Review/Approved By:

Julian Fernandez-Obregon
Project Manager
AHERA Project Designer
Certification #54212

Date: 12/13/18

Prepared By:

Rafael L. Torres, III
AHERA Project Designer
Certification #49935

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## CONTENTS

1.0  **INTRODUCTION** .................................................................................................................................................. 1

1.1 Scope of the Abatement Work .................................................................................................................................. 1

2.0  **BACKGROUND AND DEFINITIONS** .................................................................................................................. 3

2.1 Description of the Abatement Work ......................................................................................................................... 3

2.2 Definitions .................................................................................................................................................................. 3

3.0  **REGULATIONS AND SUBMITTALS** .................................................................................................................... 7

3.1 Regulations ................................................................................................................................................................. 7

3.2 Submittals .................................................................................................................................................................... 8

4.0  **MATERIALS AND EQUIPMENT** ........................................................................................................................ 9

4.1 Materials ................................................................................................................................................................... 9

4.2 Equipment ................................................................................................................................................................. 10

5.0  **PROJECT EXECUTION** ........................................................................................................................................ 12

5.1 Controlled Access to Site ............................................................................................................................................ 12

5.2 Worker and Visitor Protection .................................................................................................................................... 12

5.3 Abatement Work Area Entry and Exit Procedures ................................................................................................. 14

5.4 Respiratory Protection ............................................................................................................................................... 14

5.5 Air Monitoring:  Stop Action and Clearance Levels .............................................................................................. 15

5.6 Initial Isolation of Abatement Work Areas ............................................................................................................. 15

5.7 Preparation of Abatement Work Area and Temporary Enclosures ................................................................. 16

5.8 Construction of Decontamination Enclosures ....................................................................................................... 17

5.9 Air Circulation Inside Containment Barrier ............................................................................................................ 18

5.10 Placement of Air Filtration System Units ............................................................................................................... 18

5.11 Pressure Differential Isolation ................................................................................................................................... 19

5.12 Pre-Abatement Inspection, Testing, and Approval ................................................................................................ 19

5.13 Maintenance of Containment Barrier and Enclosures .......................................................................................... 20

5.14 Removal of Asbestos-Containing Materials ...................................................................................................... 21

5.15 Post Removal:  Cleaning and Clearance ................................................................................................................ 22

5.16 Post Clearance:  Application of Lockdown Encapsulant ........................................................................................ 23

5.17 Containment Barrier Removal .................................................................................................................................. 23

5.18 Waste Disposal ......................................................................................................................................................... 24

5.19 Job Close-Out ............................................................................................................................................................ 25
1.0 INTRODUCTION

PARS Environmental, Inc. (PARS), on behalf of Rowan University (Rowan) prepared this Asbestos Abatement Work Plan to address the removal of asbestos-containing materials (ACM) at Bunce Hall. This Asbestos Abatement Work Plan details the planning, administration, execution, and cleaning necessary to safely remove ACM and contaminated materials from the Sites prior to demolition activities. All asbestos abatement activities will comply with all local, State, and Federal codes, laws, and regulations governing asbestos removal. All abatement will be done outside Rowan University normal operating hours of 6 AM to 10 PM and or Weekends.

1.1 Scope of the Abatement Work

Based on the initial asbestos inspection performed by PARS, the following materials were found to contain asbestos greater than one percent.

