such as art supplies, laboratory chemicals, or photocopiers?* Certain materials can emit pollutants that affect IAQ.

Physical symptoms occupants may experience that could be related to IAQ issues within the building include the following:

- *Physical discomfort:* Symptoms such as headaches, fatigue, dizziness, nausea, or eye, nose, and throat irritation can be signs of poor air quality. These symptoms often improve when the person leaves the area with poor IAQ.
- *Respiratory issues:* Exacerbated asthma symptoms, frequent coughing, shortness of breath, or allergic reactions can be triggered by contaminants in the air.
- *General changes in health:* If many occupants notice they are getting sick more often, or certain symptoms appear only while they are in a specific room or building, this could indicate an IAQ problem.
- *Changes in cognitive function:* Poor IAQ can sometimes cause difficulty concentrating, memory issues, or a general sense of malaise or mental fatigue.
- *Skin dryness and irritation:* Dry or irritated skin can sometimes be a sign of low humidity or exposure to certain airborne substances.

Keep in mind that these physical signs can vary greatly among individuals and can sometimes be subtle or hard to link directly to IAQ. If poor IAQ is suspected based on these signs, it is important to conduct a thorough IAQ assessment, which could involve monitoring air quality parameters, inspecting the building and HVAC system, and discussing the issues further with occupants.

Ongoing Feedback Solicitation

In addition to directly speaking with building occupants, setting up an accessible communication channel can be an effective way of gathering data to inform IAQ strategy and mitigations. Implementation of an ongoing communication channel requires careful planning. Consider the following aspects when developing a system:

- *User-friendliness:* The system should be easy for all to use, regardless of their tech savviness. Simplicity in design and having tech-based and analog options are important.
- *Accessibility:* The system should be accessible to everyone, regardless of physical abilities or limitations. Consider features for visually or hearing-impaired users and stakeholders who require other accommodations.
- *Multiplatform compatibility:* The system should be accessible across various devices, such as smartphones, tablets, and computers, as well as through nontechnical options such as phone calls or an on-site collection form. Assign someone to collect and input paper submissions to ensure that the data is captured.
- *Confidentiality:* If health complaints are involved, confidentiality and privacy measures need to be in place. Users should feel comfortable knowing their personal health information is secure and will not be disclosed without their consent.
- *Timely response:* Ensure that each reported issue is acknowledged in a timely manner.
- *Feedback loop:* The system should keep users informed about the status of any issues they reported. This could be through automated updates or personal follow-ups.
- *Language options:* The system should be available in all primary languages used by occupants across buildings in the institution.
- *Clear instructions:* The process of reporting issues should be clearly defined, with step-by-step instructions or a simple tutorial. Consider troubleshooting resources or a support system for those who encounter difficulties or have additional questions.

Synthesizing Data and Diagnosing IAQ Problems

As data is collected, it needs to be processed, synthesized, and understood within the context of other issues being reported. Review the U.S. EPA's *IAQ Reference Guide: Indoor Air Quality Tools for Schools*, Section 5 – Diagnosing IAQ Problems, to understand spatial and timing patterns of complaints in identifying the most efficient way to uncover IAQ issues. Further diagnostic and action steps can be determined using the U.S. EPA's "Indoor Air Quality Problem Solving Tool."

External Resources

- U.S. EPA, *IAQ Reference Guide: Indoor Air Quality Tools for Schools,* https://nepis.epa.gov/Exe/ZyPDF.cgi/P1009QR0.PDF?Dockey=P1009QR0.PDF
- U.S. EPA, "Indoor Air Quality Problem Solving Tool," https://www.epa.gov/iaq-schools/indoor-air-quality-problem-solving-tool

5.1.3 Reporting on IAQ Issues

Criteria Type
Optional for all projects.

Points Available
3 points available.

Intent
To ensure procedures are in place to monitor indoor air quality and help identify opportunities to improve indoor air quality.

