

**Asbestos Abatement & Mold Remediation Work Plan
Vermont Veterans Home - Bennington, Vermont
Basement - Food, Custodial and Miscellaneous Storage Areas**

The Mold Abatement/Mold Remediation Contractor (hereinafter referred to as "Contractor") is responsible to furnish all labor, equipment, materials, services, insurance, permits, certificates, etc., for the proper removal and/or remediation of affected building materials, surfaces, and objects detailed herein at the Vermont Veterans Home in Bennington, Vermont (hereinafter referred to as the "Work").

Asbestos Abatement

The asbestos abatement work includes removal of vinyl floor tile & associated black mastic along with glovebag removal of mudded joint packings. Work practices for asbestos abatement shall be conducted in strict accordance with applicable local, state and federal requirements. This includes, but does not limit:

- ◆ Vermont Statute Annotated, Title 18, Chapter 26, Vermont Regulations for Asbestos Control "VRAC" as amended - State of Vermont - **Section 6** (exemptions for specific non-friable asbestos materials) and **Section 2.5** (small scale short duration activity requirements).
- ◆ Title 29, Code of Federal Regulations 1926-1101 - Construction Industry Standard for Asbestos - **OSHA Class II and Class III Asbestos Work**
- ◆ Title 40, Code of Federal Regulations Part 61, Subpart M - National Emission Standards for Hazardous Air Pollutants "Asbestos NESHAP" - U.S. EPA (**applicable only if flooring materials are made friable during removal activities**).

Refer to Drawing AA-1A for specific locations, subject materials and abatement notes.

Mold Remediation

Work practices for mold remediation/cleaning are to be performed utilizing a combination of recognized standards; which includes, but does not limit, the following:

- AIHA, "Recognition, Evaluation, and control of Indoor Mold" 2008;
- ACGIH, "Bioaerosols Assessment and Control," 1999;
- USEPA "Mold Remediation in Schools and Commercial Buildings," March 2001;
- OSHA - A Brief Guide to Mold in the Workplace;
- IICRC, "S520 Standard and Reference Guide for Professional Mold Remediation," 2008;

NOTE: Application of the microbial paint shall be conducted by a Vermont licensed pesticide applicator in accordance with the Vermont Department of Agriculture.

In addition to the recognized microbial standards, the following work practices are provided:

- Post microbial hazard warning signs at all entrances leading to the affected basement work areas.
- **Make sure all HVAC systems running through or operating in the affected areas are shut down and tagged out.**
- Workers are to don appropriate personal protective equipment when entering the work areas.
- Mobilize negative pressure filtration units (NPFU - also referred to as AFDs and NAMs) into the basement area (as shown on the drawings). Hook up the exhaust tubing and vent to outdoors; then energize the machines. Provide a sufficient quantity of NPFUs to provide a minimum of four air changes per hour. The Contractor is responsible for providing sufficient quantity of NPFUs that will create negative pressure and change the air every 15 minutes (approximately -0.02 inches of water column +/-).
- A worker decontamination/change station should be placed as shown on Drawing MR-1A.
- Place poly barriers over all doorways leading to the affected areas. Secure with duct tape or equivalent. **The Contractor is responsible for removing all tape residue from surfaces where poly was secured.**
- Once negative pressure is established, clean and relocate all movable items from the basement. Once cleaned, turn the items over to the Owner for temporary storage or disposal (preferably outside the building).
- Pre-clean and protect non-moveable items/objects with poly barriers. The barriers shall be sufficiently secured to prevent paint overspray from getting on the items. Care shall be taken to avoid getting paint in/on any of the mechanical systems.
- Once the above activities have been completed, begin remediation work.
- Where microbial paint is to be applied, the Contractor shall apply Foster® Interior Defense 40-50 Mold Resistant Coating or equivalent and apply with an airless sprayer. Coverage rates shall comply with manufacturer's recommendations.
- For all metal doors and frames, stair railings and stair treads (including concrete stairs), surface prep for finish painting shall include removal of rust that is present by wire brushing or sanding to bare metal. **Prime bare metal with a primer suitable for the application of the microbial paint per manufacturer's recommendations.**

Electrical Shop

- Clean access panel as shown, then prep and paint.
- Remove radiation cover(s) and thoroughly clean dirt dust and debris from the fins. Clean covers and replace.
- Carefully remove all wallboard from the floor up to 45 inches (electrical shop and corridor walls as shown on Drawing MR-1A).
- Check the partition studs and floor plates for visible mold growth (if wood studs). If mold is present, damp wipe the moldy surfaces, then lightly sand the affected components.
- Clean, prep, prime and paint metal doors.
- Conduct a cursory cleaning of wall and floor surfaces throughout the area.
- Place poly drop cloths on the floors to protect from paint overspray and drips.
- Once all wall surfaces are clean and dry, apply microbial paint to remaining wallboard, studs and floor plates. **Do not paint the ceramic wall tile.**
- After work is completed, prepare the area for post remediation verification (PRV) visual inspections and air sampling (provided by Owner).

Medical/Custodial Storage Area

- Remove small section of ceiling mold growth in the General Storage caged area.
- Remove bottom section of fiberglass insulation on fresh air intake plenum.
- Clean, prep, prime and paint metal doors.
- Conduct a cursory cleaning of wall and floor surfaces throughout the area.
- Place poly drop cloths on the floors to protect from paint over spray and drips.
- Once all surfaces are clean and dry, apply microbial paint to all ceilings and cage floor plates.
- Apply microbial paint to walls where indicated on Drawing MR-1A.
- After work is completed, prepare the area for PRV visual inspections and air sampling.

General Storage Area

- Remove all water stained and/or moldy pipe insulation from room.
- Conduct a cursory cleaning of wall and floor surfaces throughout the area.
- Clean, prep, prime and paint metal doors.
- Place poly drop cloths on the floors to protect from paint overspray and drips.
- Once all surfaces are clean and dry, apply microbial paint to all walls.
- After work is completed, prepare the area for PRV visual inspections and air sampling.

Lobby, Corridor and Dehu Mech Room Areas

- Remove all water stained and/or moldy suspended ceiling tiles from the areas (approximately 12).
- Carefully remove support column wallboard from the floor up to 45 inches (where shown on Drawing MR-1A).
- Carefully remove and dispose of all fiberglass wall panels. Where gypsum board is located behind the fiberglass panels, carefully remove the wallboard from the floor up to 45 inches.
- A section of dehumidification (dehu) duct will be removed from the dehu mechanical room (by others) for cleaning and painting by the Contractor. This duct will be reinstalled by others.
- Remove dehu intake grill and thoroughly clean, paint and turn over to Owner.
- Clean, prep, prime and paint metal doors. This includes the elevator doors.
- Conduct a cursory cleaning of wall and floor surfaces throughout the area.
- Place poly drop cloths on the floors to protect from paint overspray and drips.
- Once all surfaces are clean and dry, apply microbial paint to all walls.
- After work is completed, prepare the area for PRV visual inspections and air sampling.

Pump Room

- Remove all suspended ceiling tiles, ceiling grid and pipe insulation from the room.
- Temporarily support lights and smoke/heat sensors or other ceiling components as necessary.
- Clean, prep, prime and paint metal doors.
- Conduct a cursory cleaning of wall and floor surfaces throughout the area.
- Place poly drop cloths on the floors to protect from paint overspray and drips.
- Once all surfaces are clean and dry, apply microbial paint to all walls.
- Care shall be taken to avoid getting paint in/on any of the mechanical pumps.
- After work is completed, prepare the area for PRV visual inspections and air sampling.

Grease Trap Room

- Clean, prep, prime and paint metal doors.
- Conduct a cursory cleaning of wall and floor surfaces throughout the area.
- Place poly drop cloths on the floors to protect from paint overspray and drips.
- Once all surfaces are clean, prepped and dry, apply microbial paint to all walls.
- Care shall be taken to avoid getting paint in/on the grease trap.
- After work is completed, prepare the area for PRV visual inspections and air sampling.

East Stairway

- Remove wallboard on the east wall at the bottom of the stairs from the floor up, to a minimum of 2 feet (where shown on Drawing MR-1A).
- Clean, prep, prime and paint metal doors, hand rails and stairs.
- Conduct a cursory cleaning of wall and floor surfaces throughout the area.
- Place poly drop cloths on the floor and stairs to protect from paint overspray and drips.
- Once all surfaces are clean, prepped and dry, apply microbial paint to all walls, metal doors, hand rails and stairs.
- After work is completed, prepare the area for PRV visual inspections and air sampling.

Conveyor Area/Stairwell

- Clean, prep, prime and paint metal doors, hand rails and stairs.
- Conduct a cursory cleaning of wall and floor surfaces throughout the area.
- Place poly drop cloths on the floor and stairs to protect from paint overspray and drips.
- Once all surfaces are clean and dry, apply microbial paint to all walls, metal doors, hand rails and stairs.
- After work is completed, prepare the area for PRV visual inspections and air sampling.

GENERAL REQUIREMENTS

The following are general requirements to be employed for the remediation project:

Warning Signs

Microbial warning signs shall be displayed at all approaches to the work areas (i.e. all doorways leading into the facility). If preferred, signs can be placed inside the facility as long as any unauthorized person entering the building can see the sign immediately upon opening the door(s) leading into the remediation area.

Worker Decontamination Enclosure System

A worker decontamination enclosure system consisting of a clean room and equipment/dirty room, separated from each other and from the work area by airlocks, accessible through doorways protected with at least two (2) overlapping polyethylene sheets shall be provided. Except for the doorways, the worker decontamination enclosure system shall be airtight. All entry and exit from the work area shall be through this system. The sequence of entering and exiting the worker decontamination enclosure system shall be as follows:

- A. Entry and exit - All persons shall enter and exit the work area through the worker decontamination enclosure system.
- B. Knowledge of procedures - All persons, before entering the work area shall read and be familiar with all posted regulations, personal protection requirements, including work area entry and exit procedures and emergency procedures.
- C. Personal Protective Equipment - All persons shall proceed first to the clean room, remove all street clothing, store these items in clean, sealable plastic bags or lockers and don protective clothing. All authorized visitors shall also don NIOSH-approved respiratory protection. Clean respirators and protective clothing shall be utilized by each authorized visitor for each separate entry into the work area. Respirators shall be inspected prior to each use and tested for proper seal using qualitative or quantitative fit checks.
- D. Removal of personal protective equipment - After the workers have finished their work, they shall remove any gross debris from their disposable work suit using a HEPA vacuum. They shall remove their disposable suit and place in waste bag, then immediately enter the equipment/dirty room. Utilizing a bucket of clean warm water, they shall wet wipe their respirator and body.
- E. Clean room/clothing - After removal of disposable suits and cleaning of respirators, all persons shall proceed to the clean room and don clean personal protective equipment if returning to the work area or street clothing if exiting the enclosure.