<table>
<thead>
<tr>
<th>Material</th>
<th>Location</th>
<th>Estimated Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tan 12”x12” Floor Tile and Associated Mastic</td>
<td>Throughout 3rd Floor</td>
<td>10,000 SF</td>
</tr>
<tr>
<td>Carpet Mastic / Leveling Compound</td>
<td>Throughout 3rd Floor</td>
<td>5,000 SF</td>
</tr>
<tr>
<td>Beige 12”x12” Floor Tile and Associated Mastic</td>
<td>Classrooms Under Carpet</td>
<td>10,000 SF</td>
</tr>
<tr>
<td>Beige Carpet Mastic</td>
<td>Classrooms Under Carpet</td>
<td>10,000 SF</td>
</tr>
<tr>
<td>Gray 12”x12” Floor Tile and Associated Mastic</td>
<td>Room 329, Offices</td>
<td>1,000 SF</td>
</tr>
<tr>
<td>Red 12”x12” Floor Tile and Associated Mastic</td>
<td>Offices 333-337, 254, 255, 256</td>
<td>5,000 SF</td>
</tr>
<tr>
<td>White/Gray 12”x12” Floor Tile</td>
<td>Auditorium Hallway</td>
<td>1,500 SF</td>
</tr>
<tr>
<td>Beige/Tan 12”x12” Floor Tile and Associated Mastic</td>
<td>Throughout Basement</td>
<td>10,000 SF</td>
</tr>
<tr>
<td>Beige Mastic Associated with White 12”x12” Floor Tiles</td>
<td>Basement</td>
<td>200 SF</td>
</tr>
<tr>
<td>Beige and Black Carpet Mastic</td>
<td>Basement Offices and Classrooms</td>
<td>2,500 SF</td>
</tr>
<tr>
<td>Transite™ Transom Panels</td>
<td>Throughout Building</td>
<td>3,000 SF</td>
</tr>
</tbody>
</table>
The removal of the ACM will be performed utilizing non-friable removal techniques and procedures. As such, a full decontamination enclosure complete with airlocks and shower is not required.

The Contractor is responsible for obtaining all local, state, and federal permits and approvals for performing the abatement.
2.0 BACKGROUND AND DEFINITIONS

2.1 Description of the Abatement Work
2.1.1 The asbestos abatement shall also include, but not be limited to the following:
(a) Notification to regulatory agencies
(b) Regulatory permits, licenses and approvals
(c) Worker health and safety program
(d) Air monitoring
(e) Construction of containment barrier/decontamination enclosures
(f) Preparation for abatement operations
(g) Removal of existing ACM
(h) Transport and disposal of ACM
(i) Decontamination and cleaning
(j) Removal of temporary containment barrier/decontamination enclosures
(k) Final job close-out

2.1.2 Other Work Not Included: PARS reserves the right to collect and analyze samples or retain an independent testing laboratory to provide supplemental sampling services. These services do not relieve the Contractor from completing personal air testing as required by these specifications, OSHA, or any other requirements of other agencies with jurisdiction authority.

2.2 Definitions
2.2.1 Abatement: Procedures to control or eliminate fiber release from asbestos-containing building materials, to include encapsulation, enclosure and removal.

2.2.2 Abatement Work Area (regulated area): An area established by the employer to demarcate areas where Class I, II, III and IV asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos, exceed or there is a reasonable possibility they may exceed the permissible exposure limit.

2.2.3 Air Monitoring: The process of measuring the fiber content of a specific volume of air during a stated period of time.

2.2.4 Amended Water: Water to which a surfactant (wetting agent) has been added to increase the ability of the liquid to penetrate asbestos containing materials (ACM).

2.2.5 ANSI: American National Standards Institute.

2.2.6 ASTM: American Society for Testing and Materials.

2.2.7 Asbestos: Asbestiform varieties of chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.
2.2.8 Asbestos-Containing Material (ACM): Any material containing more than 1% asbestos by volume of any type or mixture of types.

2.2.9 Authorized Person: Any person authorized by the SI and required by work duties to be present in a regulated area.

2.2.10 Class II Asbestos Work: Activities involving the removal of ACM which is not TSI or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

2.2.11 Clean Room: An uncontaminated area or room which is part of the abatement worker/equipment decontamination enclosure, with provisions for storage of workers' or visitors' street clothing, protective equipment and uncontaminated materials and equipment. It may be used for changing clothes.

2.2.12 Competent Person: In addition to the definition in 29 CFR 1926.32 (f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32 (f). In addition, the competent person shall have successfully completed training for Class I, Class II, Class III, and Class IV projects meeting the criteria set forth in the EPA Model Accreditation Plan (40 CFR 763) for project designer or supervisor, and operations and maintenance training.