American Rescue Plan Funding Category
HR 1319-18 (O), HR 1319-18 (P), and HR 1319-18 (Q)

Standard Requirements

At least annually and during the performance period, report to each building community, at minimum, the following information:

- all IAQ issues found in the building through contaminant testing or reported by a building occupant,
- the scope and scale of the issues, and
- remediation activities planned, under way, or completed.

For K–12 institutions, in addition to the above requirements, include the following information in reports to the district community:

- a list of all IAQ issues found throughout all school buildings in the district,
- the distribution of IAQ issues by school demographics,
- areas of disproportionate IAQ effect by school demographics, and
- any relevant trends indicated by the data.

Documentation Needed
Provide evidence of reporting to the school community (e.g., email, school newsletter, website announcement, letters sent by mail) on all IAQ issues found in each building through contaminant testing or reported by a building occupant, the scope and scale of the issues, and remediation activities planned, underway, or completed.

For K-12 Institutions

Demonstrate that the reporting also contains the following information:

- the distribution of IAQ issues by school demographics,
- areas of disproportionate IAQ effect by school demographics, and
- any other relevant trends indicated by the data.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips

Creating clear, effective, and transparent communication regarding IAQ issues is crucial to maintain trust within the community and promote understanding of the steps being taken to address these issues across all buildings in the institution. The goal of such communication should be to inform, reassure, and mobilize the community in a transparent and respectful manner. It is crucial to maintain open lines of communication and provide regular updates on progress throughout the process of addressing IAQ issues.

Consider the following information when crafting communication regarding IAQ issues in buildings, causes of poor indoor air quality, and actions being undertaken to resolve them:

- *Audience understanding:* The average community member may not have in-depth knowledge about IAQ issues. Provide context and explanations for technical terms and concepts. Use clear, plain language to ensure the information is accessible to everyone. Avoid unnecessary technical jargon, and introduce acronyms when using them.
- *Specificity:* Provide specific information about the IAQ issues found, which can help avoid speculation. Include the type of issue (e.g., mold, asbestos, poor ventilation), the extent of the issue, and the location.
- *Contextualization of findings:* Explain how the issues may affect different demographics across the institution, such as those with asthma or other relevant medical conditions, young students, and those who are pregnant. Present this information in a way that respects the privacy of any vulnerable populations.
- *Action steps:* Include information on what steps are planned, underway, and completed to address each issue. This could be immediate actions, such as closing a building for repairs, as well as longer-term strategies, such as updating the HVAC system or implementing regular IAQ testing.
- *Timeframe:* Give a realistic timeline for when issues are expected to be resolved, and explain any potential disruptions this might cause (such as needing to temporarily relocate students).
- *Resources for more information:* Provide resources where parents, staff, and other community members can learn more about IAQ and its impact on health and learning.
- *Reiteration of commitment:* Reiterate the institution's commitment to providing a safe, healthy learning environment for all students. This can help reassure the community that these issues are being taken seriously.
- *Openness to questions and concerns:* Invite questions and feedback from the community. This can help build trust and ensure that everyone's concerns are being heard and addressed.

If a K–12 district discovers disparities in the maintenance and resolution of facility issues that correlate with race or socioeconomic status, it is crucial to address this issue head-on, openly, and with a commitment to rectify these inequities. Consider the following recommendations:

- *Acknowledge the disparity:* The first step is to openly acknowledge the disparity in the quality of facility maintenance across different schools. While this might be a difficult truth to face, transparency is key, and it is essential to acknowledge reality to move toward a solution.
- *Share the findings:* Communicate the findings of the IAQ trends evaluation, and explain clearly how and why the problems have disproportionately affected certain schools. Ensure that this is done in a respectful and sensitive manner.

