

Groton Public Schools Covid-19 School Opening Support and Guidance Commissioning Checklists

Administrative Office Building Groton, CT

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Executive Summary

Disclaimer: This list of recommendations is intended to help mitigate the potential spread of viruses and/or other biological hazards. Our recommendations reflect current best practices of the HVAC industry. There is no guarantee that any of these recommendations can or will prevent any occurrences of Covid-19 or any other airborne hazards.

Summary of Observations

Fuss & O'Neill, Inc. (F&O) visited the Groton Public Schools Administrative Building on August 6th, 2020 to review the items contained within these checklists. The following deficiencies were noted during the walk-down and through conversations with facility personnel. This list does not exclude other items in the checklists that follow. All items should be reviewed with school staff and facility personnel for inclusion in potential Covid-19-related renovation efforts.

System Summary for the Administrative Offices:

- HVAC systems include the following:
 - Cooling is primarily provided by ductless split conditioning units and window/wall mounted air conditioners.
 - Work areas and offices utilize a central exhaust system consisting of one return in each classroom or office ducted to a central exhaust fan. This exhaust system is always running.
 - Unit ventilators provide outdoor air and heating to rooms. Some of these units were found to be operating while others remained off.
 - Most rooms have operable windows.

General:

- The Administrative Building has an auditorium area being used for supply storage which contains destratification fans which must remain off.

Controls:

- Rooms in these facilities are independently controlled on the AC units and Unit Ventilators.
- Central Exhaust Fans are continuously operating.

Air Distribution & Filtration:

- Some exhaust grates were blocked by furniture. Ensure these areas are clear and the screen is free of debris.
- Multiple blocked unit ventilators were noted throughout the building. These areas should be cleared and marked to remain clear. Units should be assessed to confirm proper operation and perform maintenance on filters.
- Due to limited outside air being brought into the space there may be concerns for indoor air quality.

HVAC Systems:

- Most Gymnasiums, Cafeterias, and other large areas are now converted to serve other purposes.
- There is a central exhaust system for all office and work space areas.

Domestic Water:

- Nothing to report.

Summary of Recommendations:

General

- Incorporate policies to support reopening; See Checklist 1.

Controls:

- Run exhaust fans continuously during occupied mode.
- Space conditions should adhere to recommended by ASHRAE in Checklist 3 to limit mold as well as virus transmission and survivability.
- Alter ventilation schedule per Checklist 3.

Air Distribution & Filtration:

- Clean and inspect all Unit Ventilators including the filters.

Domestic Water Systems:

- Ensure plumbing traps are full of water to prevent sewer gases and viruses from entering inhabited spaces.
- Ensure all domestic water heaters are installed and maintained properly and have proper flues that limit corrosive flue gas from entering the interstitial space.

Checklist 1: General District Recommendations

Determining Building Readiness

- Create a District or Campus Health and Safety Committee that includes all stakeholders (environmental health and safety, administration, education staff, operations staff, local healthcare providers, etc.)
- Develop policies for staff and contractor PPE requirements for completing work at facilities that follow local authority, CDC, and OSHA guidelines for the proper use of Personal Protective Equipment (PPE).
- Where semi-annual / annual scheduled maintenance on the equipment can be performed safely, do not defer this maintenance cycle.
- Where worker safety could be at risk, defer semi-annual/ annual maintenance on the equipment up to 60 days until worker safety can be accomplished.
- During the summer period before occupancy, perform Checklist No. 1: Tasks to Be Completed Prior to Start of Classes
- Operate all HVAC and Exhaust Systems in occupied mode for a minimum of one week prior to occupancy.
- During the week prior to occupancy, perform Checklist No. 2: HVAC Systems Startup Checklist.
- Discuss with the entire facilities team and school administrators the general principles about what changes are planned to the usual ventilation system operation for the coming year.
- Develop a system for building users to notify the facilities department if the building needs to be open longer than usual so that the fan schedule can be altered for that day.
- Develop standards for frequency of filter replacement and type of filters to be utilized. When feasible, filters may be cleaned by lightly spraying with a 10% bleach solution or other appropriate disinfectant, approved for use against SARS-CoV-2, before removal. Filters may be disposed of in regular trash after disinfecting.
- Do not allow teachers or other staff to make changes to ventilation system controls in their respective rooms. Explain to them the importance of keeping fans running all day. If temperature, noise, or other issues exist in certain areas, encourage staff to discuss the problem with the facilities department to try to identify a suitable fix that does not negatively impact ventilation.

Checklist 2: Facility Checks Prior to Start of Classes

General

- Review existing Indoor Air Quality issues, if any, records of documents and investigate current status of complaint and address any deficiencies identified, if possible.
- General inspection of spaces to identify any potential concerns for water leaks or mold growth that could negatively impact occupant health.
- Check all lavatories and sinks for correct operation and ensure soap dispensers are functional and adequate supply of soap is available to allow for proper handwashing.