2.2.13 Decontamination Enclosure: A series of connected rooms with curtained doorways between each room, for the decontamination of the abatement workers and equipment/materials. A decontamination enclosure contains a minimum of three (3) separate rooms (typically with airlocks located between the rooms) consisting of an equipment room, shower room, and clean room. The system is constructed of an air-tight, impermeable, temporary barrier. Framing for enclosure shall be metal or fire-retardant pressure impregnated wood.

2.2.14 Disposal Bag: A properly labeled minimum 0.15 mm (6 mil) thick, leak-tight plastic bag used for transporting asbestos waste from the abatement work area to an EPA-approved disposal site for ACM waste.

2.2.15 Disturbance: Contact which releases fibers from ACM or presumed asbestos-containing material (PACM) or debris containing ACM or PACM. This term includes activities that disrupt the matrix of ACM or PACM, render ACM or PACM friable, or generate visible debris. Disturbance includes cutting away small amounts of ACM and PACM, no greater than the amount which can be contained in one standard sized glove bag (as defined in 2.2.33) or waste bag in order to access a building component. In no event shall the amount of ACM or PACM so disturbed exceed that which can be contained in one glove bag or waste bag which shall not exceed 1.52 m in length and width.
2.2.16 **Equipment Room**: A contaminated area or room which is part of the decontamination enclosure, with provisions for storage of contaminated clothing and equipment and cleaning supplies for decontamination of equipment. Airlocks are required at all entrances to the equipment room.

2.2.17 **EPA**: United States Environmental Protection Agency.

2.2.18 **Excursion Limit**: Airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc), as averaged over a sampling period of thirty minutes.

2.2.19 **Fiber**: A particulate form of asbestos, 5 micrometers or longer, with a length-to-width ratio of at least 3 to 1.

2.2.20 **Fixed Object**: A unit of equipment or furniture in the abatement work area which cannot be removed from the abatement work area.

2.2.21 **GFCI** (Ground Fault Circuit Interrupter): A type of ground fault protection in areas where personnel are at high risk of receiving electrical shocks (for example, in damp locations); makes use of a device designed to trip at a ground current in the milliampere range, i.e., very much below currents that are normally harmful.

2.2.22 **HEPA Filter**: A High Efficiency Particulate Air (HEPA) filter capable of trapping and retaining 99.97% of all mono-dispersed particles 0.3 micrometer in diameter or larger.

2.2.23 **HEPA-Filtered Vacuum Cleaner**: HEPA-filtered vacuuming equipment with a filter system capable of collecting and retaining asbestos fibers.

2.2.24 **Impermeable Waste-Disposal Containers**: Suitable to receive and retain any asbestos-containing or contaminated material until disposal at an approved site. The containers shall be labeled in accordance with OSHA Regulation 29 CFR 1910.1001 and 29 CFR 1926.1101. Containers must be both water-tight and air-tight.

2.2.25 **Movable Object**: A unit of equipment or furniture in the abatement work area which can be removed from the abatement work area.

2.2.26 **MSHA**: Mine Safety and Health Administration.

2.2.27 **Negative Exposure Assessment (NEA)**: A demonstration by the Contractor, which complies with the criteria in OSHA 29 CFR 1926.1101(f)(2)(iii), that employee exposures during an operation are expected to be consistently below the permissible exposure limits (PELs). Such assessment is to be used to justify level of respiratory protection to be used on the job.

2.2.28 **NESHAPS**: National Emissions Standard for Hazardous Air Pollutants.
2.2.29 **N.E.C.:** National Electrical Code.

2.2.30 **NIOSH:** National Institute for Occupational Safety and Health.

2.2.31 **OSHA:** Occupational Safety and Health Administration.

2.2.32 **PEL:** Permissible Exposure Limit. An occupational limit of exposure to a chemical substance or physical agent.

2.2.33 **Personal Monitoring:** Sampling of asbestos fiber concentrations within the breathing zone of an employee. Breathing zone is defined as a radius of 150 mm to 250 mm around the employee's head.

2.2.34 **Personal Protective Equipment:** Equipment which may consist of coveralls, shoes, gloves, helmet, goggles, and respirator used for protection against asbestos exposure.

2.2.35 **Plastic Sheeting:** Fire retardant Polyethylene sheet material of specified thickness used for protection of walls, floors, etc., and critical barriers in the abatement work area.

