Construction Indoor Air Quality Management Plan
IEQc3.1
IAQ Plan during Construction

GOAL: To limit indoor air quality problems resulting from construction activity.

LEED certification promotes environmentally friendly buildings and sites through sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. All subcontractors will be required to assist the project team in achieving LEED certification for the project. This plan helps projects meet or exceed the Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2007, Chapter 3.

Project IAQ Overview – General Considerations

This plan relies on SMACNA’s best practices management guide in five areas of construction IAQ management: HVAC protection, source control, pathway interruption, housekeeping and scheduling.

IAQ Supervision has been assigned to Keith Lassiter whose responsibilities include: briefing all subcontractors upon arrival on the Project IAQ Management Plan, running quality control checks to ensure products on-site meet low-emitting specifications, completion of the daily checklist for compliance of each trade and responsibility for photographic record keeping.

The project team anticipates that the HVAC system will be shut down for the majority of the construction period. In the event that project conditions warrant it and the HVAC system is put into service, filters will be replaced before beginning construction activities (MERV 8), upon completion of construction activities (prior to building flush-out) (MERV 8), and prior to occupancy (MERV 13). The building will undergo a complete flush-out prior to occupancy. A minimum two-week flush-out with new filter media with 100% outside air intake after construction ends and before occupancy will be conducted.
The project team will use plastic sheeting, portable fans and a mechanical ventilation strategy (where applicable) to prevent dust and fumes from contaminating other parts of the building through hallways, doors, windows, and the ventilation system. Even when the building is unoccupied, these ventilation and contamination strategies should be in place.

During periods of construction activity, heightened housekeeping practices are necessary not only in the immediate construction area, but throughout the rest of the building.

The IAQ Supervisor will instruct workers leaving construction activity areas to ensure that dust and fibers are not carried on their clothes, shoes or equipment when moving to other areas of the building. Use walk-off mats, removable coveralls and wipe down equipment before exiting the work area.

The project team has considered the effects of construction on ventilation and mixing of air in rooms. During construction, do not cut off a room from its supply of outside air, enclose a pollutant source in a room with inadequate exhaust or supply air or otherwise prevent adequate air movement throughout the space.

The project specifications stipulate the use of products with no and low VOC content where possible. Should new products be employed with VOC content, the project will provide for and minimize off-gassing of those products. Adequate time will be allowed for off-gassing odors or any other irritants to have been eliminated from the air. Examples of such products are: adhesives, sealants, paint, composite wood furniture, cubicle dividers, carpeting and vinyl flooring.

**HVAC Protection during Construction**

Protect all HVAC equipment and ductwork from both dust and odors. Do not use the HVAC equipment during construction except in extreme situations and without proper planning.

The HVAC equipment shall be monitored and clean filters will be installed frequently by the HVAC contractor. The HVAC equipment shall only be used if it is jointly determined by the IAQ Manager and the HVAC contractor that the HVAC system must be operated during construction.

The HVAC system shall be shut down during the heaviest periods of construction to avoid dust and odors from entering the system and being released throughout the building. Filtration media will be replaced with new materials at the end of construction, prior to occupancy. MERV ratings of filters used during construction will meet LEED IAQ credit requirements but shall, at a minimum, be MERV 8 during construction and MERV 13 at project turnover.
The ductwork brought on-site will be protected and enclosed prior to being delivered to the job site. Construction employees are to keep all supply, return and exhaust ductwork free of dust, dirt, mold and air-borne contaminants.

All open ends of installed supply, return, exhaust ductwork or return air shaft openings are to be sealed by the HVAC contractor with plastic material to prevent contamination, until start-up or testing/operation of the system. When the air distribution systems are operating during construction, temporary filtration media will be installed on all return air ductwork openings and will be checked and/or replaced during construction as necessary, at least weekly, by the HVAC contractor.

The supply air side of the HVAC system is to be kept clean. When the HVAC system is off, all duct openings and grilles, registers and diffusers are to be covered, inspected and cleaned as necessary. During start-up, it will be common for some dirt to be discharged, however if it is a considerable amount of debris, the filters are to be changed until proper indoor air quality is restored.

The return air side of the HVAC system is to be kept leak-free. When the HVAC system is off, the HVAC equipment and return air duct shall be checked for leaks and all needed repairs made promptly.

Ductwork and/or insulation, which contains moisture or is found to be wet, shall not be installed. Installed ductwork and/or insulation which are wet are to be removed and replaced with new.