- *Apologize:* Directly apologize to the affected communities within the communication (and as part of the remediation process) for the disparities in treatment they have received. This is a critical step toward rebuilding trust.
- *Detail the causes:* Share information about the systemic and logistical reasons for these disparities. This could include things like funding distribution, allocation of resources, or systemic biases.
- *Share an action plan:* Share a detailed plan of action for rectifying these disparities. This should include both immediate steps to resolve existing IAQ issues and longer-term strategies to ensure equal treatment of all schools in the future. Ensure that this plan prioritizes schools that have been most affected by poor maintenance.
- *Establish accountability measures:* Show that the district is taking responsibility by establishing clear measures for accountability. This could include periodic public reporting on the progress of the action plan, changes in policy, or staffing adjustments.
- *Encourage community feedback:* Invite feedback and questions from the community. Hold public forums or town hall meetings where parents, staff, and other community members can voice their concerns and suggestions.
- *Commit to ongoing communication:* Make a commitment to continue communicating openly about this issue, including regular updates on progress and any challenges that arise.

External Resources

None.

5.2 Performance Measurement, Metrics, and Data Tracking

Criteria Type
Optional for all projects.

Points Available
2 points available.

Intent
To provide a safe and comfortable learning environment for all students, while managing costs and resources strategically by using data effectively.

American Rescue Plan Funding Category
HR 1319-18 (O) and HR 1319-18 (P)

Standard Requirements

- Document the size and age of all buildings.
- Track the number of work orders written against the building inventory.
- Monitor work orders to ensure that all schools receive timely and equitable attention to maintenance and operations matters.
- Review, identify, and plan for improvements using data and trends identified through the IAQ and building system monitoring.

Documentation Needed
Provide a list of all institution buildings with the following information:

- size (square feet),
- age (years),
- most recent year the building underwent major renovation,
- number of work orders written against the building inventory during the performance period, and
- the status of all work orders.

Provide a narrative that explains the trends noticed by building size or age and how this information will influence future budget or operational decisions.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips
Once work order data has been compiled, review it for trends such as the following to determine appropriate operational changes or future budget considerations:

- *Aging buildings:* If older buildings have an increasing number of work orders or maintenance issues compared with newer ones, the institution may want to budget for or fast-track more extensive renovations to address the areas of greatest concern.
- *Work order distribution:* If certain buildings consistently have more work orders than others, this might suggest that they are being used more intensively, are in poorer condition, or have more occupants. This could lead to a decision to reallocate resources or reassess how these buildings are used.
- *Timeliness of maintenance:* If maintenance requests are not being addressed in a timely manner across or in certain segments of the institution, the institution might consider hiring more maintenance personnel, improving the maintenance processes, or distributing personnel across buildings differently.
- *Indoor air quality (IAQ) performance:* If IAQ issues are frequent and IAQ is consistently poor in certain buildings, this could indicate a problem with the HVAC system, which may necessitate more frequent inspections, supplemental air quality strategies, or more frequent engagement with building occupants.
- *Frequent issues:* If there are frequent work orders for the same issue in the same building or across multiple buildings, this may indicate a systemic problem, requiring a more substantial investment in solutions. If certain buildings or types of tasks consistently have problems, the institution may consider investing in specialized training for existing staff or hiring specialists.
- *Effectiveness of preventive maintenance:* Tracking the number and type of work orders can help evaluate the effectiveness of preventive maintenance. If buildings with robust preventive maintenance programs have fewer emergency work orders, this could indicate the value of such programs and make the business case for investing in preventive maintenance.

By analyzing these trends, an institution can make data-driven decisions that optimize its maintenance operations, improve the longevity and usability of its buildings, ensure the comfort and safety of its students and staff, and make the most effective use of its budget.

External Resources

None.

5.3 Staffing Formulas

Criteria Type
Optional for all projects.

Points Available
1 point available.

Intent
To ensure proper staffing is used to effectively promote health and safe, sustainable, and equitable facilities management practices.

American Rescue Plan Funding Category
None.