2.2.36 **Protection Factor:** The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.

2.2.37 **Respirator:** A device designed to protect the wearer from the inhalation of harmful atmospheres and approved by NIOSH or MSHA for a specific category of use.

2.2.38 **Surfactant:** A chemical wetting agent added to water to decrease surface tension and improve material penetration.

2.2.39 **Tape:** Glass fiber or other tape capable of sealing joints of adjacent sheets of plastic (0.15 mm [6 mil] polyethylene) and for attachment of plastic sheets to finished or unfinished surfaces of dissimilar materials under both dry and wet conditions, including use of amended water. Minimum tape width shall be 51 mm.

2.2.40 **Warning Labels and Signs:** As required by OSHA regulations 29 CFR 1910.1001 and 1926.58.

2.2.41 **Wet Cleaning:** The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with amended water.
3.0 REGULATIONS AND SUBMITTALS

3.1 Regulations
The Contractor shall comply with the most current edition of all local, State, and Federal codes and ordinances as they apply to the location(s) in which the work is performed. Make available for review at the site one copy of all applicable local, State, and Federal regulations governing the abatement work, including but not limited to:

3.1.1 Occupational Safety and Health Administration (OSHA), U.S. Department of Labor
(a) 29 CFR 1910 (General Industry) and 29 CFR 1926 (Construction) Occupational Safety and Health Standards
(b) 29 CFR 1910.1001 and 29 CFR 1926.1101 Asbestos
(c) 29 CFR 1910.134 Respiratory Protection
(d) 29 CFR 1910.1200 Hazard Communication

3.1.2 U. S. Department of Transportation
(a) 49 CFR 171 Subchapter C, Hazardous Materials Regulations
(b) 49 CFR 172 Subchapter C, Shipping Container Specifications

3.1.3 U.S. Environmental Protection Agency
(a) 40 CFR 763, Toxic Substances Control Act; particularly Subpart E, Asbestos Containing Materials in Schools
(b) 40 CFR 61, Sub-parts A and M, National Emission Standard for Hazardous Air Pollutants (NESHAPS)

3.1.4 New Jersey Department of Community Affairs
(a) N.J.A.C. 5:23-8, Asbestos Hazard Abatement Subcode

3.1.5 New Jersey Department of Environmental Protection
(a) N.J.A.C. 7:26, Division of Solid and Hazardous Waste Rules

3.1.6 New Jersey Department of Labor and Workforce Development
(a) N.J.S.A. 34:5A-32, Asbestos Control Licensing Act

3.1.7 American National Standards Institute (ANSI), 1430 Broadway, New York, New York 10018. Telephone (212)354-3300
(a) ANSI Publication Z88.2 Practices for Respiratory Protection
3.2 Submittals

3.2.1 Notices: The Contractor shall notify the appropriate federal, state, and local regulatory agencies in writing a minimum of 10 days in advance of any asbestos-related work. Notifications shall be made by the Contractor as required by USEPA National Emission Standards for Hazardous Air Pollutants (NESHAPS) Asbestos Regulations (40 CFR 61, Subpart M). Submit copies of notifications and documentation to PARS. If a project consists of multiple phases, with distinct start and stop dates, these shall be declared on the USEPA Notice or individual notices shall be filed for each phase.

3.2.2 Permits and Licenses: Maintain current licenses and obtain applicable permits as required by federal and applicable state or local jurisdictions for the removal, transporting, disposal or other regulated activity relative to the abatement work of this contract. Submit copies of all state and local licenses and permits necessary to carry out the abatement work of this contract.

3.2.2.1 All asbestos containing waste is to be transported by an entity maintaining a current "solid waste hauler permit" specifically for asbestos-containing materials (ID-27A), as required for transporting of waste asbestos-containing materials to a disposal site.
4.0 MATERIALS AND EQUIPMENT

4.1 Materials

4.1.1 Caulking: High-grade rubber base caulk for masonry and/or for other materials.

4.1.2 Encapsulant: Product shall be rated as acceptable for use intended when field tested in accordance with ASTM Proposed Specification P-189 “Specification for Encapsulants for Friable Asbestos-Containing Building Materials”. Use only materials that have a flame spread index of 25 or less when dry, when tested in accordance with ASTM E-84.

