



# ASBESTOS ABATEMENT WORK PLAN

**Colorado Mountain College – Student Center  
Spring Valley Campus  
Glenwood Springs, Colorado**

**Prepared for:**

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Apex Project No. 5708

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## Acronyms

ACBM - asbestos-containing building material  
ACGIH - American Conference of Governmental Industrial Hygienists  
ACM - asbestos-containing material  
ACWM - asbestos-containing waste material  
ASHERA - Asbestos Hazard Emergency Response Act  
AIHA - American Industrial Hygiene Association  
AMS - Air Monitoring Specialist  
APM - Asbestos Project Monitor  
ASHARA - Asbestos School Hazard Abatement Reauthorization Act  
ASTM - American Society for Testing and Materials  
CDPHE - Colorado Department of Public Health and Environment  
CFM - cubic feet per minute  
CFR - Code of Federal Regulations  
EPA - Environmental Protection Agency  
f/cc - fibers per cubic centimeter  
GAC - General Abatement Contractor  
HEPA - high efficiency particulate air  
HVAC - heating, ventilation and air conditioning  
LEA - local education agency  
LPM - liters per minute  
MAAL - Maximum Allowable Asbestos Level in air  
NAM - negative air machine  
NESHAP - National Emissions Standards for Hazardous Air Pollutants  
NVLAP - National Voluntary Laboratory Accreditation Program National Institute of Standards and Technology  
O&M - Operations and Maintenance  
OSHA - Occupational Safety and Health Administration  
PCM - Phase Contrast Microscopy  
PLM - Polarized Light Microscopy  
PPE - personal protective equipment  
RACM - regulated asbestos-containing material  
s/mm<sup>2</sup> - structures per square millimeter  
TEM - Transmission Electron Microscopy  
TSI - thermal system insulation  
TWA - time weighted average  
VAT - vinyl asbestos [floor] tile  
VSF – vinyl sheet flooring

## 1.0 Scope of Work

### 1.1 General Information

The General Abatement Contractor (GAC) will be performing the removal of all asbestos containing material(s) as indicated in the following table. The total amount of actual asbestos containing material to be removed is greater than the trigger levels and an asbestos abatement permit will required for this project.

**Table 1: ACM to be removed from CMC Student Center, Glenwood Springs, Colorado**

Material Description	Material Location	Approx. Quantity	Friability	Material Type	Asbestos Content
Wood and Metal Fire Doors	Exit Doors and Staircase Doors	5 Doors	Friable	Misc.	Presumed ACM
12-inch Tan Floor Tile with Black Mastic	Various Areas Throughout the 1 <sup>st</sup> and Second Floors – See Drawings	2,864 SF	Nonfriable	Misc.	Tile – 4-6% chrysotile Mastic – 3-5% Chrysotile
Black Mastic under 6-inch Wood Pattern Sheet Flooring	Various Areas Throughout the 1 <sup>st</sup> and Second Floors – See Drawings	830 SF	Nonfriable	Misc.	4-5% Chrysotile
Black Mastic under Existing Flooring	Various Areas Throughout the 1 <sup>st</sup> and Second Floors – See Drawings	2,150 SF	Nonfriable	Misc.	3-4% Chrysotile

- Quantities are approximate, it is the abatement contractor's responsibility to confirm quantities listed for abatement. By submitting a bid, the abatement contractor agrees with the quantities listed. Deviations from the quantities listed will not constitute a change order.
- Regulatory asbestos abatement permit notification with the CDPHE will be required for this project.
- A written Project Design shall be developed by a CDPHE Project Designer for this project.