Critical Barriers

The work area boundaries shall be isolated from the remainder of the facility by airtight critical barriers attached securely in place from inside the work area. All openings between the work area and all other areas, including but not limited to: windows, doorways, corridor entrances, drains, radiators, grates, skylights, etc., shall be sealed airtight with a minimum of one layer of 6 mil. polyethylene sheeting. All HVAC systems, including but not limited to: ducts, diffusers, grills, etc., shall be sealed airtight with a minimum of one layer of 6 mil. polyethylene sheeting. Critical barriers shall be installed in a manner which prevents mold spores from migrating outside the containment area boundaries.

Negative Pressure Enclosure

NPFU's with HEPA filtration shall be provided in sufficient quantities to provide an air change in the work area(s) every 15 minutes. The filtered NPFU exhaust shall be vented to the outside of the facility, configured in such a manner to prevent the exhaust air from being entrained back into the facility. Before beginning work within the enclosure, and at the beginning of each shift, the negative pressure enclosure shall be inspected for breaches. Any leaks found must be immediately sealed before further work can occur. The NPFU's shall run 24 hours a day until successful post remediation sampling and analysis have been achieved.

Personal Protective Equipment (PPE)

Any remediation work that disturbs mold and causes mold spores to become airborne increases the degree of respiratory exposure. Actions that tend to disperse mold include: breaking apart moldy porous materials such as wallboard; destructive invasive procedures to examine or remediate mold growth in a wall cavity; removal of contaminated wallpaper by stripping or peeling; using fans to dry items or ventilate areas.

The primary function of personal protective equipment is to prevent the inhalation and ingestion of mold and mold spores and to avoid mold contact with the skin or eyes. The following paragraphs discuss the various types of PPE that shall be utilized during remediation activities.

Skin and Eye Protection

Gloves protect the skin from contact with mold, as well as from potentially irritating cleaning solutions. Long gloves that extend to the middle of the forearm are recommended. The glove material shall be selected based on the type of substance/chemical being handled. If a biocide such as chlorine bleach or a strong cleaning solution is being utilized, Contactor shall select gloves made from natural rubber, neoprene, nitrile, polyurethane, or PVC. If you are using a mild detergent or plain water, ordinary household rubber gloves may be used. For protection of worker's eyes, properly fitted goggles or a full face respirator shall be utilized. Goggles must be designed to prevent the entry of dust and small particles. Safety glasses or goggles with open vent holes are not appropriate in mold remediation.

Respiratory Protection

Respirators protect cleanup workers from inhaling airborne mold spores, contaminated dust, and other particulates that are released during the remediation process. Either a half face air-purifying respirator or full face air-purifying respirator can be used. A full face respirator provides both respiratory and eye protection and is RECOMMENDED for this project. Respirators used to provide protection from mold and mold spores must be certified by the National Institute for Occupational Safety and Health (NIOSH). As specified by OSHA in 29 CFR 1910.134 individuals who use respirators must be properly trained, have medical clearance, and be properly fit tested before they begin using a respirator. In addition, the use of respirators requires the employer to develop and implement a written respiratory protection program, with worksite-specific procedures and elements. The Contractor's written respiratory program shall be present and available at the Work Site at all times. All of the Contractor's personnel shall strictly abide by this program. At a minimum, the Respiratory Protection Program shall include:

- ◇ medical monitoring program
- ◇ selection of respirators
- ◇ fitting of respirators
- ◇ qualitative and/or quantitative fit check requirements

Protective Clothing

While conducting remediation work, individuals will likely encounter hazardous biological agents as well as chemical and physical hazards. Consequently, appropriate personal protective clothing (i.e., disposable Tyvek® suits or similar) is required to minimize cross-contamination between work areas and clean areas, to prevent the transfer and spread of mold and other contaminants to street clothing, and to eliminate skin contact with mold and potential chemical

exposures. Disposable PPE shall be discarded after each use. They shall be placed into impermeable bags, and discarded. Appropriate precautions and protective equipment for biocide/chemical applicators shall be selected based on the product manufacturer's warnings and recommendations (e.g., goggles or face shield, aprons or other protective clothing, gloves, and respiratory protection).

Removal of Affected Building Materials

Where called for in the Work Plan, building materials scheduled for removal shall be removed intact where possible. All fasteners shall be removed from the component (i.e. sheetrock screws, nails, etc). The back sides of the removed components shall be inspected for signs of visible water staining and/or mold growth. The removed components shall be wrapped air tight with one layer of 6 mil. polyethylene (or contractor quality polyethylene bags) and sealed with industrial grade duct tape. The wrapped/bagged waste shall then be removed from the Work Area and discarded.

Disposal of Waste

The Contractor is responsible for containerizing and disposing of all waste generated by the remediation activities. All waste generated by the Work shall be stored NO CLOSER than 20 feet from the facility to prevent re-entrainment of mold spores into the facility. The waste materials can be disposed of as typical construction waste.

Cleaning/Treatment Methods

The purpose of mold remediation is to remove moldy and contaminated materials and to prevent human exposure and further damage to building materials and furnishings. A variety of cleanup methods are available for remediating damage to building materials and furnishings caused by moisture control problems and mold growth. The specific method or group of methods used will depend on the type of material affected.

It is important to perform cleaning in a methodical fashion. The workers shall clean from the highest location in the work areas, working their way down to the floor area. Once on the floor, the workers shall work from the farthest side of a room and clean towards the negative pressure filtration unit(s). In all cases, the workers shall keep the cleaning activity between their breathing zone and the negative pressure filtration units.

The Contractor shall employ one and/or a combination of the following cleaning methods:

Wet Vacuuming

Wet vacuums are vacuum cleaners designed to collect water. They can be used to remove water from floors, carpets, and hard surfaces where water has accumulated. They shall not be used to vacuum porous materials, such as gypsum board. Wet vacuums shall only be used on wet materials, as spores may be exhausted into the indoor environment if insufficient liquid is present. The tanks, hoses, and attachments of these vacuums shall be thoroughly cleaned and dried after use since mold and mold spores may adhere to equipment surfaces.

Damp Wiping

All nonporous surfaces shall be cleaned by wiping and/or scrubbing with water and a detergent solution. It is important to dry these surfaces quickly and thoroughly to avoid further mold growth.

HEPA Vacuuming

HEPA (High-Efficiency Particulate Air) vacuums shall be utilized for final cleanup of remediation areas after materials have been thoroughly cleaned, dried and contaminated materials removed. Care must be taken to assure that the filter is properly seated in the vacuum so that all the air passes through the filter. When changing the vacuum filter, the Contractor shall wear respirators, appropriate personal protective clothing, gloves, and eye protection to prevent exposure to any captured mold and other contaminants. The filter and contents of the HEPA vacuum must be disposed of in impermeable bags or containers in such a way as to prevent release of the debris.

Cursory Cleaning

Where cursory cleaning is called for, the contractor shall use a HEPA vacuum with a brush attachment and vacuum the surfaces to remove the gross/loose dirt, dust and debris. Cleaning has to be sufficient to allow microbial paint to adhere to the surface.

POST REMEDIATION VERIFICATION

Visual Inspections

Once the final cleaning has been completed and the Work area has dried, an independent qualified microbial consultant along with the Contractor's Supervisor/Competent Person will perform a visual inspection of all surfaces in the Work areas, (including Contractor's equipment). The Work area shall be free of all dust, dirt and debris. The Contractor will be required to re-clean areas where accumulated dirt, dust and debris are discovered during the visual inspection.

Final Air Sampling

The independent qualified microbial consultant will collect spore trap air samples in the same locations where pre-remediation samples were collected.

Spore Traps

The spore trap air samples will be collected onto Micro5™ Microcell spore traps or Zefon™ Air-O-Cell spore traps. Spore traps are a sampling device designed for the rapid collection and analysis of a wide range of airborne aerosols. These include fungal spores, pollen, insect parts, skin cell fragments, fibers, and inorganic particulates. Air enters the cassette, the particles become impacted on the sampling substrate, and the air leaves through the exit orifice. The cassette housing is designed in such a way that the particles are distributed and deposited equally on a special glass slide contained in the cassette housing called the "trace".

Air Sampling Protocol

Sampling pumps will be located in the work area and outdoors so that they are not unduly influenced by the configuration of the space or by each other. Sampling pumps shall not be placed in room corners, under shelves, or in other locations where airflow is restricted. The indoor air space shall be moderately agitated by fans to mimic actual occupied conditions.

Once the sampling equipment is in place, the location, time, filter number, pump number, and other pertinent information shall be recorded by the industrial hygienist. When the requisite sampling volume has been reached, the time, intermediate flow rate checks, and the final flow rate shall be recorded. Samples shall be hand delivered or shipped to the laboratory for analysis without further treatment.

Calibration

The sampling pumps shall be calibrated before and after each use to determine the actual flow rate of the pump. The flow rates shall then be averaged and recorded. A field rotometer shall be used to calibrate the pumps in the field before and after each use. The rotometer shall be calibrated by a primary standard so that an accurate flow rate is reported.

Interpretation of Analytical Results

Because of the ubiquity of fungi, samples collected from the work areas need to be evaluated against samples collected from outdoors. The genus of fungi collected from indoor air shall match outdoor air and typically shall be present at levels less than outdoors. Lower or higher levels of fungi indoors of different genera from outdoors can indicate that contamination remains on interior surfaces.

