



## **SPECIFICATIONS FOR ASBESTOS ABATEMENT**

### **CLIENT:**

**MCMILLAN PAZDAN SMITH ARCHITECTURE  
127 DUNBAR STREET  
SPARTANBURG, SC 29306**

### **SITE:**

**BYRNES HIGH SCHOOL- PHASE 2 DEMO EXTENTS  
150 E MAIN STREET  
DUNCAN, SC 29334**

**CRE Project #: PD21-0979-20740**

**Crossroads Environmental, LLC  
1258 Boiling Springs Road  
Spartanburg, SC 29303  
(864) 541-8736**

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PD#: PD-00149

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**SPECIFICATIONS FOR ASBESTOS ABATEMENT  
 BYRNES HIGH SCHOOL- PHASE 2 DEMO EXTENTS  
 150 E MAIN STREET, DUNCAN, SC 29334  
 PROJECT DESIGN #: PD21-0979-20740**

**I. PREFACE/GENERAL DESCRIPTION**

Air Monitoring and Project Management shall be performed by a qualified and licensed environmental firm that has been hired by the Building Owner. The Building Owner or other representatives of the Building Owner shall not be held liable in any way for negligence, whereas it be intentional or unintentional on the part of the Contractor.

As part of the 'Phase 2 Demolition Extents' project at Byrnes High School, all asbestos-containing materials will need to be abated prior to demolition activities.

**II. SCOPE OF WORK**

The scope of work will include abatement of all asbestos-containing materials located in the 'Phase 2 Demolition Extents' of Byrnes High School. These asbestos-containing materials include:

Material	Location	HA #	Quantity
12" x 12" Golden VFT	Located throughout the 500 hallway.	01	≈1,314 sq. ft.
9" x 9" Light Brown & Dark Brown VFT	Located in rooms 500, 501, 502, 503, 504, 505, 506, 500 Asst. Principal, 500 Conference Room, 300, 301, 302, 303, 304, 305, 306 & 307.	02	≈11,440 sq. ft.
12" x 12" Orange Vinyl Floor Tile	Located throughout the 400 hallway.	06	≈1,170 sq. ft.
12" x 12" Beige/Brown Vinyl Floor Tile	Located throughout the 300 hallway.	08	≈1,314 sq. ft.
12" x 12" Gray/Tan Vinyl Floor Tile	Located in 408, 409, 406, 407, 404, 405, 402, 403, 401, 400, 710 Annex hallway, 710, 711, 713 & 714.	09	≈10,826 sq. ft.
Transite Ceiling Panel	Located in the ceiling(s) of the 500 & 300 Electrical/Mechanical Room(s).	21	≈360 sq. ft.

Material	Location	HA #	Quantity
Pipe Run Insulation	Located in the 300 hallway, 500 hallway, and 500 & 300 Electrical/Mechanical Room(s) on potable water line(s).	24	300 In. ft.
Black Mastic on Fiberglass Roof Drain Insulation	Located on the 400 wing roof drains.	26	(4) Drains--- 14 In. ft.
Gray/Green Duct Mastic on Fiberglass	Located in the 300 Electrical/Mechanical Room on duct work at AHU.	27	24 sq. ft.
Black Mastic on Fiberglass Duct Work	Located on duct work serving the 710 Annex.	32	200 In. ft.
CMU Block Filler	Located over CMU throughout the 300 Wing, 500 Wing and 710 Annex.	33	Approximately 30,000 sq. ft.
Brick Skim Coat	Located on the 300 and 500 wing(s); material used to be exterior of structures.	36	Approximately 2,300 sq. ft.
Mechanical Flashing	Located on the 300 and 500 wing roof sections, excluding the skylights.	39	164 In. ft.
Perimeter Flashing	Located along the perimeter ends of the 300, 400, 500, and 700 hall roofing sections.	40	525 sq. ft.
Mechanical Flashing	Located along the skylights and the mechanicals on the 700 and 710 Annex.	41	220 In. ft.
TPO Roof Field over Built Up Roofing w/ Foam	Located along on the 400 and 700 hall roofing sections.	42	10,900 sq. ft.
Wall/ Mechanical Coating	Located along the perimeter wall and above the flashing on the mechanicals.	43	108 sq. ft. (Perimeter Coating Quantity Included in HA40)

### III. CONTRACTOR INFORMATION

#### A. SUBMITTALS

Project documentation including insurance certificate (see insurance requirements), SC-DHEC Asbestos Abatement Contractor's License, personnel accreditations, and waste shipment records must be submitted

to the Building Owner's Representative. The contractor and personnel accreditations must be submitted prior to project start up; waste shipment records to the Building Owner within 30 days after completion of the project.

**B. NOTIFICATIONS/LICENSES**

The Contractor is responsible for notification to SC-DHEC and for paying all applicable fees.

Contractor is responsible for obtaining a City Business license, where applicable.

**C. OSHA**

It is the abatement contractor's responsibility to fulfill all Occupational Safety and Health Administration (OSHA) requirements under CFR 1926.1101 and all other safety requirements that may be required by the work site.

**D. PERSONNEL**

**GENERAL SUPERINTENDENT/SUPERVISOR:**

Provide a General Superintendent licensed in Asbestos work that is experienced in administration, environmental remediation, general contracting coordinating, including work practices, protective measures for building and personnel, disposal procedures, etc. This person is responsible for compliance with all applicable federal, state, and local regulations, particularly those relating to asbestos-containing materials as outlined in OSHA 29 CFR 1926.1101, and 1926.20 through 1926.32. The Superintendent needs to be knowledgeable of the South Carolina Department of Health and Environmental Control Asbestos Regulation 61 61-86.1: Standards of Performance for Asbestos Projects, Effective May 27, 2011 and EPA NESHAP 61.140 Subpart M-National Emission Standard for Asbestos.

Experience and Training: The General Superintendent must be accredited as an Asbestos Abatement Supervisor in accordance with the AHERA regulation 40 CFR Part 763, Subpart E, Appendix C (ASHARA) and be licensed as a SCDHEC Asbestos Supervisor.

The General Superintendent must be on site at all times, and must be able to communicate in the language of Regulatory Personnel.