**Table 2: Add Alternate 1 - ACM to be removed from CMC Student Center, Glenwood Springs, Colorado**

Material Description	Material Location	Approx. Quantity	Friability	Material Type	Asbestos Content
12-inch Tan Floor Tile with Black Mastic	Various Areas Throughout the 1 <sup>st</sup> Floor – See Drawings	2,560 SF	Nonfriable	Misc.	Tile – 4-6% chrysotile Mastic – 3-5% Chrysotile
Black Mastic under 6-inch Wood Pattern Sheet Flooring and Carpet	Various Areas Throughout the 1 <sup>st</sup> Floor – See Drawings	2,200 SF	Nonfriable	Misc.	4-5% Chrysotile

### 1.2 Sequence of Work

All asbestos-containing material and asbestos contaminated material is considered non-friable and will be removed from their installed locations inside secondary containments, utilizing wet removal methods and a combination of handheld tools. The GAC shall conduct

abatement activities in accordance with CDPHE Regulation No. 8 in the following mandatory sequence:

- 1) Install critical barriers (pursuant to subsection III.I, Critical Barrier Installation)
- 2) Establish negative pressure (pursuant to Regulation No. 8 subsection III.J, Air Cleaning and Negative Pressure Requirements)

**Note:** *The removal of non-ACM building materials and components may only take place after negative air pressure is established in the containment work area(s).*

- 3) Construct the decontamination area (pursuant to subsection III.K, Decontamination Area)
- 4) Pre-clean surfaces (pursuant to subsection III.L, Pre-cleaning of Surfaces)
- 5) Cover fixed objects (pursuant to subsection III.M, Covering Fixed Objects)
- 6) Construct the containment (pursuant to subsection III.N, Containment Components)
- 7) Conduct abatement (pursuant to subsection III.O, Abatement Methods)
- 8) Conduct final visual inspection (pursuant to paragraph III.P.1., Final Visual Inspection)
- 9) Conduct final clearance air monitoring (pursuant to paragraph III.P.3., Final Clearance Air Monitoring)
- 10) Conduct the tear-down (pursuant to subsection III.Q., Tear-down)

All waste from the containment will be packaged in approved containers and transferred to an approved landfill for disposal. After successful air clearance of the containment the containment can be removed and all non-reusable containment materials will be packaged for disposal.

### **1.3 Discussion of Abatement Procedures**

#### **Floor tile**

Asbestos abatement of floor tile and associated mastic shall be performed within a negative pressure containment. The ceiling shall consist of a minimum single layer of 4mil polyethylene sheeting.

It is EPA's position that the use of a mechanical buffer with an abrasive pad on floor mastic would cause the floor mastic to become friable. Specifically, the application of an abrasive spinning pad creates friction which causes the floor mastic to become crumbled, pulverized or reduced to powder during the renovation or demolition operation. Without the application of solvents or any other liquid to the floor mastic, the floor mastic would create visible emissions. The EPA will not attempt to identify which products are abrasive or non-abrasive from a regulatory perspective. It is the responsibility of the GAC to make sure the work practices do not violate the asbestos NESHAP.

All surfaces to be abated will be wetted before and during removal to control dust and fiber emissions. Waste generated during removal will be gathered and wrapped in 2 layers of 6mil polyethylene sheeting or placed into 2 6ml thick properly labeled disposal bags while wet. Work must be accomplished using CDPHE certified supervisors and workers.

Work completion includes preparation of the work area, pre-clean activities, pre-abatement visual by AMS, removal and disposal of all specified ACM from the premises, final cleaning of the work area, final visual inspection and PCM clearance air monitoring by AMS.

## 2.0 Special Conditions

Asbestos abatement removal work will not begin until the APM has conducted a pre-abatement visual inspection of the work area containments.

### 2.1 Regulatory Notification and Variances

The General Abatement Contractor, (GAC) will make any required notifications to Federal and State entities regulating their work as required by applicable rules, regulations, and standards. This includes, but is not limited, to the National Emission Standards for Hazardous Air Pollutants (NESHAP) notification [notice provided to the Colorado Department of Public Health and Environment with permit application. ***The abatement contractor is responsible for quantifying amounts of ACM necessary to properly complete the project.***

### 2.2 Facility Occupancy Status

During abatement activities the facility may be occupied.

### 2.3 Site Security

Entry to the regulated asbestos work area is by permission only to authorized personnel. The perimeter of the work area may be monitored during abatement by a certified Air Monitoring Specialist (AMS). Only asbestos certified/licensed personnel employed by the GAC or federal or state regulatory agency personnel and the AMS will be allowed access to the work area. A logbook will be maintained at the entrance to the work area. Everyone who enters the work area must record name, affiliation, time in and time out for each entry.