4.1.3 Glove-Bag: 0.15 mm (6 mil) thick, 1500 mm x 1500 mm, transparent polyethylene or polyvinylchloride plastic with long sleeve gloves, designated inlets for HEPA vacuum attachment, and storage pouch.

4.1.4 Impermeable Waste-Disposal Containers: Suitable to receive and retain any asbestos-containing or contaminated material until disposal at an approved site. The containers shall be labeled in accordance with OSHA Regulation 29 CFR 1910.1001 and 29 CFR 1926.1101. Containers must be both water-tight and air-tight.

4.1.5 Plastic Sheeting: Product Standard PS 17-69 and OSHA Regulation 29 CFR 1926.1101; polyethylene plastic sheeting material 0.15 mm (6 mil) thickness for covering floors and walls, providing air locks, and sealing doors and windows; supply in appropriate widths to minimize seams. Must be flame-resistant material and must meet test criteria in NFPA 701. Reinforced sheeting is required for applications subject to wear and tear.

4.1.6 Surfactant (Wetting Agent): 50% polyoxyethylene ester and 50% polyoxyethylene ether, or approved equal, shall be mixed with water to provide a concentration of 2 ml surfactant to 1 liter of water, or manufacturer's recommended concentration.

4.1.7 Tape: Glass fiber or other tape capable of sealing joints of adjacent sheets of plastic sheeting and for attachment of plastic sheets to finished or unfinished surfaces of dissimilar materials under both dry and wet conditions, including use of amended water. Minimum tape width shall be 50 mm.

4.1.8 Warning Labels and Signs: As required by OSHA regulations 29 CFR 1910.1001 and 1926.58.

4.1.9 Waste Water Filters: Discharged liquids shall pass through a primary filter and the output shall be particles 20 microns or smaller. The secondary filter shall have output particles 5 microns or smaller.
4.2 Equipment

4.2.1 Air Filtration Units: Shall be factory-sealed and equipped with HEPA filters (final), pre-filters, instrumentation to monitor pressure differential, and safety and warning devices.

4.2.1.1 Provide units with electrical components approved by the National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL).

4.2.1.2 Access to the units for replacement of all air filters shall be from intake end. Provide units with pre-filters and intermediate filters installed either on or in the intake grid of the unit and held in place with special housings or clamps. The filter media shall be completely sealed on all edges with a structurally rigid frame with a continuous rubber gasket.

4.2.1.3 HEPA Filters: Provide units equipped with HEPA filters. Filters shall be individually tested and certified by the manufacturer.

4.2.1.4 Pre-filters: Provide a two-stage pre-filtration to extend the life of the primary HEPA filter. The first-stage pre-filter is a low-efficiency type effective for particles 100 micrometers and larger. The second-stage (or intermediate) filter has a medium efficiency effective for particles down to 5 micrometers.

4.2.1.5 Instrumentation: Provide units equipped with a magnehelic gauge or manometer to measure the pressure drop across filters and to indicate when filters have become loaded and need to be changed. A table indicating the usable air handling capacity for various static pressure readings on the magnehelic gauge affixed near the gauge for reference, or the magnehelic reading indicating at what point the filters should be changed, noting cubic feet per minute (CFM) air delivery at that point. Provide an elapsed time meter to show the total accumulated hours of operation.

4.2.1.6 Safety and Warning Devices: Provide units with the following safety and warning devices:

(a) Warning lights to indicate normal operation, too high a pressure drop across the filters (i.e., filter overloading), and too low of a pressure drop (i.e., rupture in HEPA filter or obstructed discharge).
(b) GFCIs.
(c) Audible alarm if unit shuts down due to operation of safety systems.
(d) Electrical overload protection sized for the equipment. The motor, fan, fan housing, and cabinet are to be grounded.
4.2.2 Respirators and Respirator Systems

4.2.2.1 Product Data: Must possess NIOSH and MSHA approval for each component in an assembly and/or for entire assembly.
5.0 PROJECT EXECUTION

5.1 Controlled Access to Site

5.1.1 Access to the abatement work area shall be restricted to the Contractor workers and authorized visitors as defined in these specifications.