**ASBESTOS SUPERVISOR(S):**

Provide full time Supervisor(s) for inside the asbestos work area with experience in asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. One inside supervisor must be able to communicate in the language of the workers and be able to communicate in English to the Building Owner's Representative(s) and/or state regulatory personnel. All inside supervisor(s) are responsible for compliance with all applicable federal, state, and local regulations, particularly those relating to asbestos-containing materials as outlined in OSHA 29 CFR 1926.1101, and including 1926.20 through 1926.32. The Supervisor(s) need to be knowledgeable of the South Carolina Department of Health and Environmental Control Asbestos Regulation 61 61-86.1: Standards of Performance for Asbestos Projects, Effective May 27, 2011 and EPA NESHAP 61.140 Subpart M- National Emission Standard for Asbestos.

Experience and Training: The Asbestos Supervisor(s) (competent person) must be accredited as an Asbestos Abatement Supervisor in accordance with the AHERA regulation 40 CFR Part 763, Subpart E, Appendix C (ASHARA) and be licensed as SCDHEC Supervisors.

**NON-SUPERVISORY PERSONNEL:**

Provide an adequate number of qualified personnel to meet the schedule requirements of the project.

Experience and Training: All workers employed for abatement throughout the project shall be accredited as an Asbestos Abatement Worker in accordance with the AHERA regulation 40 CFR Part 763, Subpart E, Appendix C (ASHARA) and be licensed as SCDHEC Asbestos Workers.

**EVERY ASBESTOS ABATEMENT ENTITY PERFORMING WORK MUST HAVE HIS/HER ORIGINAL LICENSE, AS WELL AS A COPY OF HIS/HER MOST CURRENT TRAINING CERTIFICATE ON SITE AT ALL TIMES. HAVING THE LICENSE/CERTIFICATE IN A VEHICLE IS NOT ACCEPTABLE.**

**E. BUILDING OWNER AND OWNER'S REPRESENTATIVES**

**1. BUILDING OWNER:**

District Five Schools of Spartanburg County  
100 North Danzler Road  
Duncan, SC 29334  
Building Owner Contact: Dr. Greg Wood

2. **FACILITY:**  
Byrnes High School  
150 E Main Street  
Duncan, SC 29334
  
3. **DESIGN FIRM & PROJECT MANAGER:**  
Crossroads Environmental, LLC  
1258 Boiling Springs Road  
Spartanburg, SC 29303  
Point of Contact: Kay H. Horton

**F. POWER & WATER**

Power and water will be provided by the Building Owner. The Contractor will be responsible for hoses, connectors, power chords, etc.

**G. SANITARY FACILITIES:**

The Building Owner will provide access to designated restrooms; however, the Contractor should restrict movement outside of the work areas to restroom use only, and will be responsible for cleaning the designated restrooms.

**H. SUMMARY OF TASKS:**

Contractor shall remove and dispose of all asbestos-containing materials to be impacted by demolition activities as indicated in the specifications for **Byrnes High School- Phase 2 Demo Extents**.

Contract work includes:

1. Pre-abatement activities including pre-construction meeting, inspection, notifications, permits, submittal approvals, preparations, emergency arrangements, and submittal of plan of action.
2. Abatement activities including preparation of work site, removal and disposal of asbestos containing and/or contaminated waste, recordkeeping, security of job site, pre-work and post-work inspections, and OSHA compliance air monitoring.
3. Cleaning, Decontaminating, and Clearance activities including final inspection, clearance testing, certification of decontamination, and all post work submittals.
4. Any equipment that is unable to be moved must be polyed and protected during abatement.

**I. STOP WORK:**

If the Building Owner or Owner's Representative verbally issues a stop work order, the abatement contractor shall immediately and automatically stop all work and initiate fiber reduction activities. Do not resume asbestos removal until authorized by the Building Owner or the Owner's Representative. Do not recommence work until authorized by the Building Owner or the Owner's Representative. Standby time and cost required for corrective action will be at the contractor's expense. The occurrence of the following events shall be reported in writing to the Owner's Representative and shall require the contractor to immediately stop asbestos removal and initiate fiber reduction and other appropriate activities:

1. Excessive airborne fibers outside the containment area (>0.01 f/cc or established background levels, whichever is greater).
2. Break in either the primary or critical containment barriers.
3. Serious injury to a worker within the containment area that necessitates interruption of the normal decontamination procedures.
4. Presence of a fire and/or safety emergency.
5. Respiratory Protection System failure.
6. Power failure

**IV. PERSONAL PROTECTIVE EQUIPMENT**

The following work practices must be employed during the abatement of the above materials accordingly:

**A. WORKER PROTECTION:**

Before beginning work of this section provide workers with the required protective equipment. Require that appropriate protective equipment be used at all times.

Protective Clothing:

Coveralls: Provide disposable full-body coveralls with head covers, and require that they be worn by all workers in the Work/Isolation Area. Provide a sufficient number for all required changes, for all workers in the Work/Isolation Area.

Boots: Provide work boots with non-skid soles, and where required by OSHA, foot protection, for all workers. Provide boots at no cost to workers. Do not allow boots to be removed from the Work/Isolation Area for any



reason, after being contaminated with asbestos-containing material. Thoroughly clean, decontaminate and bag boots before removing them from Work/Isolation Area at the end of the work.

Hard Hats: Provide head protection (hard hats) as required by OSHA for all workers, and provide 4 spares for use by Owner's Representative, Project Administrator, and Owner. Require hard hats to be worn at all times that work is in progress that may potentially cause head injury. Provide hard hats with plastic strap type suspension. If hats are utilized in the Work/Isolation Area, thoroughly clean, decontaminate and bag hats before removing them from Work/Isolation Area at the end of the work.

Goggles: Provide eye protection (goggles) as required by OSHA for all workers involved in scraping, spraying, or any other activity which may potentially cause eye injury. Thoroughly clean, decontaminate and bag goggles before removing them from Work/Isolation Area at the end of work.