The fungal concentrations indoors shall not significantly exceed concurrent outdoor concentrations. The Rank Order of magnitude shall also be similar for concurrent indoor and outdoor levels. For an example of the term Rank Order – if outdoor samples contain predominantly *Cladosporium* followed by Basidiospores in Rank Order, it would be reasonable to anticipate finding the indoor samples containing predominantly *Cladosporium* followed by Basidiospores. However, if the indoor samples contain predominantly *Fusarium*, or a mold other than *Cladosporium* or Basidiospores (a difference in Rank Order), the results would suggest that contamination remains on interior surfaces.

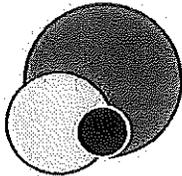
Post Remediation Air Clearance Criteria

The work area would be deemed acceptable when indoor mold spore concentrations are similar to outdoor mold spore concentrations, including Rank Order.

End of Work Plan

Work plan prepared by:

R. Chris Crothers, Certified Microbial Consultant
Board-Certified by the American Council for Accredited Certifications



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Section 13280

PHASE II - Mold Remediation Work Plan

Vermont Veterans Home - Bennington, Vermont
Basement Areas

November 22, 2013

The Mold Remediation Contractor (hereinafter referred to as "MRC") is responsible to furnish all labor, equipment, materials, services, insurance, permits, certificates, etc., for the proper removal and/or remediation of affected building materials, surfaces, and objects detailed herein at the Vermont Veterans Home in Bennington, Vermont (hereinafter referred to as the "Work").

All quantities of materials scheduled for removal or remediation provided herein and on schematic drawings is approximate. Contractor is responsible for verifying actual amounts of subject materials/surfaces prior to submitting their bid. No extra compensation will be awarded for failure to verify material quantities.

It is agreed upon that the date of beginning, rate of progress, and the time for completion of the work to be done are essential conditions of the contract and that the Work shall be coordinated when Owner issues the written Notice to Proceed.

Time Schedule

Refer to time schedules provided in the architectural plans and specifications

Bid

By submitting a bid, the bidder acknowledges that they have investigated and satisfied themselves to the following:

- The conditions affecting the work, including, but not limited, to: physical conditions of the site which may bear upon site access, handling and storage of tools and materials, access to water, electrical service or other utilities, or which may otherwise affect performance of required activities;
- The character and quantity of all surface and subsurface materials or obstacles to be encountered in so far as this information is reasonably ascertainable from an inspection of the site, including exploratory work done by the Owner and/or project designer, as well as information presented in drawings and specifications included with this package.

Failure by the bidder to acquaint themselves with available information will not relieve them from the responsibility for estimating properly the difficulty or cost of successfully completing or performing the work. The Owner is not responsible for any conclusions or interpretations made by the bidder on the basis of the information made available by the Owner or project designer.

Mold Remediation

Work practices for mold remediation/cleaning are to be performed utilizing a combination of recognized standards; which includes, but does not limit, the following:

- AIHA, "Recognition, Evaluation, and Control of Indoor Mold" 2008;
- ACGIH, "Bioaerosols Assessment and Control," 1999;
- USEPA "Mold Remediation in Schools and Commercial Buildings," March 2001;
- OSHA - A Brief Guide to Mold in the Workplace;
- IICRC, "S520 Standard and Reference Guide for Professional Mold Remediation," 2008;

In addition to recognized microbial standards, the following work practices are provided:

Refer to Drawings MR-1 B & C Wing Basement, MR-2 D Wing Basement, MR-3 Chapel Corridor Exterior, MR-4 Admin Building Basement, and MR-5 Admin Building 2nd Floor for specific locations and remediation notes. Where discrepancies between the specifications and the drawings are discovered, the MRC shall utilize the most stringent method.

NOTE: with the exception of the Admin 2nd floor work and exterior work, all equipment, materials, waste, etc., shall be moved in and out of the work areas through the kitchen storage area stairwell. **AT NO TIME SHALL MRC MOVE EQUIPMENT, MATERIALS, WASTE, ETC., THROUGH PATIENT AREAS.**

- Post microbial hazard warning signs at all entrances leading to the affected work areas.
- Make sure all HVAC systems running through or operating in the affected areas are shut down and tagged out. Coordinate with maintenance department for any needed shutdowns
- Workers are to don appropriate personal protective equipment when entering the work areas.
- Mobilize negative pressure filtration units (NPFU - also referred to as AFDs and NAMs) into the basement area (as shown on the drawings). Hook up the exhaust tubing and vent to outdoors; then energize the machines. Provide a sufficient quantity of NPFUs to provide a minimum of four air changes per hour. The MRC is responsible for providing sufficient quantity of NPFUs that will create negative pressure and change the air every 15 minutes (approximately -0.02 inches of water column +/-).
- A worker decontamination/change station should be placed as shown on drawings or in a practical location that is suitable for the space.
- Place poly barriers over all doorways leading to the affected work areas. Secure with duct tape or equivalent. **The MRC is responsible for removing all tape residue from surfaces where poly was secured.**
- Once negative pressure is established, clean and relocate all movable items from the work areas. Once cleaned, turn the items over to the Owner for temporary storage or disposal (preferably outside the building).
- Pre-clean and protect non-moveable items/objects with poly barriers. The barriers shall be sufficiently secured to prevent paint overspray from getting on the items. Care shall be taken to avoid getting paint in/on any of the mechanical systems.
- Once the above activities have been completed, begin remediation work.

In the B and C Wing basement mechanical areas and Admin basement, the work areas will be deemed acceptable when the work area mold spore concentrations are similar to make-up air mold spore concentrations and the visual inspection passes.

Make sure to pre-clean the doors at the top of the stairwells and install a poly barrier over the doorway with a mold remediation warning sign attached to the occupant side of the poly barrier. Remediation personnel are to avoid entering the patient space on the other side of the doors. Loud talking or other noisy activities are prohibited when working in these areas.

C-Wing Basement – West Mechanical Space

Refer to Drawing MR-1 for location and notes.

This work area contains significant mold contamination. PPE should be used whenever entering this space.

- Make sure the area is properly setup up, negative pressure established and air systems feeding the area have been shut down.
- Place poly drop cloths on the floor to capture gross debris during ceiling removal.
- Remove all gypsum wallboard (GWB) in room (ceilings, column enclosures, etc.). Temporarily support conduits, temp controls, fire controls, piping, etc., that are attached to the GWB surfaces.
- Remove and dispose of all mechanical pipe insulation from this room.
- Thoroughly scrub all surfaces, including but not limited to, ceiling, walls and floors with an abrasive pad (similar to the coarse black pads used on a floor buffing machine), warm water and detergent.
- When scrubbing is complete and surfaces are dry, thoroughly leaf-blow the space with an electric leaf blower, followed immediately by a thorough HEPA vacuuming of all surfaces in the area.
- In conjunction with the mechanical space, remove GWB walls from stairwell from floor up two feet. Thoroughly clean wall cavities, walls, ceilings and stairs utilizing the same procedures as provided in the mechanical space.
- After work is completed, prepare the area for post-remediation verification (PRV) visual inspections and air sampling (provided by Owner).

C-Wing Basement – East Mechanical Space

Refer to Drawing MR-1 for location and notes.

- Once the area is properly setup up, negative pressure established, and air systems feeding the area have been shut down, remove and dispose of mechanical pipe insulation with water staining and visible mold growth in this room.
- Thoroughly scrub all surfaces, including but not limited to, ceiling, walls and floor surfaces with an abrasive pad, warm water and detergent.
- In conjunction with the mechanical space, thoroughly scrub walls, ceilings, floors and stairs in stairwell.
- When scrubbing is complete and surfaces are dry, thoroughly leaf-blow the space with an electric leaf blower, followed immediately by a thorough HEPA vacuuming of all surfaces in the area.
- After work is completed, prepare the area for PRV visual inspections and air sampling (provided by Owner).

B-Wing Basement – West and East Mechanical Spaces

Utilize same procedures provided above for C-Wing Basement, East Mechanical Space.
Refer to Drawing MR-1 for location and notes.

Food Service Mechanical Room

Refer to Drawing MR-1 for location and notes.

- Provide a NPFU and vent outdoors or into B & C Wing basement area
- Place poly drop cloths on the floor beneath visible mold on ceiling.
- Conduct surface cleaning only where visible mold is present.
- After work is completed, prepare the area for PRV visual inspection and air sampling.

D-Wing Basement

Refer to Drawing MR-2 for location and notes.

- Once the area is properly setup up, negative pressure established, and air systems feeding the area have been shut down conduct an initial cursory cleaning of all surfaces.
- Starting from the east side of the work area, leaf-blow all surfaces while heading toward NPFU's.
- When leaf-blowing is complete, conduct final HEPA vacuuming.
- After work is completed, prepare the area for PRV visual inspections and air sampling.

Chapel Corridor – Exterior Work

Refer to Drawing MR-3 for location and notes.

- Once the GC has removed the affected wood siding and the MRC's personnel have donned appropriate PPE, begin removal of all fiberglass within wall cavity. Place insulation into polyethylene bags and dispose of.
- Conduct a thorough scrubbing of all wall studs and floor plates. If studs and plates are rotten or degraded to an unusable condition, please notify the GC as soon as possible.
- After work is completed, prepare the area for PRV visual inspection.

Administration Building Basement

Refer to Drawing MR-4 for location and notes. This work is part of Deduct Alternate #1, *See Spec Section 01030*

- Once the area is properly setup up, negative pressure established, and air systems feeding the area have been shut down (if any), remove and dispose materials/items as provided on Drawing MR-4.
- Once demolition activities are complete, conduct a thorough cleaning of wall, ceiling and floor surfaces throughout the work area.
- After work is completed, prepare the area for PRV visual inspections and air sampling (provided by Owner).

Administration Building 2nd floor

Refer to Drawing MR-5 for location and notes. This work is part of Deduct Alternate #1, *See Spec Section 01030*

- Once the area is properly setup up, negative pressure established, and air systems feeding the Medical Records room have been shut down, remove and dispose materials/items as provided on Drawing MR-5.
- Once demolition activities are complete, conduct a thorough cleaning of wall, ceiling and floor surfaces throughout the room.
- After work is completed, prepare the area for PRV visual inspections and air sampling (provided by Owner).
- The mechanical contractor will be disconnecting fan coil units from walls. MRC is to wrap the units in 6 mil poly and duct tape, then remove from building and dispose of offsite.