HVAC System Startup

Commissioning

- Commission building mechanical systems for full occupancy.
- Operate HVAC to maintain human comfort while reducing potential spread of pathogens and mold growth. Maintain temperatures between 68-78 degrees F dry bulb and 40-60% relative humidity per ASHRAE guidelines. Installation of portable humidifiers and/or electric heaters is acceptable to maintain these conditions while maximizing outdoor air.

Filtration

- Verify filters are installed correctly.

Space Air Flow Patterns

- Ensure airflow patterns in classrooms are adjusted to minimize occupant exposure to particles.

Domestic Water System

- Systems should be flushed to remove potential contaminants from stagnant equipment, piping, fixtures, etc.
 - Domestic cold-water systems should be flushed with all fixtures on a branch of piping opened simultaneously for a minimum period of five minutes – preferred approach is to have all building fixtures open at same time if possible – if not, care should be taken to ensure flow rate is adequate to flush piping mains and branch lines.
 - Domestic hot water systems should be flushed with all fixtures on a branch of piping opened simultaneously for a minimum period of 15 minutes – preferred approach is to have all building fixtures open at same time if possible – if not, care should be taken to ensure flow rate is adequate to flush piping mains and branch lines.
- All plumbing traps should contain water to avoid transmission through dry traps.

Checklist 3: HVAC System Operation during the Academic Year

Scheduling

- Change the start of operation hours (e.g. change 6 am start to 4 am). The goal is to create a thermal lag and minimize HVAC operations when occupied

Ventilation

- Perform a daily air flush prior to occupancy: Mechanical Systems should be operated in occupied mode (including normal or peak outside air rate introduced to each space) for minimum period of 2 hours prior to occupants re-entering building and 1 hour after occupancy with the dampers fully open to maximize fresh air intake. Where possible, this controls sequence should be programmed into the building occupancy schedule.
- Keep the ventilation system running during all hours that the building is occupied.
- Keep bathroom exhaust systems running all day, every day (24 hours a day/7 days a week).
- Where temperature allows and no other means of ventilation is available, windows should be opened to allow for some minimum level of fresh air exchange into occupied spaces.
- Separate, free-standing air cleaner or HEPA filter units are not recommended for individual classrooms. These units are highly variable in their effectiveness in larger open spaces such as classrooms and in general, any effect on indoor air quality is likely insignificant and greatly outweighed by the additional costs to school systems.

Exhaust Fans

- Turn on 24/7, use DOAU as makeup air, if available.
 - Only applies to school days, not weekend operations. The goal is to flush the building with OA and positively pressurize the building.

Local HVAC Units

Includes Fan Coils, VRF, and Radiators/Baseboards

- Increase Filtration to the maximum MERV suggested by the manufacturer.
- Compensate for loss of capacity in winter with portable plug in electric heaters or higher discharge temps.
- Hydronic baseboard can remain operational.
- Install Portable humidifiers in each classroom for local humidity control.

Domestic Systems

- Keep plumbing traps full of water to avoid transmission through dry traps.

Appendix A: Routine HVAC Preventative Maintenance Items

Daily Maintenance

Cleaning

- All areas that have been occupied after previous cleaning efforts should be re-cleaned.
- All restrooms should be thoroughly cleaned.
- All food preparation areas should be thoroughly cleaned.
- Any spaces not previously cleaned should have all accessible surfaces properly cleaned.

Monthly Maintenance

Boilers

- For systems with Steam Boilers, develop a schedule that provides minimum supervision on-site.
- Perform chemical testing of system water. Verify water treatment target levels are being maintained.
- For systems using fuel oil:
 - Check fuel pump for proper operation.
 - Inspect fuel filter; clean and verify proper operation.
- For systems using natural gas:
 - Check gas pressure, gas valve operation, and combustion fan operation.
 - Check for evidence of leakage of fuel supply, heat transfer fluid, and flue gas.
- Verify proper operation of safety devices per manufacturer's recommendations.

Chilled Water, Hot Water and Condenser Water Systems

- Perform chemical testing of system water. Verify water treatment target levels are being maintained.
- Check for proper fluid flow and for fluid leaks. If necessary, vent air from system high points and verify backflow preventers and pressure regulating valves on makeup water lines are functioning properly.
- Check the control system and devices for evidence of improper operation.
- Verify control valves operate properly.
- Check variable-frequency drives for proper operation.
- Check expansion tanks and bladder type compression tanks have not become waterlogged.

Air Cooled Chillers

- Check the refrigerant system for evidence of leaks.
- Check and clean fan blades and fan housing.
- Check coil fins and check for damage.
- Check for proper evaporator fluid flow and for fluid leaks.

Unitary and Single Zone Equipment: Fan Coil Units

- Check for particulate accumulation on filters, replace filter as needed.
- Check the control system and devices for evidence of improper operation.
- Verify control dampers operate properly.

Annual Maintenance

Pumps

- Inspect pumps and associated electrical components for proper operation.
- Check variable-frequency drive for proper operation.
- Check the control system and devices for evidence of improper operation.