**B. RESPIRATORY PROTECTION:**

Description of Work:

Instruct and train each worker involved in asbestos abatement or maintenance and repair of Class I, II, and III asbestos-containing materials in proper respiratory use. Require that each worker always wear a respirator, properly fitted on the face in the Work/Isolation Area from the start of any operation which may cause airborne asbestos fibers until the Work/Isolation Area is completely decontaminated. Use respiratory protection appropriate for the fiber level encountered in the work place or as required for other toxic or oxygen-deficient situations encountered.

Respiratory Protection Program: Comply with ANSI Z88.2 - 1992 "Practices for Respiratory Protection" and OSHA 29 CFR 1910.134 and CFR 1926.1101. Require that respiratory protection be used at all times where there is any possibility of disturbance of asbestos-containing materials whether intentional or accidental. Require that a respirator be worn by anyone in a Work/Isolation Area at all times, regardless of activity, during a period that starts with any operation which could cause airborne fibers until a negative exposure assessment has been completed.

General: The employer shall provide respirators, and ensure that they are used where required. Respirators shall be used in the following circumstances:

- During all Class I asbestos jobs.
- During all Class II work where the ACM is not removed in a substantially intact state.
- During all Class II and III asbestos jobs where the employer does not produce a "negative exposure assessment".
- During all Class III jobs where TSI or surfacing ACM or PACM is being disturbed.
- During all Class IV work performed within the regulated areas where employees performing other work are required to wear respirators.
- During all work where employees are exposed above the TWA (0.1 f/cc) or excursion limit (1.0 f/cc).

**V. PREPARATION OF THE REGULATED WORK AREA(S)**

**A. REGULATED AREA DEMARCATION:**

The Regulated area is the location where environmental remediation work occurs. All class I, II, and III asbestos work as defined in OSHA CFR 1926.1101 (b) shall be conducted within regulated areas.

All work areas where asbestos work or other contaminants are being removed must be demarcated with barrier tape and signs.

Access to the regulated area shall be limited to persons authorized in accordance with OSHA and SC-DHEC.

Prohibited activities within the regulated area include, but are not limited to: no eating, drinking, smoking, chewing of tobacco and gum, or applying of cosmetics. The competent person shall ensure that all asbestos work performed within regulated area is supervised by a competent person, which is defined in South Carolina as a licensed Supervisor.

**WORK/ISOLATION AREA:**

The Work/Isolation area that is located within the regulated area is a variable of the extent of work of the Contract. It may be a portion of a room, a single room, or a complex of rooms. A "Work/Isolation Area" is considered contaminated during the work, and must be separated from the balance of the building, and decontaminated at the completion of the asbestos-control work.

Completely separate the Work/Isolation Area from other parts of the building to prevent asbestos-containing dust or debris from passing beyond the work/isolated area. Should the area beyond the Work/Isolation Area(s) become contaminated with asbestos-containing dust or debris because of the work, clean those areas in accordance with the specifications. Perform all such required cleaning or decontamination at no additional cost to owner.

Place all tools, scaffolding, staging, etc. necessary for the work in the area to be separated prior to completion of Work/Isolation Area separation.

**CONTROL ACCESS:**

Provide Warning Signs at each access to the Regulated Area on doors and/or critical barriers. Post an approximately 20 inch by 14 inch manufactured caution sign displaying the following legend with letter sizes and styles of a visibility required by OSHA 29 CFR 1926.1101:

**LEGEND:**

**DANGER  
ASBESTOS  
MAY CAUSE CANCER  
CAUSES DAMAGE TO LUNGS  
AUTHORIZED PERSONNEL ONLY  
WEAR RESPIRATORY PROTECTION AND PROTECTION CLOTHING IN THIS AREA**

Provide spacing between respective lines at least equal to the height of the respective upper line.

**B. CRITICAL BARRIERS:**

Individually seal each opening between the work area and uncontaminated areas including windows, doorways, elevator openings, corridor entrances, drains, ducts, electrical outlets, grilles, grates, diffusers, and skylights with duct tape and a minimum of two (2) independent layers of polyethylene sheeting at least 6 millimeters (mil) in thickness taped securely in place. Seal all stationary equipment with a minimum of one (1) layer of polyethylene sheeting at least 4 mil in thickness. Maintain all seals until all work, including Project Decontamination, is complete and passing clearance results have been obtained.

**C. PRIMARY BARRIERS:**

The Primary Barriers must be installed in addition to Critical Barriers as specified in the preceding paragraphs. This is to protect the building and other surfaces in the Work/Isolation Area from damage from water and high humidity or from contamination from asbestos-containing debris, slurry or high airborne fiber levels by covering with a primary barrier as described below.

**Cover all ceilings/decking materials with one (1) layer of clear polyethylene sheeting, each at least 4 mil in thickness, extending beyond wall/ceiling joints at least 12 inches,** mechanically supported and sealed with tape in the same manner as “Critical Barrier” sheet plastic barriers. Tape all joints.

**Cover any walls not being abated with a minimum of one (1) layer of clear polyethylene sheeting, each at least 4 mil in thickness, extending beyond wall/floor joints at least 6 inches,** mechanically supported and sealed with duct tape or spray-adhesive in the same manner as “Critical Barrier” sheet plastic barriers. Tape all joints.

**Cover all floors not being abated with a minimum of two (2) layers of clear polyethylene sheeting, each at least 6 mil in thickness, extending beyond wall/floor and wall/wall joints at least 12 inches on any walls not being abated,** mechanically supported and sealed with duct tape or spray-glue in the same manner as “Critical Barrier” sheet plastic barriers. Tape all joints.

**Install a viewing port** in each containment measuring at least 24 inches by 24 inches in an external wall to allow unobstructed observation of abatement activities in the work area.

**PRESSURE READINGS MUST BE RECORDED A MINIMUM OF FOUR TIMES PER 8-HR. SHIFT BY THE ON-SITE AIR MONITOR.**

**D. DECONTAMINATION UNIT:**

Provide attached Personnel Decontamination facility for containment areas. Construct the decontamination facility in compliance with OSHA 29 CFR 1926.1101 and SC-DHEC Regulations. This requires that the decontamination enclosure (decon) include a clean room, airlock, shower with controllable hot and cold water, airlock, and equipment room. In addition, the Contractor must provide an adequate changing area that

allows privacy when dressing out and a proper storage space for street clothes. Steps required to exit the work area through the decon are as follow:

- 1) Remove gross contamination and debris from protective clothing before entering the equipment room
- 2) Enter equipment room and remove and dispose of suit
- 3) Enter shower with respirator on, pass filters into equipment room for disposal
- 4) After showering, enter clean room to put on street clothes

The decontamination chambers must remain free of debris and standing water.