5.1.2 Authorized visitors shall have access to the work site at all times following notification to the Contractor. The Contractor shall supply protective clothing and equipment for visitors as necessary, except for respirators which are to be provided by the visitor in accordance with this document.

5.1.3 The Contractor shall prominently post signs at all potential entry points to the abatement work area which clearly state: "Restricted Area Under Construction-Admittance by Special Permission Only - Protective Clothing Required Beyond This Point". Immediately inside entry point and outside critical barriers post a warning sign meeting specifications of OSHA 29 CFR 1910 and 1926. Suggested format is a sign of minimum size 508 mm by 356 mm displaying the following legend:

```
DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY
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5.1.4 All workers and authorized visitors shall enter the abatement work area only through the abatement worker/equipment decontamination enclosure, in accordance with this document.

5.1.5 All workers and authorized visitors, before entering the abatement work area, shall read and be familiar with all posted regulations, personal protection requirements, and emergency procedures and exit routes.

5.1.6 The Contractor shall maintain a daily job site personnel log listing names and social security numbers of individuals who entered the abatement work area, and the times of entering and leaving the area.

5.2 Worker and Visitor Protection

5.2.1 No eating, drinking, smoking, or chewing gum is permitted within the abatement work area. The Contractor shall be informed of a "break area" where these activities are permitted.

5.2.2 Workers and Visitors shall be fully protected with respirators and protective clothing during any work which may disturb asbestos-containing materials and result in
fiber release. Full protection is not required during pre-abatement inspections of the containment, while work is not being conducted.

5.2.3 Protective Clothing and Equipment: Provide workers and visitors with sufficient sets of protective full body clothing, to include full body coveralls with hood, boots (for workers) and footwear coverings (for workers and visitors), and gloves. Provide eye protection and hard hats as required by applicable safety regulations. Contaminated non-disposal clothing and footwear shall be left in the equipment room until the end of the asbestos abatement work, at which time such items shall be disposed of as asbestos waste, or shall be thoroughly cleaned of all asbestos or asbestos-containing material. The Contractor shall have at least three (3) sets of disposable protective full body clothing for authorized visitors for each work day. Provide storage facilities for visitors and workers for removed street clothing in the clean room.

5.2.3.1 Boots: Provide workers non-skid type work boots with protective shields as required by OSHA. Paint uppers of boots with red waterproof enamel paint as a permanent marking that the boots have been exposed to ACM abatement work areas. These boots are to be handled as asbestos-contaminated materials.

5.2.3.2 Hard Hats: Provide hard hats that meet ANSI Z89.1 for use where work is overhead, scaffolding is being used, or as otherwise required by OSHA. Label hats with same warning labels as required for ACM disposal bags.

5.2.3.3 Goggles: Provide goggles that meet ANSI Z87.1 as required by OSHA.

5.2.3.4 Gloves: Provide disposable work gloves for use in the abatement work area.

5.2.3.5 Coveralls with Hood: Provide disposable coveralls with hoods for use in the abatement work area.

5.2.3.6 Respirators: Provide workers with personally issued and marked respirator equipment approved by NIOSH/MSHA and, in accordance with these specifications, suitable for the asbestos exposure level in the abatement work area. Where respirators with disposable filters are employed, provide sufficient filters for replacement as necessary by the abatement worker, or as required by the applicable regulation. Authorized visitors must provide their own respirators, with fresh filters or cartridges as necessary, to enter the abatement work area. These are minimum requirements. Section 5.4 of this document is to be consulted for more detail.
5.3  Abatement Work Area Entry and Exit Procedures
As the project will involve the non-friable removal of ACM, full decontamination procedures are not required. At a minimum, entrants to the work area will be required to follow the following measures.

5.3.1 Each time the abatement work area is entered remove all street clothes in the Clean Room of the Decontamination Enclosure and put on two sets of new disposable coveralls, new head cover, and a clean respirator. Proceed through the decontamination chamber.