### 2.4 Field Changes

Minor modifications to the project design are allowed. Minor changes include but are not limited to, relocation of negative air machines, decontamination facility and waste load-out. Any modifications to the project design must be approved by the Project Designer before the changes are made.

## 3.0 Project Design

Prior to the start of any asbestos abatement in a area of public access in which the amount of friable asbestos-containing material to be abated exceeds 1,000 linear feet on pipes, or 3,000 square feet on other surfaces, a written project design shall be developed by a Project Designer certified under Regulation No. 8, in accordance with paragraph IV.G.7.

### 3.1 Standards and Primacy of Rules

The following standards will be adopted as they pertain to asbestos abatement. In any instance where adopted standards conflict with each other, the most stringent shall apply.

- 1) Colorado Department of Public Health and Environment Regulation No. 8
- 2) 5CCR 1000-10 Part B asbestos handling, transportation, and storage
- 3) 29 CFR 1926.1101, the OSHA Construction Industry Asbestos Standard
- 4) 40 CFR 61 Subpart M, EPA's NESHAP Asbestos Standard
- 5) NIOSH/OSHA/EPA –“Occupational; Safety & Health Guidance Manual for Hazardous Waste Site Activities”, Section 8-20; Heat Stress and Other Physiological Factors.
- 6) All other applicable laws, rules, and regulations, including but not limited to those relating to:
- 7) Workers' Compensation Insurance;
- 8) Liability Insurance

9 All contract specifications and documentation

**3.2 Site Access**

The GAC has access to the facility for the purpose of abatement from 7:00AM to 5:00PM until project completion which is projected to be 7/22/19.

**3.3 Utilities Service**

Access to electrical power water and sanitary sewer is available inside the facility. Any temporary utility lines running to the regulated asbestos work area shall be adequately protected from damage and abrasion from vehicle and foot traffic. All waste water shall be filtered to five (5) microns prior to discharge into a sanitary sewer.

**3.4 Decontamination Facilities & Load-Out Facilities**

Personnel decontamination facilities shall consist of an Equipment (Dirty) Room, Shower, and a clean room constructed in accordance with Regulation #8 III.K Decontamination Unit. The Waste Load Out shall consist of two separate chambers constructed in accordance with Regulation #8 - III.N.3.

All load-out and disposal procedures shall be in accordance with applicable federal, state, and local regulations and project specifications.

**3.5 Critical Barriers**

All critical barriers will consist of 1 layer of 6mil poly critical barrier on all, openings, and vents.

**3.6 Negative Pressure Ventilation**

The GAC shall maintain a negative pressure differential of -0.02 inches of water in the work areas in accordance with Regulation #8 III.J Air cleaning and Negative Pressure Requirements, until final visual and clearance air monitoring complete.

**3.7 Air Exchange Calculations**

**AIR CHANGE CALCULATIONS** for a 2000 cfm negative air machine (NAM)

$$\begin{aligned}
 \text{AIR CHANGES} &= \frac{A}{B \times C} & A &= \text{Room volume in cubic feet } (l \times w \times h) \\
 & & B &= 15 \text{ minutes} \\
 & & C &= \text{Estimated 75\% rated capacity of NAM (1500 cfm)}
 \end{aligned}$$

**Example work area containment calculations:**

$$\begin{aligned}
 A &= 70 \times 12 \times 10 = 8400 \text{ cubic feet} \\
 B \times C &= 5,625 \\
 8400 &/ 5,625 = 1.49 && \text{So 2 NAM's required}
 \end{aligned}$$

### **3.8 Containment Construction**

Containments for the asbestos removal shall be constructed in accordance with CDPHE Regulation 8 and these project specifications. Danger signs will be posted at ingress locations, and approaches to locations, where airborne concentrations of asbestos exceed or can reasonably be expected to exceed the PEL. Signs will be posted at a distance sufficiently far from the work area to permit an employee to read the sign and take the necessary protective measures to avoid exposure. Additional signs may need to be posted following construction of workplace containment barriers.