Standard Requirements

- Develop staffing formulas that take into consideration building size, occupant load, space usage, and any unique needs of student populations.
- Use staffing formulas when making staffing decisions.

Documentation Needed
Provide the staffing formulas and calculations used to allocate resources across buildings in the institution for facility operations and maintenance. Provide a narrative description of how the formula was developed and to what extent the current staff allocation is meeting the facility operations and maintenance needs of the institution.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
None.

Submittal Templates Available for Use
None.

Implementation Tips
Consider using the formula below to determine the number of full-time equivalent custodians necessary for a building. Use the average of the following factors to determine the number of cleaning custodians needed:

- number of teachers divided by 9,
- number of students divided by 300 for elementary schools and 200 for secondary schools,
- number of teaching stations divided by 12,
- building square footage divided by 16,000, and
- number of washroom fixtures divided by 35.

In addition to factors such as building size, numbers of students and teachers, and type of school, schools with stadiums, gymnasiums, and swimming pools need more workers, as do education facilities with carpeting.

To conduct a more in-depth process to determine the appropriate staffing for each building, consider the following factors in detail. Create a list of all buildings, and rank each in regard to the following parameters to make the most of existing staffing, forecast and identify specific hiring needs, and maintain basic operations during periods of understaffing:

Building Size

- *Volume of work:* Larger buildings generally have more rooms, corridors, HVAC systems, electrical systems, plumbing, and other features that need to be maintained. The larger the building, the more maintenance tasks are likely to be required.
- *Maintenance complexity:* Larger buildings often have more complex infrastructures. They might have multiple HVAC systems or more complicated plumbing and electrical systems. This increased complexity could necessitate more staff or staff with specific expertise.
- *Task time and effort:* The physical size of a building can make a difference in the amount of time it takes for maintenance personnel to complete tasks. In larger buildings, staff may spend a considerable amount of time moving from one area to another, and tasks like cleaning or checking safety equipment may take longer.
- *Emergency response:* Larger buildings may need more maintenance personnel on hand to respond quickly and effectively to an emergency such as a power outage, water leak, or safety issue. In larger buildings, it may take longer for personnel to reach the site of the problem.
- *Specialized spaces:* Buildings that have more specialized spaces, such as science labs, performance theaters, or sports facilities, may require unique maintenance skills.
- *Preventive maintenance:* Larger buildings require a robust preventive maintenance program to ensure the longevity of the systems and equipment. This often necessitates more staff to manage and execute those programs.

Occupant Load

- *Increased wear and tear:* Buildings with a higher occupant load may experience more wear and tear. High-traffic areas such as hallways, bathrooms, and common rooms need more frequent daily maintenance and potential repairs, requiring additional time from maintenance staff.
- *Sanitation needs:* More occupants typically mean greater sanitation needs. Bathrooms require more frequent cleaning. During a public health crisis, such as the COVID-19 pandemic, heightened sanitation requirements may necessitate additional staff.
- *Increased waste:* More occupants produce more waste, necessitating more custodial staff to manage waste removal and recycling efforts.
- *HVAC system maintenance:* More occupants can put an increased load on HVAC systems, leading to the need for more frequent maintenance and potential repairs.
- *Emergency response:* A larger occupant load means greater potential for accidents or emergencies requiring response by maintenance staff.
- *Space scheduling:* In buildings with high occupant loads, some spaces, such as classrooms, gyms, or meeting rooms, may be in constant use and thus may need to be cleaned or rearranged more often, requiring more maintenance and custodial staff.

Space Usage

- *Type of space:* Different types of spaces may have different maintenance needs. Classrooms, labs, kitchens, bathrooms, gyms, auditoriums, and outdoor spaces each have unique requirements for cleaning, repairs, and preventive maintenance.