The Contractor must ensure that all contaminated water is filtered through a five-micron or smaller filter and discharged to a sanitary sewer system. No water (contaminated or filtered) shall be allowed to lead or drain outside of the work area.

**E. LOAD-OUT:**

Provide decontamination area for removal of bagged waste from work area. Where feasible, this load-out area should be separate from the personnel decon.

**F. TEMPORARY LIGHTING FOR FULL CONTAINMENT:**

Disconnect all existing power to lighting circuits in Work Area as described in Temporary Enclosures. All lighting to the Work Area and Decontamination facilities is to be provided from temporary electrical panel(s).

Provide the following or equivalent light level: One 100-watt incandescent lamp per 1,000 square feet of floor area, uniformly distributed, for general construction lighting, or equivalent illumination of a similar nature. In corridors and similar traffic areas provide one 100-watt incandescent lamp every 25 feet. In stairways, scaffold level, and at ladder runs, provide one lamp minimum per landing, located to illuminate each landing and flight. Provide sufficient temporary lighting to ensure proper workmanship everywhere.

- Provide lighting in areas where work is being performed to supply a 100-watt minimum light level in all areas of the work area.
- Provide lighting in any area being subjected to a visual inspection to supply a 100-watt minimum light level in all areas of the work area.

- Provide lighting in the Decontamination Unit supplying a 75-watt minimum light level.
- Provide sufficient lighting circuits as required by the work. All lighting circuits are to originate at temporary electrical panel.

**G. HEPA FILTERED FAN UNITS:**

Use units in the work areas that meet the following requirements.

Cabinets are to be constructed of durable materials able to withstand damage from rough handling and transportation. The width of the cabinet should be less than 30 inches to fit through standard-size doorways. Provide units whose cabinets are:

- \* Factory-sealed to prevent asbestos-containing dust from being released during use, transport, or maintenance.
- \* Arranged to provide access to and replacement of all air filters from intake end.
- \* Mounted on casters or wheels.
- \* Rate capacity of fan according to usable air movement capacity under actual operating conditions.
- \* Clean and operates with sufficient number of pre and secondary filters to be changed out throughout the day.

Provide an operational air circulation system supplying a minimum of the following air circulation rate: 4 air changes per hour to achieve required air circulation according to the following procedure:

Air Circulation Required in Cubic Feet of Air per Minute (CFM) =

$$\frac{\text{Volume of Work/isolation Area (cu. ft.)}}{60 \text{ (minutes per hour)}} \times \frac{\text{Number of air changes per hour}}{60 \text{ (minutes per hour)}}$$

CFM/Capacity of unit= Number of units required

Capacity of a unit for purposes of this section is the capacity in cubic feet per minute with fully loaded filters (pressure differential which causes loaded filter warning light to come on) in the machine's labeled operating characteristics or 50% of the manufacturer's rated capacity for the unit. The capacity of the combined units shall at least be capable of maintaining a negative pressure differential of -0.02 inches of water around the entire perimeter of the Work/isolation Area.

Provide a minimum of 2 additional units per containment as back-ups.

**Contractor is responsible for calculating the correct number of units per containment and for providing enough units during the removal process to ensure negative pressure.**

**ALL UNITS SHOULD HAVE NEW HEPA FILTERS INSTALLED PRIOR TO PLACEMENT ON PROJECT SITE. IF A UNIT IS FOUND TO CONTAIN A DIRTY UNIT, THE CONTRACTOR WILL BE REQUIRED TO HAVE NEW HEPA FILTERS INSTALLED IMMEDIATELY OR HAVE THE UNIT WITH THE DIRTY FILTER REMOVED FROM THE JOBSITE.**

**H. MANOMETER:**

A manometer must be utilized to measure the relative pressure. The inlet sensor of the manometer shall be located at the farthest point from any source of make-up air. The manometer must be calibrated by the Supervisor prior to the start of each work shift. The manometer record of daily readings must be recorded four times per eight-hour shift by the Licensed Air Monitor.

**I. EQUIPMENT:**

The Contractor must ensure that all necessary equipment to perform the job efficiently is provided. This includes attachments for HEPA vacuums.

**VI. REMOVAL PROCEDURES**

**Please note: Both friable and non-friable removal procedures are provided below for floor tile and mastic abatement. Flooring materials may be removed non-friable, as needed, to prepare the workspace and/or where there are single layers of tile in areas where a full containment for other materials won't be needed. Following construction of a negative pressure enclosure, friable abatement may be performed.**

- **FRIABLE ABATEMENT OF VINYL FLOORING & MASTIC WITHIN THE NEGATIVE PRESSURE ENCLOSURE:**

Remove binding strips or other restrictive molding from doorways, walls, etc. Dispose of any materials that have glue or floor mastic on them as asbestos-containing waste. Wet the floors with amended water so that entire surface is wet. Do not allow to puddle or run off to other areas. Keep floor continuously wet throughout removal operation. Bag and dispose of carpet strips as ACM. Remove tiles using a manual or powered spade, or stripping machine. Continuously mist floor in area where removal is being performed with amended water. Wet any asbestos contaminated debris generated as necessary to keep continuously wet. Keep floor where tile has been removed continuously wet until after completion of heavy adhesive residue removal. Shovel broken tiles and asbestos contaminated debris into a disposal bag. Place bagged waste in a second disposal bag during decontamination and dispose of waste as required.

Remove adhesive residue by using adhesive removal solvents. Provide a slow-drying solvent intended to remove tile adhesive. Provide material that is not flammable, does not create combustible vapors and has no significant inhalation hazard. Provide materials that have no volatile organic solvents (VOCs) unless previously approved in writing by the Building Owner's Representative. Use solvents in accordance with manufacturers' instructions. Saturate adhesive with removal solvent and allow adhesive to soften. Remove by scraping, wet sanding, or wet scrub with floor cleaning machine with abrasive pad. Provide worker protection as required by material safety data sheet (MSDS) for any material used. Mop floor with removal solvent as required by manufacturer's directions as required to completely remove all residue of adhesive.