Danger signs will include the following wording:

**DANGER  
ASBESTOS  
MAY CAUSE CANCER  
CAUSES DAMAGE TO LUNGS  
AUTHORIZED PERSONNEL ONLY**

### **3.9 Set up of work areas**

Regulated work area containment construction will consist of 1 layer of 6mil polyethylene sheeting (critical barriers on openings, and vents) and an additional 1 layer of 4mil polyethylene sheeting on the walls and ceiling. The floors of the regulated work area shall consist of 2 layers of 6mil polyethylene sheeting. A covering of ¾" plywood, minimum, will be required over any door or window openings over 4" in diameter to allow for the venting of negative air machines. The negative air machines shall be directly vented to the outside. A minimum of one (1) negative air machines are required for each containment. A static negative air pressure of 0.02 inches of water column shall be maintained at all times in the work area during abatement activities. Air flow testing utilizing smoke tubes will be performed to validate air flow direction and air exchanges.

### **Pre-Cleaning Activities**

Pre-cleaning activities will be performed in accordance with CDPHE Regulation 8. All workers performing pre-cleaning must utilize HEPA equipped vacuums and wet methods. Any prepping activities that will contact non-friable ACM, or be within arms' reach of friable ACM must be accomplished by workers utilizing PPE.

### **3.10 Asbestos Removal**

Removal of materials containing asbestos and contaminated with asbestos shall be performed in accordance with the Colorado Department of Public Health and Environment Regulation 8 III, Abatement, Renovation and Demolition Projects and this project work plan.

### **3.11 Asbestos Spill Response**

In the event of a spill or a breach of the regulated work area containment, the area outside the regulated work area with visible debris shall be cleaned utilizing HEPA vacuuming and wet wiping plus an additional 10 horizontal feet beyond the visible debris. All filters, mop heads, and cloths utilized during clean-up activities shall be disposed of as asbestos contaminated waste in leak tight containers.

The GAC shall have available, equipment and supplies (HEPA filtered vacuum, airless sprayer with amended water, mops, rags, polyethylene sheeting, duct tape, caution tape...) for spill response in the event of accidental spill of materials containing asbestos.



In the event of an asbestos spill outside the work area containment the GAC shall:

Immediately wet the spilled material and surrounding area with the airless sprayer.

Restrict access to the spill area and post warning signs to prevent entry to the area by persons other than those necessary to respond to the incident.

Seal all openings between the contaminated and uncontaminated areas as directed by the asbestos consultant. This is to be accomplished by using polyethylene sheeting and tape.

HEPA vacuum and wet clean all surfaces in the contaminated area.

Following completion of the above, the on-sight Air Monitoring Specialist shall conduct a visual assessment of the spill area to confirm adequate cleaning has been accomplished by the GAC.

### **3.12 Asbestos Waste Transportation, Storage, and Disposal**

All ACM waste must be wrapped in two layers of 6 mil polyethylene sheeting or double-bagged in 6 mil polyethylene bags labeled with the appropriate OSHA label for asbestos and must also bear the generator label as required by EPA's 40 CFR 61 Subpart M NESHAP Standard. Containerizing and transport of asbestos wastes shall be in accordance with applicable federal and state regulations.

The existing installed building finishes, hardscaping and landscaping shall be protected from damage by the GAC, until completion of all works.

Safety scaffolding, rubbish skips, access ladders etc. shall be approved by the client and in accordance with the current Health and Safety regulations.

GAC workers will not drag or drop packaged waste. All waste equipment and materials will be hand carried, or transported in wheeled carts to waste transport vehicles.

At the end of each work shift all packaged asbestos waste shall be directly loaded from the work area onto an enclosed, locked truck or container for disposal. No waste material may be temporarily stored in the building or the work area containment.

#### **Waste Disposal:**

All waste containers shall be transported from the permitted work areas to an approved disposal landfill by the GAC.

#### **Waste Transporter:**

By GAC.

### **3.13 Final Clean/ Final Visual Inspection Criteria**

All interior surfaces of the work area will be free of visible dust and debris. The work area must pass a final visual inspection by a CDPHE Certified Air Monitoring Specialist (AMS) leaving only critical barriers in place.