- *Intensity of use:* Spaces that are used more intensively or for longer hours may require more frequent cleaning and maintenance. For example, a gymnasium that is used throughout the day for various activities may require more attention than a classroom used by a smaller number of students.
- *Specialized spaces:* Some spaces may require specialized maintenance skills. Science labs, art studios, computer labs, and kitchens, for example, may have equipment or materials that need regular, specialized maintenance.
- *Multifunction spaces:* Spaces that are used for multiple purposes may require more frequent reconfiguring or cleaning. For example, a cafeteria that is also used for assemblies may require additional custodial staff to clean and reconfigure the space regularly.
- *Frequency of use:* Spaces that are used infrequently may not require as much cleaning and maintenance. However, these spaces still need to be checked regularly for safety, cleanliness, and operational issues, so a balance between maintaining the facility properly and staffing efficiency is required.
- *Preventive maintenance:* Certain spaces may require more preventive maintenance based on usage. For instance, high-traffic areas might need more frequent preventive maintenance to avoid major repairs in the future.

Unique Student Needs

- *Special education needs:* If a school building has a significant number of students with disabilities, it may require additional or specialized maintenance personnel. For example, equipment such as wheelchair ramps, lifts, or specialized bathroom facilities need regular maintenance and monitoring for repairs.
- *Age groups:* Different age groups may have different impacts on facilities or cause more wear and tear on certain types of equipment or furniture, necessitating more frequent repairs or replacements.
- *Cultural considerations:* Schools with culturally diverse populations may need to consider specific maintenance needs. For instance, certain cultural or religious practices may require specific facilities or spaces that need a particular type of upkeep.
- *Health and allergy considerations:* Students or staff with specific health needs or allergies could require certain types of cleaning products to be used, more frequent cleaning, and monitoring for additional adverse health effects.
- *Program-specific needs:* If the school hosts unique programs, such as advanced science labs, performing arts programs, or sports academies, these may require specific maintenance personnel who are trained to manage and maintain specialized equipment or spaces.
- *Safety needs:* The safety needs of the student population can also play a role in maintenance staffing. If a school is in an area prone to certain natural disasters, or if the student population has specific safety considerations, additional maintenance staff may be needed for emergency drills, building safety checks, or disaster response.

External Resources

None.

5.4 Ongoing Training

Criteria Type
Optional for all projects.

Points Available
Up to 4 points available. Points are awarded according to the following table.

Points for Ongoing Training

Activity	Points
Annual training for cleaning personnel	2
Cross-departmental training	1
Procurement training	1

Intent
To ensure that personnel receive appropriate training to promote health, safety, sustainability, and sanitation; work in the safest, most effective manner possible; and minimize the spread of infectious disease through their work.

American Rescue Plan Funding Category
HR 1319-17 (H)

Standard Requirements

5.4.1. Annual Training for Cleaning Personnel (2 points)
For all cleaning personnel who have been on staff at least one year, provide 24 or more hours of annual training, delivered through in-service, continuing education, or professional development, to maintain knowledge of correct procedures for safety, cleaning products, equipment, techniques, and relevant environmental standards. Points are awarded as follows:

- 12 hours of training: 1 point
- 24 hours of training: 2 points

Document requests for training accommodations (e.g., materials in a non-English language, transcripts or recordings of presentations) and the accommodations provided.

Maintain records for each staff member of all training required by this standard. Records must include the following:

- topics addressed in the training,
- general outline of information covered,
- name and qualifications of the trainer, and
- dates and duration of the training.

Retain the records for all training for the duration of each staff member's employment, and for one year after departure.

Within one month of annual training, use a pass-fail test or hands-on check with equipment to ensure that personnel understand and can successfully implement skills taught during ongoing training. Maintain a record of skills testing alongside other training records.

During the performance period and at least once every two years, conduct an evaluation of training and testing materials to check for relevance and appropriateness. Update materials as needed.

5.4.2 Cross-Departmental Training (1 point)
During the performance period and at least once per year, provide teachers, nurses, food service staff, maintenance and grounds staff, transportation personnel, and other relevant school personnel training on their roles and responsibilities in supporting the plan, promoting health and safety, and minimizing the spread of infectious disease.