- **NON-FRIABLE REMOVAL TECHNIQUES FOR FLOOR TILE:**

Non-friable removal techniques may be utilized in areas where the tile can be feasibly removed intact to prepare the work area for renovation and friable abatement.

The work areas shall include critical barriers, splashguards, negative air machines to be used as air scrubbers, and decontamination unit (one-stage minimum). Continuously mist the work areas and floor tiles as necessary during the removal process. Remove binding strips or other restrictive molding from doorways, walls, etc. Clean and dispose of as



non-asbestos waste. Dispose of any materials that have glue or floor mastic on them as asbestos-containing waste. Removal of the floor tiles should include the combination of infrared heat machines with flat shovels, or by the use of dry ice. Remove the tiles with minimum amount of breakage, and maintain the flooring material in a non-friable condition. Pick up whole tiles, stack, and place in labeled disposal bags or wrap in 2 layers of labeled poly. At the Contractor's option tiles may be placed directly into durable leak-tight containers. Place bagged waste in a second disposal bag during decontamination.

**Please note that in the event that the flooring material becomes friable during the removal process, work will stop and all regulatory requirements regarding the removal of friable ACM will apply.**

- **REMOVAL OF ACM MASTIC ON FIBERGLASS DUCTWORK/ROOF DRAIN INSULATION:**

Wet material, cut material to remove, and place in disposal bag for disposal as ACM waste.

- **REMOVAL OF ASBESTOS-CONTAINING CMU BLOCK/BRICK FILLER/SKIM COAT:**

All abatement of CMU block/brick filler/skim coat must be performed under full negative pressure enclosure.

For interior walls that are being completely removed prior to demo, the blocks may be removed and disposed of as ACM. Please note that Contractor is responsible for correspondence with GC and engineers regarding structural feasibility of removing walls. Crossroads is not instructing the abatement contractor to remove walls, but is providing options for abatement/removal if removal of walls is feasible from a structural standpoint. Any required shoring, etc. will be the responsibility of the abatement contractor.

For exterior walls that will remain in place, the skim coat may be removed using wet "blasting" methods employing high pressure water and/or other media, ensuring that all material is completely removed down to the substrate/bare block.

All waste, water, media etc. generated during "blasting" removal must be filtered through a five (5) micron filter and disposed of in a sanitary sewer, or drummed or bagged and disposed of as ACM.

- **REMOVAL OF THERMAL SYSTEM INSULATION (GLOVEBAG METHOD):**

Use glovebag procedures in compliance with federal and state regulations for the removal of small sections of TSI. Place a Primary Barrier of at least one layer of 6 mil polyethylene as a drop cloth below material to be removed extending at least 10 feet in all directions. Provide, at a minimum, 6 mil polyethylene, polyvinylchloride or equivalent plastic sack with two inward projecting long sleeved gloves or mittens, preprinted with same warning notice as a disposal bag, equipped with a pouch for storage of tools, with designated location for wand or HEPA vacuum wand, and sufficient capacity to hold removed materials and permit sealing as specified. Provide a hand pump type pressure-can garden sprayer fabricated out of either metal or plastic, equipped with a metal wand at the end of a hose that can deliver a stream or spray of liquid under pressure. Check pipe where the work will be performed. Wrap damaged (broken lagging, hanging, etc.), pipe in 6 mil plastic and "candy-stripe" with duct tape. Place one layer of duct tape around undamaged pipe at each end where the glove bag will be attached. Slit top of the glove bag open (if necessary) and cut down the sides to accommodate the size of the pipe (about two inches longer than the pipe diameter). Place necessary tools into pouch located inside glovebag. This will usually include at least the following items: bone saw, utility knife, rags, scrub brush, wire cutters, tin snips and pre-wetted cloth. Place one strip of duct tape along the edge of the open top slit of glove bag for reinforcement. Place the glove bag around section of pipe to be worked on and staple top together through reinforcing duct tape. Next, duct tape the ends of glove bag to pipe itself, where previously covered with plastic or duct tape. Use smoke tube and aspirator bulb to test seal. Place tube into water sleeve (two-inch opening to glove bag) squeezing bulb and filling bag with visible smoke. Remove smoke tube and twist water sleeve closed. While holding the water sleeve tightly, gently squeeze glove bag and look for smoke leaking out, (especially at the top and ends of the glove bag). If leaks are found, tape closed using duct tape and re-test. Insert wand from garden sprayer through water sleeve. Duct tape water sleeve tightly around the wand to prevent leakage. Thoroughly wet material to be worked on with amended water or removal encapsulant and allow to soak in. Wet adequately to penetrate and soak material through to substrate. One person places his hands into the long-sleeved gloves while the second person directs garden sprayer at the work. Use bone saw, if required, to cut insulation at each end of the section to be removed. A bone saw is a serrated heavy gauge wire with ring-type handles at each end. Throughout this process, spray amended

water or removal encapsulant on the cutting area to keep dust to a minimum. Remove insulation using putty knives or other tools. Place pieces in bottom of bag without dropping. Rinse all tools with water inside the bag and place back into pouch. Using scrub brush, rags and water, scrub and wipe down the exposed pipe. Remove water wand from water sleeve and attach the small nozzle from HEPA-filtered vacuum. Turn on the vacuum only briefly to collapse the bag. Remove the vacuum nozzle, twist water sleeve closed and seal with duct tape. From outside the bag, pull the tool pouch away from the bag. Place duct tape over twisted portion and then cut the tool bag from the glove bag, cutting through the twisted/taped section. Contaminated tools may then be placed directly into next glove bag without cleaning. Alternatively, tool pouch with the tools can be placed in a bucket of water, opened underwater, and tools cleaned and dried. Discard rags and scrub brush with asbestos waste. With removed insulation in the bottom of the bag, twist the bag several times and tape it to keep the material in the bottom during removal of the glove bag from the pipe. Slip a 6 mil disposal bag over the glove bag (still attached to the pipe). Remove tape or cut bag, open the top of the glove bag, and fold it down into disposal bag. Clean all surfaces in the Work Area using disposable cloths wetted with water with surfactant or removal encapsulant added. When the surfaces have dried, clean them with a HEPA filtered vacuum. Seal exposed ends of remaining pipe insulation and exposed pipe. Collapse the bag with a HEPA vacuum twist top of bag, seal with at least 3 wraps of duct tape, bend over, and seal again with at least 3 wraps of duct tape.