General Requirements/Recommendations

The following are general requirements and/or recommendations to be employed for the remediation project:

Warning Signs: Microbial warning signs should be displayed at all approaches to the work areas (i.e. all doorways leading into the dwelling). If preferred, signs can be placed inside the dwelling as long as any unauthorized person entering the work areas can see the sign immediately upon opening the door(s) leading into the remediation area.

Worker Decontamination Enclosure System: A worker decontamination enclosure system consisting of a clean room and equipment/dirty room, separated from each other and from the work area by airlocks, accessible through doorways protected with at least two (2) overlapping polyethylene sheets should be provided. Except for the doorways, the worker decontamination enclosure system should be airtight. All entry and exit from the work area should be through this system. The sequence of entering and exiting the worker decontamination enclosure system should be as follows:

Entry and exit - All persons should enter and exit the work area through the worker decontamination enclosure system.

Knowledge of procedures - All persons, before entering the work area should read and be familiar with all posted regulations, personal protection requirements, including work area entry and exit procedures, and emergency procedures.

Personal Protective Equipment - All persons should proceed first to the clean room, remove all street clothing, store these items in clean sealable plastic bags or lockers and don protective clothing. All authorized visitors should also don NIOSH-approved respiratory protection. Clean respirators and protective clothing should be utilized by each authorized visitor for each separate entry into the work area. Respirators should be inspected prior to each use and tested for proper seal using qualitative or quantitative fit checks.

Removal of personal protective equipment - After the workers have finished their work, they should remove any gross debris from their disposable work suit using a HEPA vacuum. They should remove their disposable suit and place in waste bag, then immediately enter the equipment/dirty room. Utilizing a bucket of clean warm water, they should wet wipe their respirator and body.

Clean room/clothing - After removal of disposable suits and cleaning of respirators, all persons should proceed to the clean room and don clean personal protective equipment if returning to the work area or street clothing if exiting the enclosure.

Critical Barriers: The work area boundaries should be isolated from the remainder of the dwelling by airtight critical barriers attached securely in place from inside the work area. All openings between the work area and all other areas, including but not limited to; windows, doorways, corridor entrances, drains, radiators, grates, skylights, etc., should be sealed airtight with a minimum of one layer of 6 mil. polyethylene sheeting. All HVAC systems, including but not limited to: ducts, diffusers, grills, etc., should be sealed airtight with a minimum of one layer of 6 mil. polyethylene sheeting. Critical barriers should be installed in a manner which prevents mold spores from migrating outside the containment area boundaries.

Negative Pressure Enclosure: NPFU's with HEPA filtration should be provided in sufficient quantities to provide an air change in the work area(s) every 15 minutes. The filtered NPFU exhaust shall be vented to the outside of facility, configured in such a manner to prevent the

exhaust air from being entrained back into the home. Before beginning work within the enclosure, and at the beginning of each shift, the negative pressure enclosure should be inspected for breaches. Any leaks found must be immediately sealed before further work can occur. The NPFU's should run 24 hours a day until successful post-remediation sampling and analysis have been achieved.

Personal Protective Equipment (PPE): Any remediation work that disturbs mold, and causes mold spores to become airborne, increases the degree of respiratory exposure. Actions that tend to disperse mold include: breaking apart moldy porous materials such as wallboard; destructive invasive procedures to examine or remediate mold growth in a wall cavity; removal of contaminated wallpaper by stripping or peeling; using fans to dry items or ventilate areas. The primary function of personal protective equipment is to prevent the inhalation and ingestion of mold and mold spores and to avoid mold contact with the skin or eyes. The following paragraphs discuss the various types of PPE that should be utilized during remediation activities.

Skin and Eye Protection - Gloves protect the skin from contact with mold, as well as from potentially irritating cleaning solutions. Long gloves that extend to the middle of the forearm are recommended. The glove material should be selected based on the type of substance/chemical being handled. If a biocide such as chlorine bleach or a strong cleaning solution is being utilized, Contractor should select gloves made from natural rubber, neoprene, nitrile, polyurethane, or PVC. If you are using a mild detergent or plain water, ordinary household rubber gloves may be used. For protection of worker's eyes, properly fitted goggles or a full face respirator should be utilized. Goggles must be designed to prevent the entry of dust and small particles. Safety glasses or goggles with open vent holes are not appropriate for mold remediation.

Respiratory Protection - Respirators protect cleanup workers from inhaling airborne mold spores, contaminated dust, and other particulates that are released during the remediation process. Either a half face air-purifying respirator or full face air-purifying respirator can be used. A full face respirator provides both respiratory and eye protection and is RECOMMENDED for this project. Respirators used to provide protection from mold and mold spores must be certified by the National Institute for Occupational Safety and Health (NIOSH). As specified by OSHA in 29 CFR 1910.134, individuals who use respirators must be properly trained, have medical clearance, and be properly fit tested before they begin using a respirator. In addition, use of respirators requires the employer to develop and implement a written respiratory protection program, with worksite-specific procedures and elements. The MRC's written respiratory program shall be present and available at the Work Site at all times. All of the MRC's personnel shall strictly abide by this program. At a minimum, the Respiratory Protection Program shall include:

- ◇ medical monitoring program
- ◇ selection of respirators
- ◇ fitting of respirators
- ◇ qualitative and/or quantitative fit check requirements

Protective Clothing - While conducting remediation work, individuals will likely encounter hazardous biological agents, as well as chemical and physical hazards. Consequently, appropriate personal protective clothing (i.e., disposable Tyvek® suits or similar) is required to minimize cross-contamination between work areas and clean areas, to prevent the transfer and spread of

mold and other contaminants to street clothing, and to eliminate skin contact with mold and potential chemical exposures.

Disposable PPE should be discarded after each use. They should be placed into impermeable bags, and discarded. Appropriate precautions and protective equipment for biocide/chemical applicators should be selected based on the product manufacturer's warnings and recommendations (e.g., goggles or face shield, aprons or other protective clothing, gloves, and respiratory protection).

Removal of Affected Building Materials: Where called for in the Work Plan, building materials scheduled for removal should be removed intact where possible. All fasteners should be removed from the component (i.e. GWB screws, nails, etc). The back sides of the removed components should be inspected for signs of visible water staining and/or mold growth. The removed components should be wrapped air tight with one layer of 6 mil polyethylene (or contractor quality polyethylene bags) and sealed with industrial grade duct tape. The wrapped/bagged waste should then be removed from the Work Area and discarded.

Disposal of Waste: The MRC is responsible for containerizing and disposing of all waste generated by the remediation activities. All waste generated by the Work should be stored NO CLOSER than 20 feet from the home to prevent re-entrainment of mold spores into the home. The waste materials can be disposed of as typical construction waste.

Cleaning/Treatment Methods: The purpose of mold remediation is to remove moldy and contaminated materials and to prevent human exposure and further damage to building materials and furnishings. A variety of cleanup methods are available for remediating damage to building materials and furnishings caused by moisture control problems and mold growth. The specific method or group of methods used will depend on the type of material affected.

It is important to perform cleaning in a methodical fashion. The workers should clean from the highest location in the work areas, working their way down to the floor area. Once on the floor, the workers should work from the farthest side of a room and clean towards the negative pressure filtration unit(s). In all cases, the workers should keep the cleaning activity between their breathing zone and the negative pressure filtration units.

Cursory Cleaning - Where cursory cleaning is called for, the MRC shall use a HEPA vacuum with a brush attachment and vacuum the surfaces to remove the gross/loose dirt, dust and debris. Cleaning has to be sufficient to allow paint to adhere to the surface.

The MRC should employ one and/or a combination of the following cleaning methods:

Wet Vacuuming - Wet vacuums are vacuum cleaners designed to collect water. They can be used to remove water from floors, carpets, and hard surfaces where water has accumulated. They should not be used to vacuum porous materials, such as gypsum board. Wet vacuums should only be used on wet materials, as spores may be exhausted into the indoor environment if insufficient liquid is present. The tanks, hoses, and attachments of these vacuums should be thoroughly cleaned and dried after use since mold and mold spores may adhere to equipment surfaces.

Damp Wiping - All nonporous surfaces should be cleaned by wiping and/or scrubbing with water and a detergent solution. It is important to dry these surfaces quickly and thoroughly to avoid further mold growth.

HEPA Vacuuming - HEPA (High-Efficiency Particulate Air) vacuums should be utilized for final cleanup of remediation areas after materials have been thoroughly cleaned, dried and contaminated materials removed. Care must be taken to assure that the filter is properly seated in the vacuum so that all the air passes through the filter. When changing the vacuum filter, the MRC should wear respirators, appropriate personal protective clothing, gloves, and eye protection to prevent exposure to any captured mold and other contaminants. The filter and contents of the HEPA vacuum must be disposed of in impermeable bags or containers in such a way as to prevent release of the debris.

Post-Remediation Verification

Visual Inspections: Once the final cleaning has been completed and the Work area has dried, an independent qualified microbial consultant along with the MRC's Supervisor/Competent Person will perform a visual inspection of all surfaces in the Work areas (including MRC's equipment). The Work area shall be free of all dust, dirt and debris. The MRC will be required to re-clean areas where accumulated dirt, dust and debris are discovered during the visual inspection.

Final Air Sampling: The independent qualified microbial consultant should collect spore trap air samples in the same locations where pre-remediation samples were collected.

Spore Traps - The spore trap air samples will be collected onto Micro5™ Microcell spore traps or Zefon™ Air-O-Cell spore traps. Spore traps are a sampling device designed for the rapid collection and analysis of a wide range of airborne aerosols. These include fungal spores, pollen, insect parts, skin cell fragments, fibers, and inorganic particulates. Air enters the cassette, the particles become impacted on the sampling substrate, and the air leaves through the exit orifice. The cassette housing is designed in such a way that the particles are distributed and deposited equally on a special glass slide contained in the cassette housing called the "trace."