Document requests for training accommodations (e.g., materials in a non-English language, transcripts or recordings of presentations) and the accommodations provided.

Maintain records for each staff member of all training required by this standard. Records must include the following:

- topics addressed in the training,
- general outline of information covered,
- name and qualifications of the trainer, and
- dates and duration of the training.

Retain the records for all training for the duration of each staff member's employment, and for one year after departure.

5.4.3 Procurement Training (1 point)
During the performance period and at least once per year, provide procurement staff training on selecting environmentally preferable cleaning products, materials, and equipment; understanding third-party product certifications; and soliciting cleaning personnel's assessment of the cleaning products.

Document requests for training accommodations (e.g., materials in a non-English language, transcripts or recordings of presentations) and the accommodations provided.

Maintain records for each staff member of all training required by this standard. Records must include the following:

- topics addressed in the training,
- general outline of information covered,
- name and qualifications of the trainer, and
- dates and duration of the training.

Retain the records for all training for the duration of each staff member's employment, and for one year after departure.

Documentation Needed

For each criterion of 5.4.1–5.4.3 the institution is pursuing, provide the following:

- evidence of the training curriculum used,
- the name, role, employee type, and date of hire for each employee hired during the performance period, including contracted employees, managers, and supervisors,
- uploaded individual new employee training records for each training course completed, including the following required information:
  - employee name,
  - course title,

  - course duration (hours),
  - topics addressed in the training,
  - general outline of information covered,
  - name and qualifications of the trainer,
  - dates and duration of the training, and
  - requests for training accommodations (e.g., materials in a non-English language, transcripts from presentations or recordings) and the accommodations provided
- a narrative summary of the findings from the materials review, changes implemented as a result of the review, and the timeline for implementing issues identified but not yet incorporated.

For 5.4.1 only, also provide the following:

- records for all skills testing conducted for new employees during the performance period.

Streamlined Documentation Options for Programs Certified to Green Seal, GS-42
Programs that demonstrate an eligible scope for the Healthy Green Schools & Colleges Standard and are certified to Green Seal, GS-42, Standard for Commercial and Institutional Cleaning Services meet the required criteria and earn all points available in Sections 5.4.1 and 5.4.3.

Submittal Templates Available for Use

Sections 5.4.1–5.4.3: Training Records Template
Section 5.4.1: Skills Testing Template