- **REMOVAL OF THERMAL SYSTEM INSULATION WITHIN THE NEGATIVE PRESSURE ENCLOSURE:**

Once the negative pressure enclosure has been constructed, lightly mist to the satisfaction of Owner's Representative and/or the Owner's Industrial Hygienist (IH) asbestos-containing materials to be removed. Accomplish misting by using a fine spray (mist) of amended water. Use a mixture of surfactant and water which results in wetting of the Asbestos-Containing Material and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water. Saturate material through to the substrate sufficiently to wet to the substrate without causing excess dripping. Allow time for amended water to penetrate material thoroughly. Spray material repeatedly

during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions.

Mist the work area continuously with amended water whenever necessary to reduce airborne fiber levels.

As the material is removed, pack material while still wet into labeled 6-mil disposal bags. Do not allow material to dry out. Evacuate air from disposal bags with a HEPA filtered vacuum cleaner before sealing. Use the "gooseneck" procedure to seal bags by twisting the neck of the bags, sealing with duct tape, bending the neck of the bag over, and sealing again with a minimum three wraps of duct tape. Clean outside of bag and move to Wash-Down Station adjacent to Equipment Decontamination Unit.

- **WET REMOVAL PROCEDURES DURING FRIABLE REMOVAL OF TRANSITE PANEL(S) WITHIN THE NEGATIVE PRESSURE ENCLOSURE:**

The negative pressure enclosure shall consist of critical barriers, a minimum of one layer of 4-mil polyethylene sheeting on the ceilings, a minimum of two layers of 6 mil polyethylene sheeting on the floors (only in areas where there is no floor tile to be abated), negative pressure differential machines, and a decontamination unit. Once the negative pressure enclosure has been constructed, lightly mist with a fine spray (mist) of amended water. Use a mixture of surfactant and water which results in wetting of the Asbestos-Containing Material and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water. Saturate material through to the substrate sufficiently to wet to the substrate without causing excess dripping. Allow time for amended water to penetrate material thoroughly. Spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions.

Mist work area continuously with amended water whenever necessary to reduce airborne fiber levels.

As the material is removed, pack material while still wet into labeled 6-mil disposal bags. Do not allow material to dry out. Evacuate air from

disposal bags with a HEPA filtered vacuum cleaner before sealing. Use the "gooseneck" procedure to seal bags by twisting the neck of the bags, sealing with duct tape, bending the neck of the bag over, and sealing again with a minimum three wraps of duct tape. Clean outside of bag and move to Wash Down Station adjacent to Equipment Decontamination Unit.

- **REMOVAL OF ROOFING MATERIALS:**

Mist roof flashing, field, ACM caulks/mastics, and associated materials with amended water so that entire surface is wet. During removal, ensure that there are no visible emissions of dust from the work area.

ALL roofing materials and associated flashings must be placed in a 6-mil disposal bag, wrapped in 6-mil polyethylene sheeting, or placed in a leak-tight DOT approved container. Bagged, wrapped, or drummed asbestos roofing material must be lowered to the ground by being carried or passed to ground by hand, lowered in dust-tight chute, or lowered with crane or hoist, and no later than the end of the work shift.

**CLEAN UP**

Dispose of all rags, plastic sheet, etc. as ACM.

Decontaminate Equipment: After the completion of all work, decontaminate all equipment and machinery used for work.

**VII. WASTE STORAGE AND DISPOSAL PROCEDURES**

All ACM waste materials are to be contained in one of the following: (1) Two 6 mil disposal bags, both bags twisted closed, folded over (gooseneck style), and both bags sealed with duct tape; (2) One 6 mil disposal bag, sealed as previously described placed into a durable leak-tight disposable container; (3) DOT-approved drum; (4) Two layers of 6-mil polyethylene sheeting sealed at seams with duct tape.

Waste stored on the site prior to disposal, must be maintained in a secured, locked location where access is controlled.

**LABELING OF DISPOSAL CONTAINERS:**

On the outside of the chosen disposal container, the following three labels must be placed and visible:

**First Label:** Provide in accordance with 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard:

**Second Label:** Until October 1, 1993, provide in accordance with U. S. Department of Transportation regulation on hazardous waste marking. 49 CFR Parts 171 and 172. Hazardous Substances: Final Rule. Published November 21, 1986 and revised February 17, 1987:

**Third Label:** Provide in accordance with 40 CFR Part 61 (AMENDED), subpart M, section 61.150(a)(1)(v) of EPA's National Emission Standards for Hazardous Air Pollutants; Asbestos NESHAP Provision. Published November 20, 1990.

All waste is to be hauled by a waste hauler with all required licenses from all state and local authorities with jurisdiction. Protect walls, floors, and ceilings of the interior of the truck or dumpster with one layer of 6 mil polyethylene sheeting. Floor sheeting shall be installed first and shall extend up the side wall at least 12 inches and taped securely into place. Wall sheeting shall overlap by at least six inches and be taped into place. Ceiling sheeting shall extend down the sides of the walls at least six inches and be taped into place. Take containers from the Work Area directly to a sealed truck or dumpster. Do not transport disposal bagged materials on open trucks. Comply with any local or state regulations for prior notice and delivery, and comply with any special landfill requirements.

At a disposal site, vehicles shall approach the dump location as closely as possible for unloading of the asbestos waste. Bags, drums and wrapped components shall be inspected when unloaded at the disposal site. Material in damaged containers shall be re-wrapped or re-packed in empty bags or drums. If more than 25% of the bags are broken or damaged, return to work site for re-bagging. Waste containers shall be placed on the ground at the disposal site, not pushed or thrown out. Following the removal of all containerized waste, polyethylene sheeting shall be removed and discarded in bags or drums along with contaminated cleaning materials and protective clothing. Clean cargo area of the truck or dumpster by wet-wiping with amended water and/or using a HEPA vacuum cleaner.