Air Sampling Protocol: Sampling pumps will be located in the work area and outdoors so they are not unduly influenced by the configuration of the space or by each other. Sampling pumps should not be placed in room corners, under shelves, or in other locations where airflow is restricted. The indoor air space should be moderately agitated by fans to mimic actual occupied conditions. Once the sampling equipment is in place, the location, time, filter number, pump number, and other pertinent information should be recorded by the industrial hygienist. When the requisite sampling volume has been reached, the time, intermediate flow rate checks, and the final flow rate should be recorded. Samples should be hand delivered or shipped to the laboratory for analysis without further treatment.

Calibration: The sampling pumps should be calibrated before and after each use to determine the actual flow rate of the pump. The flow rates should then be averaged and recorded. A field rotometer should be used to calibrate the pumps in the field before and after each use. The rotometer should be calibrated by a primary standard so an accurate flow rate is reported.

Interpretation of Analytical Results: Because of the ubiquity of fungi, samples collected from the work areas need to be evaluated against samples collected from outdoors. The genus of fungi collected from indoor air should match outdoor air and typically should be present at levels less than outdoors. Lower or higher levels of fungi indoors of different genera from outdoors can indicate that contamination remains on interior surfaces.

The fungal concentrations indoors should not significantly exceed concurrent outdoor concentrations. The Rank Order of magnitude should also be similar for concurrent indoor and outdoor levels. For an example of the term Rank Order - if outdoor samples contain predominantly *Cladosporium* followed by Basidiospores in Rank Order, it would be reasonable to anticipate finding the indoor samples containing predominantly *Cladosporium* followed by Basidiospores. However, if the indoor samples contain predominantly *Fusarium*, or a mold other than *Cladosporium* or Basidiospores (a difference in Rank Order), the results would suggest that contamination remains on interior surfaces.

Post Remediation Air Clearance Criteria: The work area would be deemed acceptable when indoor mold spore concentrations are similar to outdoor mold spore concentrations, including Rank Order. When there is snow cover outdoors (when outdoor mold spores are nearly nonexistent), the microbial consultant should use professional judgment to determine if indoor airborne mold spore concentrations have been successfully abated. The presence of elevated concentrations of airborne *Aspergillus/Penicillium*-like mold spores inside the work area may require re-cleaning and retesting. These molds were discovered in elevated concentrations during the pre-remediation sampling. *In the B and C Wing basement storage areas, these work areas will be deemed acceptable when the work area mold spore concentrations are similar to make-up air mold spore concentrations.*

Work plan prepared by:
Chris Crothers, Certified Microbial Consultant
Board-Certified by the American Council for Accredited Certification

Legend



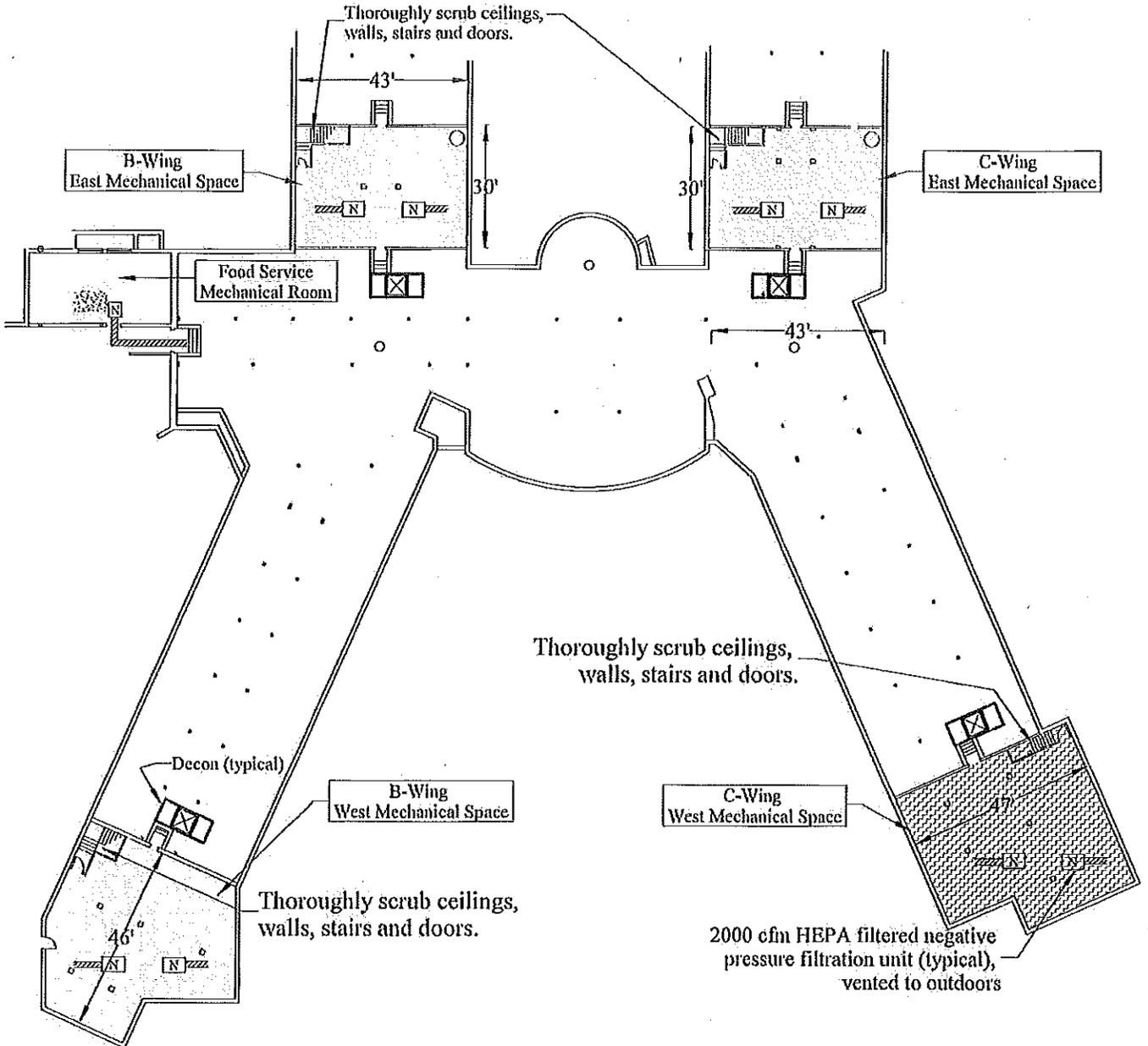
- MRC to thoroughly scrub "all" surfaces with warm water and detergent. When complete and dry, thoroughly leaf blow the space, then conduct a thorough HEPA vacuuming of all surfaces in the area.



- MRC to remove all GWB in room (ceilings, column enclosures, etc). Temporarily support conduits, etc. that are attached to ceiling. Thoroughly scrub walls with warm water and detergent. When complete and dry, thoroughly leaf blow the space, then conduct a thorough HEPA vacuuming of all surfaces in the area. Remove and dispose of all pipe insulation from this area as well.



- MRC to thoroughly clean visible surface mold from ceiling (less than 20 sq.ft.) in Food Service Mechanical Room.



Job North



Prepared by:

 **CROTHERS** Environmental Group, LLC
Morrisville, Vermont 802-888-1936

Floor Plan provided by:
Timothy D. Smith & Associates

Vermont Veterans Home

325 North Street - Bennington, Vermont

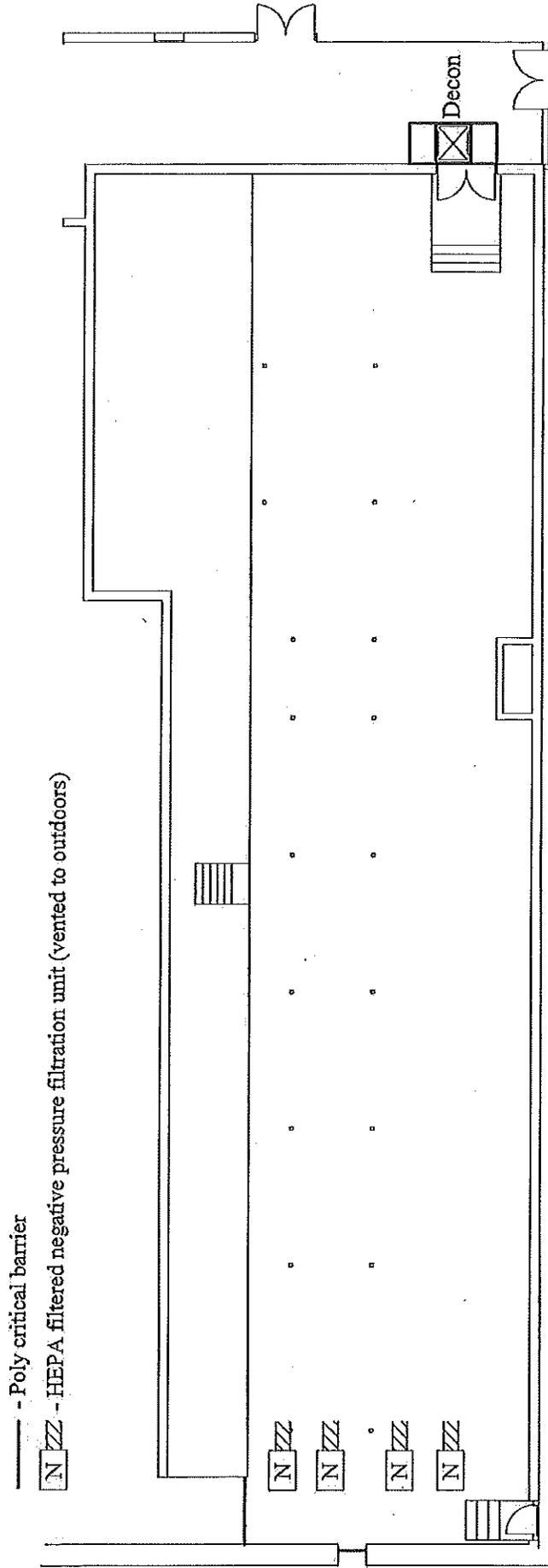
Basement - B Wing & C Wing Mechanical Spaces