5.3.2 Each time the abatement work area is exited, the following procedures shall be followed:

5.3.2.1 Before leaving the regulated area, employees and authorized visitors shall remove all gross contamination and debris from their protective clothing and the outer set of disposable coveralls.

5.3.2.2 Personnel exiting the regulated area shall move directly to the clean room for doffing of PPE and the inner set of disposable coveralls.

5.4  Respiratory Protection
5.4.1 The Contractor is hereby advised that asbestos has been determined by the U.S. Government to be a CANCER-CAUSING AGENT. Provide workers with respirators [which, as a minimum, meet the requirements of OSHA 29 CFR 1926.1101] and protective clothing during all phases of the abatement work and until final visual inspection and approval of the completed work by PARS.

5.4.2 The Contractor shall select respirators from among those jointly approved as being acceptable for protection by the MSHA and the NIOSH under the provisions of 30 CFR Part 11.

5.4.3 The Contractor shall select and provide respirators, at no cost to the employee and shall ensure that the employee uses the respirator provided.

5.4.4 Instruct and train each worker involved in asbestos abatement or maintenance and repair of asbestos-containing materials in proper respiratory use and require that each worker always wear in the abatement work area a respirator, properly fitted on the face. The respirator shall be worn from the start of any operation which may cause airborne asbestos fibers until the abatement work area is completely decontaminated.

5.4.5 Allow an individual to use only those respirators for which training and fit-testing have been provided. Require that each time an air-purifying respirator is put on it be checked for fit with a positive and negative pressure fit test in accordance with the manufacturer's instructions or ANSI Z88.2.
5.4.6 For this project, use respiratory protection appropriate for the fiber level encountered in the abatement work area. The level of respiratory protection which supplies an airborne fiber level inside the respirator, at the breathing zone of the wearer, at or below the permissible exposure limit (PEL) is the minimum level of protection allowed (Table 1, Respiratory Protection for Asbestos Fibers, 29 CFR 1926.1101). Do not use single-use, disposable, or quarter-face respirators.

5.4.7 Authorized visitors are responsible for providing their own respirator and replacement filters and cartridges, and for having been previously and properly trained fit-tested for the respirator used.

5.4.8 For use with air-purifying respirators, provide, at a minimum, HEPA type filters certified by NIOSH and MSHA for protection against asbestos fibers.

5.5 Air Monitoring: Stop Action and Clearance Levels

5.5.1 PARS will not be performing air monitoring to meet the Contractor’s OSHA requirements for personal sampling or any other purpose. The Contractor is to conduct air monitoring required by OSHA for Contractor personnel.

5.5.2 Abatement Work Area Final Clearance:

5.5.2.1 Final work area clearance will involve: 1) a visual inspection by PARS to ensure all ACM and visible debris has been removed from the work areas, and 2) final air clearance testing. The visual inspection will include the use of a leaf blower to identify hidden ACM debris from corners, underneath equipment, structural beams, and other work area locations where debris may be located.

5.6 Initial Isolation of Abatement Work Areas

5.6.1 The Contractor shall completely separate the abatement work area from other portions of the building, and the outside, by sealing all openings (windows, doorways, elevator openings, corridor entrances, drains, ducts, grill, diffusers, skylights, etc.) with barriers of 0.15 mm (6 mil) polyethylene sheeting and tape, or by sealing cracks leading out of the abatement work area. Doorways and corridors which will not be used for passage during work must be sealed with hard barriers of 9.5 mm (3/8 inch) plywood, wood framing, and plastic sheeting with tape. These hard barriers will need to be constructed for each specific abatement area.

5.6.2 If it becomes necessary to shut down electric power to the enclosed abatement work area, then the Contractor shall provide temporary power and lighting and ensure safe installation of temporary power sources and equipment in accordance with NFPA 70 electric code requirements.

5.6.3 Arrange for the abatement work area to be locked during non-work hours. Install temporary doors with entrance type locksets that are key lockable from the outside and always unlocked and operable from the inside. Remove deadbolts and padlocks.