Retain Waste Shipment Records (WSRs) from landfill and/or processor for materials disposed of. At completion of hauling and disposal of each load submit copy of waste manifest and landfill receipts to Owner's Representative and comply with local and state regulations for disposal documentation.

As per NESHAPS 61.150 vii(3)(4) waste shipment records shall be obtained from the landfill/or hauler within 35 days, if not received within 45 days, EPA shall be notified by the contractor of unresponsive records.

#### **VIII. AIR MONITORING AND PROJECT COMPLETION**

A qualified and licensed air monitoring firm shall provide all air monitoring and perform all visual inspections.

##### **BACKGROUND AIR MONITORING:**

Background monitoring shall be performed both inside and outside of the work areas to establish existing ambient air levels under normal activity conditions. The background samples will be analyzed using Phase Contrast Microscopy (PCM) analysis.

##### **DAILY AREA AIR MONITORING:**

The purpose of the Owner's daily area air monitoring is to evaluate quality, resolve problems, and minimize the potential for the spread of contamination beyond the work area. In addition, the work of the Owner's IH includes performance of the final visual inspection and testing to determine whether a space or a building has been adequately decontaminated. All daily air monitoring is to be done utilizing Phase Contrast Microscopy (PCM) except for Final Clearance Monitoring as specified in the following paragraphs. Owner's Air Monitor will perform the following tasks:

1. Perform continuous air monitoring, inspection and testing inside and outside the work area during actual abatement work to detect any faults in the work area isolation and any adverse impact on surrounding areas from work area activities
2. Perform final inspection and testing of decontaminated areas or buildings at the conclusion of the abatement and clean-up work to certify compliance with decontamination standard.

All data, inspection results, and testing results generated by the Owner's IH will be available to the contractor for information and consideration. Contractor shall provide cooperation and support to the Owner's IH for efficient and smooth performance of their work.

Monitoring and inspection results of the IH may be used to issue any stop removal orders to the contractor during abatement work and to accept or reject an area or a building as decontaminated.

This section also sets forth airborne fiber levels both inside and outside the work area as action levels, and describes the action required by the Contractor if an action level is met or exceeded.

**STOP ACTION LEVELS:**

Inside Work Area: Maintain an average airborne count in the work area of less than .05 f/cc. If the fiber counts rise above this figure for any sample taken, revise work procedures to lower fiber counts. If the Time Weighted Average (TWA) fiber count for any work shift or 8 hour period exceeds the Stop Action Level, stop all work except corrective action, leave pressure differential and air circulation system in operation and notify Owner's Representative. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by Owner's Representative.

If airborne fiber counts exceed 0.1 f/cc cease all work except corrective action. Notify Owner's Representative. Do not recommence work other than corrective action for 24 hours unless otherwise authorized, in writing, by Owner's Representative.

Outside Work Area: If any air sample taken outside of the Work Area exceeds 0.01 f/cc or the base line established by background air monitoring, immediately and automatically stop all work except corrective action. The Owner's Representative will determine the source of the high reading and notify the Contractor in writing.

If the high reading was the result of a failure of Work Area isolation measures initiate the following actions:

- Immediately erect new critical barriers to isolate the affected area from the balance of the building. Erect Critical Barriers at the next existing structural isolation of the involved space (eg. wall, ceiling, floor).
- Decontaminate the affected area in accordance with Project Decontamination Procedures.
- Require that respiratory protection as set forth in Respiratory Protection be worn in affected area until area is cleared for re-occupancy in accordance with Final Clearance Monitoring.



- Leave Critical Barriers in place until completion of work and ensure that the operation of the pressure differential system in the Work Area results in a flow of air from the affected area into the existing Work Area.
- If the exit from the clean room of the personnel decontamination unit enters the affected area, establish a separate decontamination facility consisting of a Shower Room and Changing Room.
- After Certification of Visual Inspection in the Work Area, remove critical barriers separating the work area from the affected area. Final air samples will be taken within the entire area as set forth in Final Clearance Monitoring.

If the high fiber reading was the result of other causes, initiate the corrective action as determined by the Owner's Representative.

**CONTRACTOR RELEASE CRITERIA FOR FINAL WORK AREA CLEARANCE:**

**1) VISUAL INSPECTION**

Final Clearance Monitoring will not begin until the Asbestos Abatement Work Area airborne asbestos structure concentrations have been reduced to the level specified and described in Project Decontamination is complete, the area has passed a thorough visual inspection by the Owner's Air Monitor and the Project Manager and successful completion of these requirements has been certified by the Owner's Air Monitor and Project Manager. The visual inspection will be performed at the request of the Supervisor following fine cleaning of the work area.

**2) ENCAPSULATION**

A coating of compatible encapsulant must be applied to porous surfaces that have been stripped and cleaned of ACM. This must be compatible with the substrate of the replacement material.

**3) REMOVAL OF PRIMARY BARRIERS**

After all encapsulant is thoroughly dry, all primary barriers, if present, must be removed. If any evidence of contamination is observed after removal of the primary barriers, the debris/particulate should be HEPA vacuumed and wet-wiped under not residue remains.

**4) FINAL AIR MONITORING**

**TEM clearance sampling will be required on this project due to the amount of friable ACM present.**

Sampling sensitivity in the tables below refer to:

Analytical Sensitivity for TEM analysis as set forth in the analytical method used and/or the AHERA regulation.

TEM samples will be secured as indicated below:

**TRANSMISSION ELECTRON MICROSCOPY:**

In each homogeneous work area after completion of all cleaning work, a minimum of 5 samples, or sufficient for the size of the project, will be taken and analyzed as follows:

Location Sampled	Number of Samples	Analysis Method	Analytical Sensitivity (fibers/cc)	Recommended Volume (liters)	Rate in Liters per Minute (LPM)
Work Area	A minimum of 5	TEM	0.005	1,200-1,800	1-10
Outside of Work Area	5*	TEM	0.005	1,200-1,800	1-10
Work Area Blank	1	TEM	0.005	0	Open for 30 Seconds
Outside of Work Area Blank	1	TEM	0.005	0	Open for 30 Seconds
Laboratory Blank	1	TEM	0.005	0	Do Not Open

\* If samples collected inside of the work area report >70 structures/mm<sup>2</sup>, TEM samples shall be collected outside of the work area.