Phase II - Mold Remediation

Not to scale

December 9, 2013

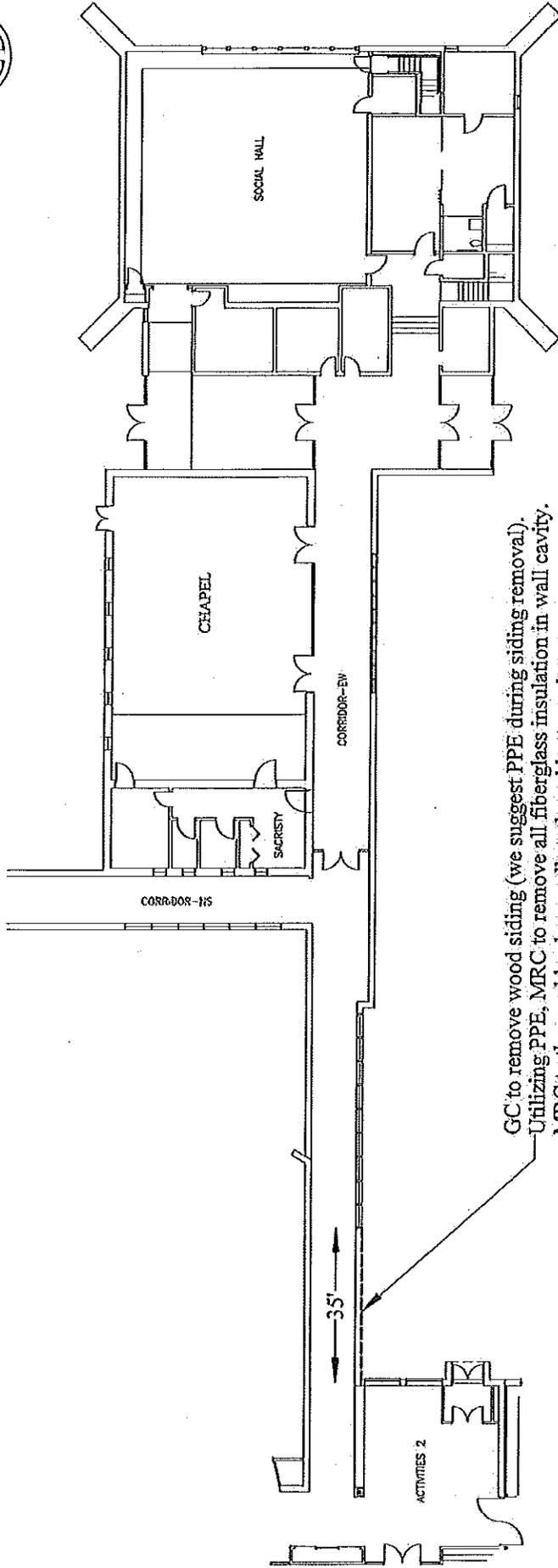
MR-1



- 1) Pre-clean and temporarily relocate stored items to Kitchen Storage area (coordinate with Owner).
- 2) Establish negative pressure.
- 3) Conduct a cursory cleaning of all surfaces.
- 4) Starting from the east side of the work area, leaf blow all surfaces while heading toward NPFU's.
- 5) When leaf-blowing is complete, conduct final HEPA vacuuming.
- 6) Prepare area for PRV visual and air testing.

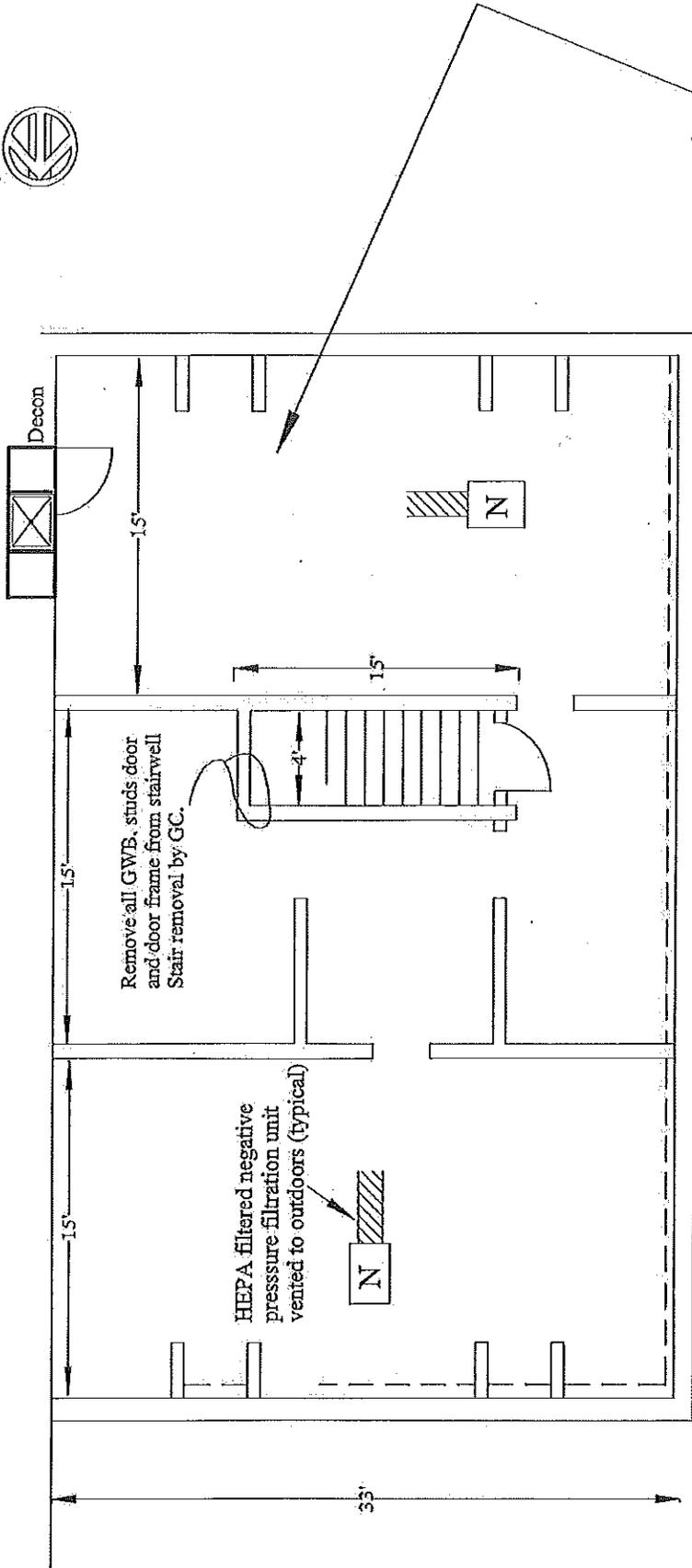
Prepared by:	Vermont Veterans Home
 CROTHERS Environmental Group, LLC Morrisville, Vermont 802-888-1936	325 North Street - Bennington, Vermont Basement - D Wing
Floor Plan provided by: Timothy D. Smith & Associates	Phase II - Mold Remediation
	Not to scale
	December 9, 2013
	MR-2

Job North



GC to remove wood siding (we suggest PPE during siding removal).
 Utilizing PPE, MRC to remove all fiberglass insulation in wall cavity.
 MRC to thoroughly clean wall studs and bottom plates.

Prepared by:  CROTHERS Environmental Group, LLC Morrisville, Vermont 802-888-1956 Floor Plan provided by: Timothy D. Smith & Associates	Vermont Veterans Home
	325 North Street - Bennington, Vermont
	Chapel Corridor - Exterior
	Phase II - Mold Remediation
	Not to scale
	December 9, 2013
	MR-3



- 1) Remove and dispose of all loose wall plaster to the point of refusal.
- 2) Remove all ceiling materials. Temporarily support, conduits, lights, etc.
- 3) Remove and dispose of all loose paint to the point of refusal. All painted surfaces are presumed to contain lead.
- 4) Clean all visible mold discovered on painted foundation rock walls.
- 5) MRC to conduct thorough cleaning of ceilings, floors and walls. Prep surfaces wall and ceiling for application of microbial paint.

LEGEND

- - - - - Remove all demarcated GWB and metal stud framing. Clean visible mold from foundation encountered behind GWB.

Place all boxes of records into a 6 mil "clear" poly bag and tape up airtight. Turn bagged records over to Owner. All records are strictly "confidential." and shall not be reviewed or tampered with in any manner. Clean metal shelving and turn over to Owner. Remove and dispose of garbage, wood pallets and other non-salvageable items.