All Variable Air Volume (VAV) and Fan Terminal Units (FTU) boxes are to be wrapped in plastic and covered completed while in storage and while installed until such time as to be placed in service.

Do not use Mechanical Rooms or HVAC Equipment for construction storage.

All condensate drain flows from mechanical equipment are to be constantly monitored for proper flow and blockage prevention.

For projects with special minimum or maximum indoor humidity level requirements for proper preparation or installation environments for millwork, casework, wood finishes and furnishings, etc., the IAQ Manager, in conjunction with the installing subcontractor, shall plan procedures to achieve and maintain the appropriate humidity levels.
Source Control

Construction materials such as paints, solvents, adhesives, caulk, etc. will not be stored in any mechanical or air-mixing room to eliminate the risk of product off gases being absorbed by other materials or being distributed through the ventilation system.

Materials have been specified for this project that have no or low-VOC profiles to include adhesives, sealants, paints, coatings, flooring, composite woods, furniture, cubicle systems, ceiling systems and cleaning products.

Combustion based construction equipment used in the interior of the building will be exhausted directly to the outside using long-snake exhaust pipes through window and door openings.

Products and Materials

The IAQ Manager shall review all finish materials, such as paints, stains, carpet, composite wood, ceramic tiles, adhesives and sealants to be used on or brought to the job—site. The IAQ Manager shall ensure that all products and materials have low toxicity levels or preferably, none at all, if alternate products and materials are available.

All finish materials that are applied off-site and brought on-site for installation shall be reviewed and evaluated for off-gassing potential.

All finish products and materials shall be stored on-site for a minimum period of time. The designated storage area shall be isolated from the construction clean area and shall be ventilated to the exterior. All finish products and materials shall be covered or contained prior to installation and after installation as much as possible, along with all waste material be the installing subcontractor.

Mechanical rooms and air handling equipment areas are not to be used as on-site storage areas for construction products and materials (or waste).

Construction activities will be inspected for visible moisture when installing drywall by the installing subcontractor. Upon identification of moisture in drywall by the installing subcontractor and with the assistance of the IAQ Manager, the source of the moisture is to be verified and eliminated and specific measures to remediate will be followed.

No materials will be covered up which are wet or can absorb moisture.

Wall vapor barriers will be checked constantly by the installing subcontractor for proper installation.
Equipment

The IAQ Manager shall monitor all equipment brought on-site and shall evaluate the equipment for compliance with the Construction IAQ Management Plan. The use of different equipment during construction can negatively affect the IAQ during construction. The IAQ Manager shall require alternative fuel equipment whenever possible. Examples of this equipment would be fork-lifts, man-lifts, “salamander” heaters, etc. Converting this equipment from fossil fuel equipment to electric powered equipment, when feasible, will improve air quality. A good faith effort will be made to utilize electric equipment in lieu of fossil fuel powered equipment to limit combustion discharge into the occupied area of the construction project.

The use of temporary, portable, fossil fuel fired heating equipment that directly vents into the occupied space should be minimized.

All fossil fuel powered vehicles, tools, heaters, etc. shall not be used in close proximity to any outside air intakes and entrance/exit pathways and shall be turned off when not in use.

Pathway Interruption

SMACNA best practices will be employed to include:

- Temporary barriers such as plastic sheeting to cordon off work areas in which dust-producing activities (such as drywall sanding) or off-gassing are occurring
- Use of self-contained, dust-less apparatuses where practicable
- Isolation of construction dust produced by activities such as drywall and wood cutting

Objectionable odors created as a part of the construction process such as installation of epoxy flooring, etc. will be properly identified during the initial IAQ meeting.

Appropriate warning signage will be posted to notify workers of potential hazards or potential protective equipment requirements.

The exhausting of all contaminants out of the building and away from outside air intakes and entrance/exit pathways will be implemented in order to improve IAQ levels. Determination of odor control and ventilation means will be made during the initial IAQ meetings be the IAQ Manager in conjunction with the installing subcontractor. Construction areas that create a large amount of contaminants as defined by SMACNA IAQ Guidelines for Occupied Buildings under Construction and OSHA Guidelines, whether air borne dust, drywall or similar contaminants, are to be properly ventilated away from other construction activities to reduce transfer of the contaminants from one work area to another. Construction areas that create a large amount of contaminants may require isolation from the remainder of the construction areas by a
temporary barrier(s) that contain the contaminant. The containment area shall be maintained in a negative pressure environment, relative to the remainder of the building.