### **3.14 Final Air Clearance Monitoring**

Clearance criteria for this containment shall be in accordance with CDPHE Regulation #8, Section III.P and shall use Phase Contrast Microscopy (PCM). A minimum of five (5) air samples will be collected from the work area(s) with only critical barriers in place. Upon notification that clearance monitoring levels are acceptable, the GAC may remove critical barriers and demobilize from the work area.

If any samples collected for the final air test exceeds 0.01 f/cc the entire work area shall be re-cleaned immediately upon receipt of air test results. The abatement work area shall be re-tested and the costs associated for additional Final Clearance Air Monitoring shall be borne by the GAC at no additional cost to the Owner.

### **3.15 Personal Exposure Air Monitoring**

The GAC shall be responsible for conducting personal exposure air-monitoring as applicable in accordance with OSHA 29 CFR 1926.1101 Asbestos Construction Standard. Contractor to supply results to APM and will post results.

### **3.16 Electrical Hazards Control**

All electrical power utilized during the project will be on ground fault circuit interrupters (GFCI) whose power source is located outside the work area.

### **3.17 Emergency Egress and Fire Protection**

The abatement contractor shall abide by the emergency egress rules for the facility. All contractor personnel shall receive emergency procedure orientation specific to the facility prior to initiation of abatement activities.

### **3.18 Fire Protection Plan:**

1. No items capable of initiating or sustaining combustion (lighters, matches, torches, etc.) will be allowed in containment.
2. The use of flammable liquids is not permitted.
3. Any electricity utilized must be on Ground Fault Circuit Interrupters (GFCI).
4. A minimum of one, 2A: 20B: C rated fire extinguishers will be maintained on-site. There must be available at least one 2A: 20B: C rated fire extinguisher within a maximum travel distance of 50 feet from any point in the work area.
5. Workers will be trained in the use of fire extinguishers, emergency egress plans, basic fire safety, and emergency reporting procedures prior to work beginning.
6. All emergency exits will be labeled as such with tools available for breaching poly and keys in door locks where necessary.
7. The Contractor must implement an emergency action and fire prevention plan in accordance with 29 CFR 1910.38 Employee emergency plans and fire prevention plans.

### **3.19 Fall Protection**

The GAC shall provide proper fall protection and training for their employees when working above 6 feet of height in accordance with Occupational Safety and Health Administration 29 CFR Part 1926 Subpart M Fall Protection.

### **3.20 Respiratory Protection / PPE**

The GAC shall provide proper respiratory protection for their employees with NIOSH approved HEPA filters during all pre-clean, abatement removal, waste load out procedures and during waste lift operations for effected employees. The GAC shall provide proof of medical fitness to wear respiratory protection and current fit testing documentation for all employees.

### **3.21 Site and Work Area Protection**

The GAC shall repair or replace, to the Owners satisfaction, any damage caused by the GAC or GAC subcontractors, to existing finishes, landscaping, or other building components.

The GAC is responsible for distributing water from the designated supply to the work area (s). This will likely be done with hoses which shall be disconnected at the end of each shift. The GAC will be solely responsible for any associated damages and/or costs that might occur as a result of a water leak outside the work areas.

### **3.22 Additional PPE:**

- Hooded Tyvek suits
- Safety Glasses with side shields (exception – not required when wearing a full-face respirator).
- Leather Gloves
- Safety toe boots
- Fall Protection as required.
- Hearing protection as required
- PPE per MSDS / SDS requirements.

### **3.23 Pre-Abatement Document Submittal**


The GAC shall provide the following submittals to the Owner's APM for approval prior to site mobilization.

- ✓ Copies of all worker AHERA / STATE certifications.
- ✓ Copies of all worker asbestos medical evaluations.
- ✓ Copies of all worker respirator fit tests.
- ✓ Copies of MSDS for all chemicals (spray-glue, encapsulant, surfactant etc.) that will be used

### **3.24 Post-Abatement Document Submittal**

- ✓ Asbestos waste receipts / total.
- ✓ OSHA Personal Exposure Air Monitoring
- ✓ Copies of daily logs

Revised by:



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## Appendix A Exhibits

## Appendix B Certifications