Deduct Alternate #1
See Spec Section 01030

Prepared by:	Vermont Veterans Home
	325 North Street - Bennington, Vermont
	Basement - Administration Building
	Phase II - Mold Remediation
	Not to scale
	December 9, 2013
	MR-4

Vermont Veterans Home
 325 North Street - Bennington, Vermont
 Basement - Administration Building
 Phase II - Mold Remediation
 Not to scale
 December 9, 2013

Prepared by:

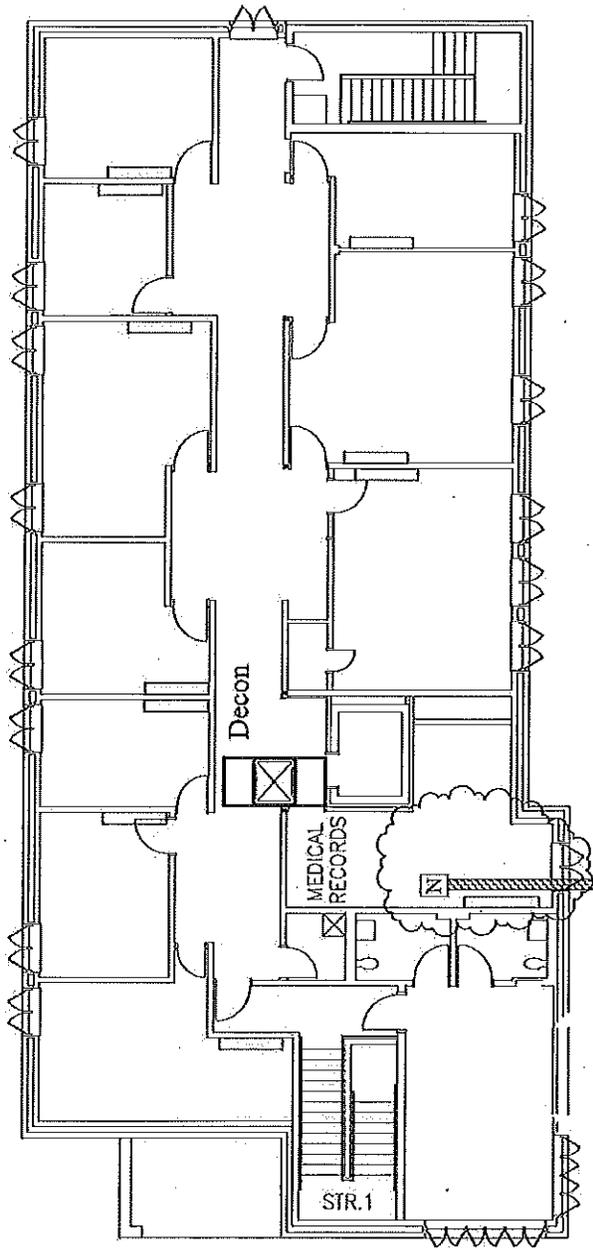
CROTHERS Environmental Group, LLC
 Morrisville, Vermont 802-888-1936
 Floor Plan provided by:
 Timothy D. Smith & Associates



Legend

 - HEPA filtered negative pressure filtration unit (vented to outdoors)

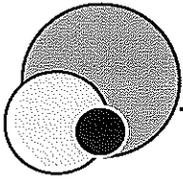
 - Existing fan coil unit (FCU) to be disconnected by mechanical contractor.
MRC to seal FCU with poly & duct tape, then remove and dispose of FCU.



- 1) Establish negative pressure within the Medical Records room.
- 2) Remove and dispose of all vinyl floor tile (non-asbestos) throughout the room.
- 3) Remove and dispose of sub-flooring materials down to sleepers in clouded area.
- 4) Remove and dispose of sleepers.
- 5) Remove bottom 2 feet of double layer GWB in clouded area.
- 6) Clean and lightly sand water/mold stained floor plates and lower sections of studs.
- 7) Conduct a thorough cleaning of all surfaces in the entire room.
- 8) Prepare area for PRV visual and air testing.

Deduct Alternate #1
See Spec Section 01030

Prepared by:  CROTHERS Environmental Group, LLC Morrisville, Vermont 802-888-1956 Floor Plan provided by: Timothy D. Smith & Associates	Vermont Veterans Home 325 North Street - Bennington, Vermont Administration Building - 2nd Floor Phase II - Mold Remediation Not to scale December 9, 2013
	MR-5



January 8, 2014 (revised 2/12/14)

Peter Hack, Project Engineer
State of Vermont – Department of Buildings & General Services
2 Governor Aiken Avenue
Montpelier, Vermont 05633

RE: Vermont Veterans Home (VVH) – Bennington, Vermont
Comprehensive Plan to Address Ongoing Mold Issues

Executive Summary

Mold is omnipresent and exists naturally in our environment to break down dead organic material such as wood, paper and fabrics. Mold can also derive nutrients from some synthetic products such as paints and adhesives. Mold requires nutrients, water, oxygen and favorable temperatures to grow. Mold also requires moisture to proliferate, although some mold species can obtain that moisture from moist air when the relative humidity is maintained above 60%. With the possible exception of ultra-filtered cleanroom environments, it is impossible to eliminate mold and mold spores from the indoor environment. A healthy indoor environment will have mold species and concentrations similar to those found outdoors. Since we cannot achieve a mold free indoor environment, we strive for a mold safe environment.

Crothers Environmental Group, LLC (CEG) was contacted on August 10, 2012 to conduct an initial mold assessment of isolated areas of VVH due to concerns by some of the VVH staff that mold may be present. During the initial assessment, it was discovered that a majority of the water source heat pumps (WHPs) were plagued with internal mold growth due to condensation issues created during the cooling season. This led to mold remediation of the WHPs by a specialized mold remediation contractor utilizing engineering controls to protect the building occupants. This also prompted an initial facility-wide mold assessment to determine if mold growth issues were present elsewhere.

Currently Known Mold Issues

All basement levels were found to have unfavorable mold concentrations of varying degrees. Ground water intrusion, vapor pressure and mechanical system leaks have provided sufficient moisture for mold proliferation on surfaces that support mold growth in these areas.

During the summer of 2013, the most immediate area of concern was the basement Food Storage areas. VVH employees were regularly entering these spaces to get supplies, thus it was crucial to get these areas properly cleaned as soon as possible. A limited microbial work plan was developed by CEG and put out to bid to qualified mold remediation contractors (MRCs). Once the remediation work was complete, CEG conducted post-remediation verification visual inspections and air monitoring to ensure the work had been conducted properly.

Once the Food Storage area remediation was complete, a Phase II limited microbial work plan was developed to address the next most immediate areas of concern. These included remediation in the mechanical spaces and stairwells in "B" Wing and "C" Wing; the basement of the historic section of the Administration Building; and a microbial cleaning in "D" Wing basement. The remaining basement areas are itemized below.

Mold issues in the occupied spaces above the basements were limited to mold growth in the WHPs and fan coil units. The majority of units were properly remediated in the summer of 2012. In addition, the units have been equipped with ultra-violet lights to mitigate future mold growth inside the units. As part of the Phase II microbial work plan discussed above, the work plan has addressed remediating the fan coil units in the 2nd floor medical records area of the Administration Building

The following is a building by building breakdown of known mold issues, remediation recommendations and estimated costs.

"A" Wing Basement Mechanical Room

The "A" Wing basement is a mechanical space. Airborne mold spore concentrations are slightly elevated in this area. There are a few locations of water stained mechanical insulation with some slight visible mold growth. It is likely that airborne mold spore concentrations increased when the foundation wall was opened up to connect this area to the North Wing north crawlspace. The North Wing north crawlspace has elevated airborne mold spore concentrations, which has likely contributed to the elevated airborne concentrations in the "A" Wing mechanical area.

This mechanical space should only require minimal work and should be conducted in a negative pressure enclosure. All water stained and/or mold stained mechanical insulation should be removed and replaced. This includes both duct and pipe insulation. When the aforementioned work is complete, a thorough microbial cleaning should be conducted from ceiling to floor utilizing a HEPA sandwich (HEPA sandwich is a process involving three steps with high efficiency particulate air (HEPA) filtration vacuuming being the first and last step, with damp-wiping/washing in between HEPA vacuuming steps). At the conclusion of remediation, post-remediation verification (PRV) visual inspections and air monitoring should be conducted.

The estimated remediation cost would be approximately \$23,000.00.

North Wing Crawl Spaces

The North Wing crawl spaces are mechanical spaces primarily utilized for mechanical heat and domestic water piping distribution lines. These areas were subjected to significant water vapor throughout the years causing mold to grow in the soils and on mechanical insulation jacketing. The corrugated ceiling decks have rusted due to the exposure to the moisture. A few years ago, concrete was poured over the dirt floor, which significantly reduced the intrusion of water vapor coming from the soil.

Airborne mold spore concentrations are elevated in the north crawl space and slightly elevated in south crawl space. There are numerous locations of water stained mechanical insulation with some visible mold growth.

These crawl spaces should be contained in a negative pressure enclosure. All mechanical pipe insulation with a paper all-service jacket should be removed. A thorough microbial cleaning should be conducted of all surfaces from ceiling to floor utilizing a HEPA sandwich. At the conclusion of remediation, PRV visual inspections and air monitoring should be conducted.

The estimated remediation cost would be approximately \$55,000.00.

In the event the remedial action provided above is not effective, the work areas should again be contained within a negative pressure enclosure, then the entire rusted metal ceiling deck and bar joists should be abrasively cleaned by bead blasting to de-rust the deck and remove all mold reservoirs from these surfaces. When complete, the abraded surfaces should be painted with a primer followed by an application of microbial paint. Once the paint has cured, PRV visual inspections and air monitoring should be conducted.

The estimated cost for properly bead blasting and painting will be approximately \$155,000.00.

East Wing Basement Crawlspace

The East Wing crawl space is a mechanical space primarily utilized for mechanical heat and domestic water piping distribution lines. This area is deemed a confined space, limiting access to non-qualified personnel. The floor space is soil with years of accumulated trash and organic debris. This area has been subjected to significant water vapor throughout the years causing mold to grow in the soils, the debris laying in the soil, and on mechanical insulation jacketing. The corrugated ceiling deck is rusted due to the exposure to the moisture.

Airborne mold spore concentrations are elevated in the East Wing crawlspace. There are numerous locations of water stained mechanical insulation with some visible mold growth.

This crawl space should be contained in a negative pressure enclosure. All mechanical pipe insulation with a paper all-service jacket should be removed. A thorough microbial cleaning should be conducted of all surfaces from ceiling to floor utilizing a HEPA sandwich. Once the remediation is complete, PRV visual inspections and air monitoring should be conducted. At the conclusion, two layers of reinforced poly sheeting should be placed over the dirt floor and secured in place (or the preferred method would be to pour concrete on the soil surface similar to the concrete application in the North Wing spaces).

The estimated remediation cost would be approximately \$90,000.00 (does not include pouring a concrete floor).

In the event the remedial action provided above is not effective, the work areas should again be contained within a negative pressure enclosure, then the entire rusted metal ceiling deck and bar joists should be abrasively cleaned by bead blasting to de-rust the deck and remove all mold reservoirs from these surfaces. When complete, the abraded surfaces should be painted with a primer followed by an application of microbial paint. Once the paint has cured, PRV visual inspections and air monitoring should be conducted.

The estimated cost for properly bead blasting and painting will be approximately \$146,000.00 +/-.