An alternative method to be considered, as is applicable, is the local recirculation of air by filtering out all odors and dust. The filters are to be properly selected for the products and materials to be controlled. This method shall not be employed during the use or application of any Volatile Organic Compounds (VOC) or any VOC contaminated environment. All VOC contaminated environments shall be exhausted to the exterior utilizing 100% outside air. Air from other areas of the building shall not be used as make-up air for the VOC contaminated environments. Temporary exhaust fans directed to the building exterior and/or temporary re-circulating and/or filtering fans are to be provided by the installing subcontractor to the satisfaction of the IAQ Manager.

All project equipment and material staging areas will be located away from the critical air flow pathways.

All porous building materials should be protected from exposure to moisture and stored in a clean area prior to installation.

**Housekeeping**

A clean project contributes to project safety. General cleaning will be on-going. Surfaces will be wet-wiped. All carpeting and mats will be vacuumed with high-efficiency vacuums. Building system components, including those in the ventilation system, will be cleaned. Used MERV filters will be disposed of and replaced as scheduled. Any accumulation of water inside the building will be promptly removed and porous materials, such as insulation and ceiling tiles, will protected from exposure to moisture. Frequent communication to workers will build compliance.

Cleaning activities shall be continuous in order to control contaminants in the building spaces during construction and prior to occupancy.

Construction waste, debris and trash are to be removed during all phases of construction daily. All lunch litter will be placed into trash receptacles. Food and drinks, other than drinking water, will not be allowed in the building interior. Tobacco smoking or chewing will not be allowed in the building interior under any circumstances.

Construction-generated waste and debris, such as sawdust, metal shavings or filings, etc. are to be swept up and disposed of promptly. If this strategy does not provide a clean workspace, then other strategies such as vacuum cleaners with high efficiency particulate filters and an increase in cleaning frequency, along with the use of wetting agents, shall be employed.
Loose fill insulation media material installation is to be controlled and monitored by the IAQ Manager to prevent fiber discharge or particle release.

Before sealing up a vertical shaft or chase, the bottom area and all surfaces associated with shaft construction are to be cleaned of trash, dust, dirt and debris by the shaft construction contractor.

Each construction man-way or foot-entrance location will have pedi-mats or clean gravel to limit foot traffic dirt from migrating into the building.

Each construction vehicle or equipment entrance location (for equipment such as front end loaders, forklifts or wheel barrows) will have rough surface mats to clean vehicle wheels without impeding vehicle traffic (e.g., pushing a wheel barrow through a bed of clean gravel).

**Scheduling**

Installation has been scheduled to prevent construction pollution of absorptive materials. For example, painting and flooring installation will occur before delivery and installation of ceiling tile to avoid off-gases being absorbed by the ceiling tile. These considerations have been built into the project schedule.

During the initial IAQ Meeting, all sources of contaminants and their associated activities shall be identified and a detailed sequence of activities shall be created in order to minimize the impact on indoor air quality.

Important characteristics to be considered in the creation of the schedule are:

- High pollution potential – these activities may require scheduling during typical off-hours, i.e. nights or weekends
- Flush out time – as the flush out procedure is time dependent, this required time should be included in the project schedule

**Inspection and Maintenance**

Upon completion of the flush out procedure, the HVAC equipment shall be inspected and, if required, cleaned and returned to like-new condition. Final filters, MERV 13 or greater, shall be replaced. Time shall be included in the Project Schedule for these activities.

**Documentation and Communication**

The IAQ Supervisor is tasked with the management and documentation of the IAQ Management Plan During Construction. A checklist will be employed to note compliance and document activities. Each subcontractor and crew will be briefed upon arriving to the project.
site about the IAQ requirements of the project. The IAQ plan will also be reviewed with the project team and subcontractors at weekly project meetings. The IAQ Supervisor will routinely inspect all products for compliance to the project specifications. All construction activity will be documented photographically on a weekly basis and a photo log will be maintained. Subcontractors are required to submit LEED data sheets (see attached) for each product supplied. Subcontractors are responsible for conveying the IAQ requirements to their crews. The Project Manager is responsible for producing a monthly Progress Report for review by Senior Project Management and the LEED Consultant. Signs are posted in several locations around the project site and in the job-site trailer to remind everyone of the IAQ requirements.