Analysis will be performed using the analysis method set forth in the AHERA Regulation 40 CFR Part 763 Appendix A.

Asbestos Structures referred to in this Section include asbestos fibers, bundles, clusters or matrices, as defined by method of analysis.

Release Criteria: Decontamination of the work site is complete if:  
The arithmetic mean (average) asbestos concentration is less than 70 structures per square millimeter of filter area.

**LABORATORY TESTING AND ANALYTICAL METHODS:**

**PHASE CONTRAST MICROSCOPY (PCM):**

Analysis of background and daily samples will be performed utilizing the methods set forth in NIOSH 7400 method.

**TRANSMISSION ELECTRON MICROSCOPY (TEM):**

Analysis of clearance samples will be performed using the analysis method set forth in the AHERA regulation 40 CFR Part 763 Appendix A. Samples will be sent by overnight courier for analysis by Transmission Electron Microscopy. Samples will not be carried on weekends, so that samples shipped on Friday will arrive on the following Monday. Faxed and Verbal results will normally be available during the 2ND working day after receipt of samples by the laboratory. All Transmission Electron Microscopy results will be available to the Contractor.

**SAMPLE VOLUMES:**

The number and volume of air samples taken by the Owner will be in accordance with all regulations and standards governing air monitoring. Additional samples may be taken at Owner's or Owner's Representatives discretion. If airborne fiber counts exceed allowed limits additional samples will be taken as necessary to monitor fiber levels.

**SAMPLE CASSETTES:**

PCM: Samples will be collected on 25 mm cassettes with a 0.80 micrometer mixed cellulose ester filter.

TEM: Samples will be collected on 25 mm cassettes with 0.45 micrometer mixed cellulose ester filter.

**WRITTEN REPORTS:**

Written reports will be posted at the job site on a daily basis, and within 24 hours of collection of the samples. Location will be determined by Owner's Representative and Contractor's General Superintendent. Clearance results shall be posted at the site prior to tear-down of the containment area(s).

**ADDITIONAL TESTING:**

The Contractor may conduct his own air monitoring and laboratory testing. If he elects to do this the cost of such air monitoring and laboratory testing shall be at no additional cost to the Owner.

If clearance samples do not meet clearance criteria, Contractor will be responsible for reimbursement to County for air monitoring and samples cost for re-test.

**PERSONAL MONITORING:**

Contractor is responsible for performing air monitoring to meet Contractor's OSHA requirements for personnel sampling or any other purpose.

**IX. SUBMITTALS**

The list below includes the submittal requirements prior to the start of work, and before project closeout. Submittal for the section At Project Closeout must be submitted to the Owner's Representative with the Final Payment Request.

**SUBMITTAL CHECKLIST - MANDATORY**

Submittal for section Before Start of Work must be turned in to the Owner or the Owner's Representative at the Pre-Construction Meeting. If no Pre-Construction Meeting is held, then the paperwork must be submitted to the Owner's or the Owner's Representative Office 48 Hours before the start of work. The Owner or Owner's Representative will then give the contractor written permission to begin work. The Contractor will not begin work without written permission.

**BEFORE START OF WORK**

- \_\_\_\_\_ 1. Copy of Contractor's SC-DHEC Contractor's License.
- \_\_\_\_\_ 2. Copies of SC-DHEC Licenses for each individual that will be working on the job site.
- \_\_\_\_\_ 3. SC-DHEC Permit
- \_\_\_\_\_ 4. Insurance Certificate

Submittal for the section Periodically During Work or Before Project Closeout must be submitted to the Owner or Owner's Representative with the Progressive Payment Request. If Progressive Payments are not indicated, then the submittals must be turned into the Owner or Owner's Representative Office before the Project Closeout. Contractor must have written permission from Owner or Owner's Representative before beginning Project Closeout.

**PERIODICALLY DURING WORK OR BEFORE PROJECT CLOSEOUT**

- \_\_\_\_\_ 5. Copy of containment checklist filled out by Air Monitor and Contractor
- \_\_\_\_\_ 6. Daily Logs filled out and signed by the Project Supervisor
- \_\_\_\_\_ 7. Daily Sign In\Sign Out Sheets
- \_\_\_\_\_ 8. Contractor's copy of Initial Exposure Assessment
- \_\_\_\_\_ 9. Contractor's copy of Negative Exposure Assessment
- \_\_\_\_\_ 10. Contractor's copy of Daily Air Monitoring Results
- \_\_\_\_\_ 11. Accident and Incident Investigation Report
- \_\_\_\_\_ 12. Visitor Log and signed Visitor's Authorization Form
- \_\_\_\_\_ 13. Documentation of Manometer Readings and Asbestos Filtration (AFD) and Water Filtration (WFD) Device Inspections
- \_\_\_\_\_ 14. Personnel Air monitoring reports

Submittal for the section At Project Closeout must be submitted with the Final Payment Request.

**AT PROJECT CLOSEOUT**

- \_\_\_\_\_ 15. Certification of Removal
- \_\_\_\_\_ 16. Asbestos Chain-of-Custody Form (Trip Ticket) completed by and signed by the Contractor Representative, Transporter and Disposal Site Representative within 35 days as required by NESHAPS 61.150 vii(3)(4)

Copies of the submittals for the section Items to be Submitted by the Air Monitoring Firm should also be obtained by the Contractor and included in the Contractor Submittals as indicated above.

**ITEMS TO BE SUBMITTED BY THE AIR MONITORING FIRM(S)**

- \_\_\_\_\_ 17. Air monitoring reports posted within 24 hours
- \_\_\_\_\_ 18. Summary to owner within 5 days
- \_\_\_\_\_ 19. Copy of Air Monitor's license(s)