Admin Building Basement - Mechanical Area (4000 square foot area that has an elevator)

This basement mechanical area did not have elevated airborne mold spore concentrations during previous sampling events. It would be prudent to conduct a thorough microbial cleaning in this space since it is contiguous to three adjacent mechanical basements with elevated mold spore concentrations. All water stained mechanical pipe insulation should be removed, followed by a HEPA sandwich cleaning.

The estimated cost to thoroughly clean the space will be approximately \$45,000.00.

Chapel Basement Crawlspace

The Chapel area crawlspace is a mechanical space primarily utilized for mechanical heat and domestic water piping distribution lines. This area is deemed a confined space, limiting access to qualified personnel only. The floor space is soil with years of accumulated trash and organic debris. This area has been subjected to significant water vapor throughout the years causing mold to grow in the soils, the debris laying in the soil, and on mechanical insulation jacketing.

Airborne mold spore concentrations are significantly elevated in this crawlspace. There are numerous locations of water stained mechanical insulation with visible mold growth.

This crawl space should be contained in a negative pressure enclosure. All mechanical pipe insulation with a paper all-service jacket should be removed. A thorough microbial cleaning should be conducted of all surfaces from ceiling to floor utilizing a HEPA sandwich. At the conclusion, two layers of reinforced poly sheeting should be placed over the dirt floor and secured in place (or the preferred method would be to pour concrete on the soil surface similar to the concrete application in the North Wing spaces).

In the event the remedial action provided above is not effective, the work areas should again be contained within a negative pressure enclosure, then the entire rusted metal ceiling deck and bar joists should be abrasively cleaned by bead blasting to de-rust the deck and remove all mold reservoirs from these surfaces. When complete, the abraded surfaces should be painted with a primer followed by an application of microbial paint. Once the paint has cured, PRV visual inspections and air monitoring should be conducted.

The estimated remediation cost would be approximately \$80,000.00 (does not include pouring a concrete floor).

“D” Wing Basement

The “D” Wing basement is a mechanical space. Airborne mold spore concentrations are slightly elevated in this area. There are limited locations of water stained mechanical insulation. This basement mechanical space should only require minimal work. All work should be conducted in a negative pressure enclosure. All water stained and/or mold stained mechanical insulation jacketing should be removed and replaced. This includes both duct and pipe insulation. When the aforementioned work is complete, a thorough microbial cleaning should be conducted from ceiling to floor utilizing a HEPA sandwich. At the conclusion of remediation, PRV visual inspections and air monitoring should be conducted.

The estimated remediation cost would be approximately \$42,000.00.

Food Service Basement

The Food Service underwent limited mold remediation in 2013. This addressed the most serious surface areas. With periodic surveillance and air testing, additional remediation activities should not be necessary. If periodic surveillance determines that problems are returning, then a more comprehensive remediation plan should be employed. The plan would address removal of all suspended ceiling tiles, mechanical systems insulation, and water stained gypsum wallboard located throughout the space. This would be followed by a thorough cleaning and PRV testing.

The estimated remediation cost would be approximately \$70,000.00. (Does not include installation of new ceilings and wallboard).

Tunnel to Boiler Room

The tunnel connecting the Food Service basement to the Boiler Room is a mechanical space utilized for mechanical heat and domestic water piping distribution lines. This area has been plagued with chronic water leaks for an extended period of time.

This tunnel should be contained in a negative pressure enclosure. All mechanical systems insulation with a paper all-service jacket should be removed. A thorough microbial cleaning should be conducted of all surfaces from ceiling to floor utilizing a HEPA sandwich. At the conclusion of remediation, PRV visual inspections and air monitoring should be conducted.

The estimated remediation cost would be approximately \$40,000.00.

“B” & “C” Wings Basements

The “B” and “C” Wing basement crawl spaces are mechanical spaces primarily utilized for ventilation units and distribution ducts and mechanical heat and domestic water piping distribution lines. These areas were subjected to significant water vapor throughout the years causing mold to grow on mechanical systems insulation jacketing and most notably on surface paint. Numerous location of corrugated ceiling decks have rusted due to outside air being mechanically introduced into the crawlspaces.

Airborne mold spore concentrations are significantly elevated throughout the crawlspaces and mechanical rooms. There are numerous locations of water stained mechanical insulation with visible mold growth.

These crawl spaces should be contained in a negative pressure enclosure. The ceiling decks and painted I-beams and bar joists should be abrasively cleaned by bead blasting to remove the mold covered paint. When complete, the abraded surfaces should be painted with a primer followed by an application of microbial paint. All mechanical pipe insulation with a paper all-service jacket with water should be removed.

A thorough microbial cleaning should be conducted of all surfaces from ceiling to floor utilizing a HEPA sandwich. This should include a thorough pressure washing of all foundation walls. At the conclusion of remediation, PRV visual inspections and air monitoring should be conducted.

The estimated remediation cost would be approximately \$1,675,000.00.

Total Estimated Cost for Comprehensive Remediation Activities

The estimated remediation cost for all work described above is approximately \$2,750,000.00. This figure includes estimated project design, project monitoring and PRV visual inspections and air monitoring costs.

Valued engineering could be employed to considerably cut costs. This would include applying microbial paint over moldy surfaces in lieu of bead blasting. The surfaces would have to be cleaned of excess rust, dirt, dust and debris first, but there would be a savings of approximately 35% to 40% off the remediation numbers provided above.

Post-Remediation Periodic Surveillance

Once remediation is complete, preventative measures should be implemented to prevent future mold growth or at least identify problems early so they can be mitigated at a reasonable cost.

Regular periodic surveillance should be conducted by maintenance personnel to ensure that mechanical systems are not leaking, equipment is functioning properly, and to monitor for water/moisture intrusion issues. When discovered, organic building materials that have become wet should be removed and disposed of promptly. If large areas have become wet, an outside water mitigation company should be retained to respond and rapidly dry the affected building materials. The WHPs should be periodically inspected and cleaned as necessary, with July and August as the best times for inspection.

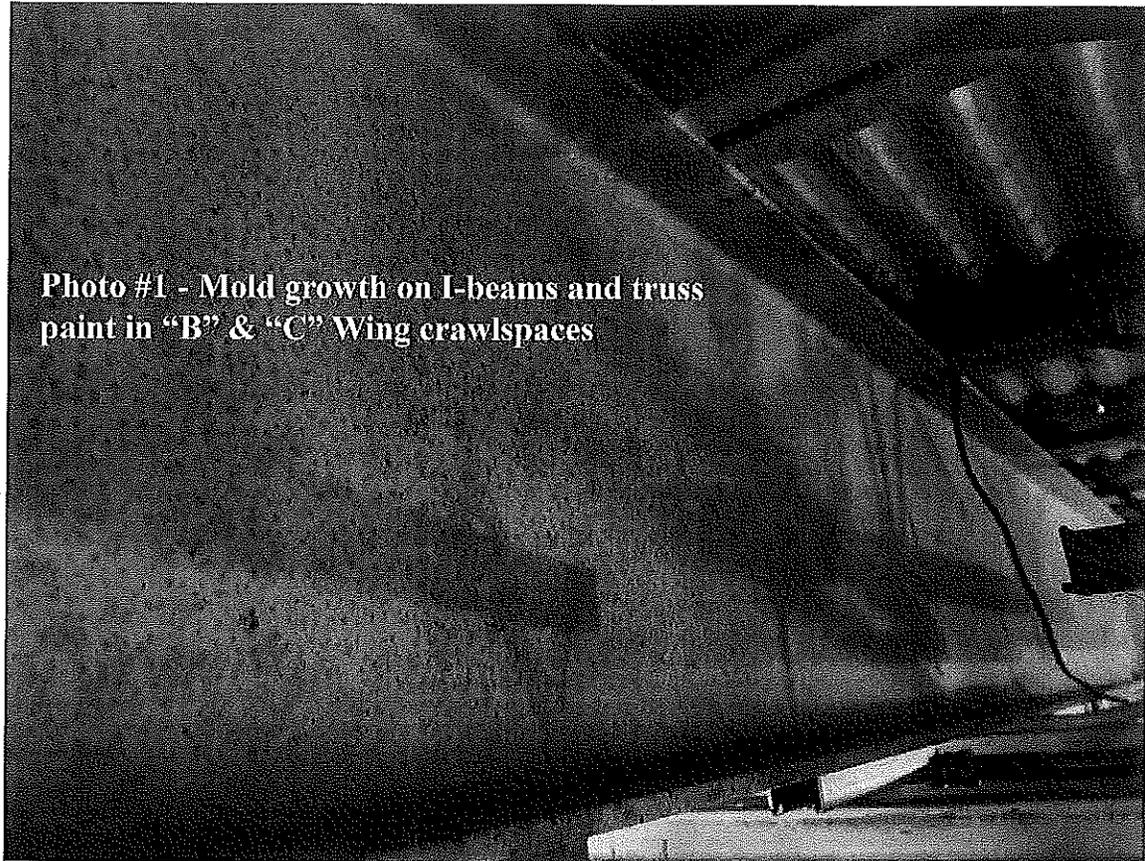
Mold spore trap air sampling should be conducted quarterly for the first year after remediation is complete. If sample results are favorable, sampling frequency should be lessened to a semi-annual basis. To save money, CEG could provide sampling equipment, sampling cassettes, training and sample analysis to designated maintenance personnel so they could undertake the majority of spore trap air sampling tasks. Maintenance staff should conduct primary surveillance and discuss issues with a mold consultant. An outside consulting firm should conduct sampling every other year (or more frequent as needed) to provide full transparency for employees and occupants.

When conducting renovation activities in the basements, consideration should be given to using building materials that do not promote mold growth (i.e. gypsum board with paper, mechanical insulation with a paper jacket, etc.)

These proactive approaches should prevent expensive reactive approaches. As these are extremely important preventative measures, consideration should be given to obtain an additional maintenance person to assist the overburden maintenance staff.

Signed,

Chris Crothers, Principal/Senior Scientist/CMC
Crothers Environmental Group, LLC



**Photo #2 - "B" & "C" Wing crawlspaces
rusted, moldy ceiling deck paint**



**Photo #3 - "B" & "C" Wing basement stairwells
with significant mold growth on walls**