Implementation Tips

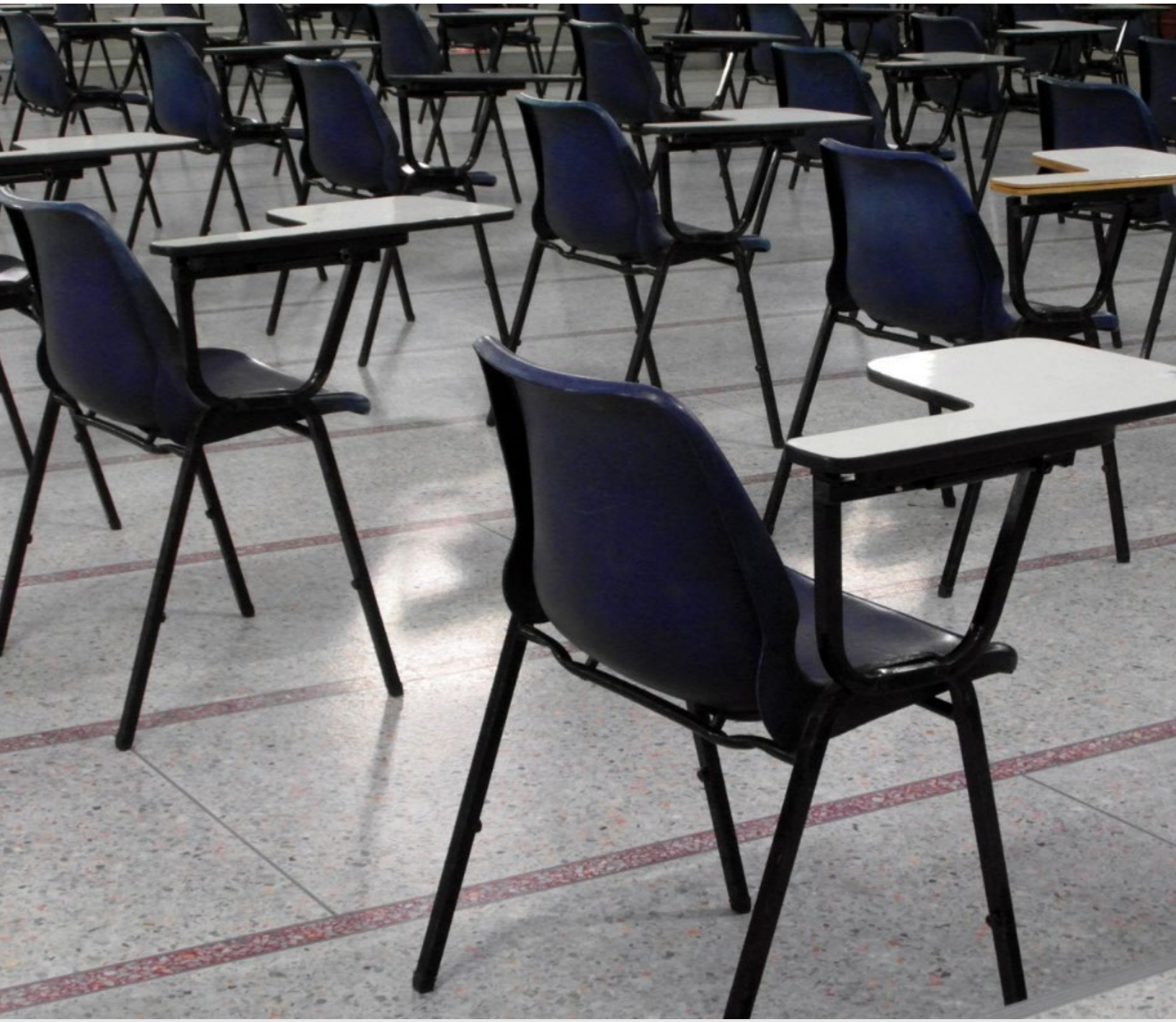
Training is essential for successfully integrating indoor air quality into the institution's Facility Operations and Maintenance Program. Seasoned staff, procurement personnel, and relevant personnel from other departments should receive ongoing training to help them understand their role in advancing the program outcomes.

Consider soliciting input from personnel in other departments regarding any questions they may have about their role in integrating indoor air quality into the institution's Facility Operations and Maintenance Program. Following are examples of potential training needs:

- Does the procurement team need more guidance on purchasing environmentally preferable products?
- Could the school nurse use more information on how poor indoor air quality might cause more students to have particular health issues?
- Do teachers need more information on acceptable products to use for just-in-time cleaning in their rooms?
- If teachers have CO2 monitors in their rooms, are they aware of the acceptable levels and what to do if CO2 readings exceed those levels?
- Do staff in other departments feel they lack any of the tools they need to be successful, and can training help fill those gaps?

Ensure that training is consistent across the institution in terms of quality of instructors, time spent with instructors, access to accommodations as requested, and follow-up as appropriate.

Provide accessible training resources that address requests for accommodations, such as training in the preferred language of the personnel, using written or visual materials, walking through tasks together, or making other accommodations to adequately meet the needs of the learner.

External Resources

- Dartmouth Center for Advanced Learning, "Creating Accessible Materials," https://dcal.dartmouth.edu/resources/teaching-methods/creating-accessible-materials