5.7 Preparation of Abatement Work Area and Temporary Enclosures

5.7.1 Clean all contaminated furniture, equipment, and supplies with a HEPA-filtered vacuum cleaner or by wet wiping, as directed by PARS, prior to being moved or covered.

5.7.2 Before removal, clean by HEPA-filtered cleaner and/or by wet wiping, all electrical and mechanical items, (such as lighting fixtures, clocks, diffusers, registers, etc.) and general construction items (such as cabinets casework, door and window trim, moldings, etc.) which cover the surface of the abatement work as required to prevent interference with the abatement work.

5.7.3 Remove all removable equipment, supplies, and demolition debris that have been deemed by PARS to be uncontaminated, or completely cover with two (2) layers of polyethylene sheeting, at least 0.15 mm (6 mil) in thickness, securely taped in place with duct tape. Such equipment, supplies, and demolition debris shall be considered outside the abatement work area unless covering plastic or seal is breached.

5.7.4 Clean all surfaces in abatement work area with a HEPA-filtered vacuum cleaner or by wet methods prior to installation of primary barrier.

5.7.5 All critical barriers, including ventilation openings (supply and exhaust), lighting fixtures, clocks, doorways, windows, speakers, and other openings into the abatement work area shall be individually sealed with 0.15 mm (6 mil) plastic sheeting and tape. Elevator doors, fire extinguisher cabinets, and all other penetration in the floor, walls, or ceiling shall be sealed in the abatement work area. If a temporary polyethylene/stud wall must be erected, that wall shall be treated as a critical barrier. The double layer polyethylene containment enclosure shall then be erected on that wall. Critical barriers shall be sealed prior to installation of primary barriers.

5.7.6 Install critical barrier walls of abatement work area including critical barrier sheet plastic with primary barrier of two (2) layers of reinforced 0.15 mm (6 mil) polyethylene sheeting, mechanically supported, and sealed with duct tape or spray-glue in the same manner as critical barrier sheet plastic. Size to minimize seams. Seams shall be staggered and separated by at least 600 mm (24 inches). Hardwood barriers may be required to ensure the competence and stability of the abatement work area walls.

5.7.7 Provide emergency exiting from the enclosure as required by NFPA 101, Life Safety Code. Arrange exit door(s) so that it is secure from outside the abatement work area but permits exiting from the abatement work area. Mark outline of door on barriers with luminescent paint at least 250 mm (10 inches) wide. Hang a razor knife on a string beside outline. Post a sign identifying "EMERGENCY EXIT", using letters at least 150 mm (6 inch) high, inside outline with luminescent paint. Arrows shall be taped on the polyethylene wall covering at eye level and at floor level to indicate location of exits. At entrance to decontamination chamber, post building floor plan and escape routes, plus locations of nearest exist and phone numbers of BCC security. Emergency lighting shall be required, in accordance with the Life Safety Code.
5.7.8 A 4.5 kg (5 lb.) ABC type portable fire extinguisher shall be located by each exit and clean room.

5.7.9 Provide GFCI protection for all electrical equipment.

5.7.10 Provide temporary lighting inside the decontamination enclosure facility.

5.8 Construction of Decontamination Enclosures

As the project will involve the non-friable removal of ACM, full decontamination procedures are not required. At a minimum, the Contractor will erect a two-chamber decontamination enclosure.

5.8.1 Worker/equipment decontamination enclosures shall be provided at each location where workers shall enter or exit the abatement work area. The decontamination enclosures will be constructed outside and attached to the abatement work area.

5.8.2 The Contractor shall construct a worker/equipment decontamination enclosure consisting of at least a clean room and an equipment room.

5.8.2.1 All rooms shall be constructed of or fully lined with 0.15 mm (6 mil) thick polyethylene sheeting and suitable framing to make them as air-tight as possible. Where joining separate sheets of polyethylene is necessary, the two sheets of polyethylene shall be over-lapped at least 150 mm (12 inches) and adhered with an unbroken line of tape in such a manner to prohibit air movement. Stagger joints. Tape shall then be used to further seal the joint on the other side of the containment barrier so that both loose edges of the overlap are completely sealed.

5.8.2.2 Doorways will consist of three (3) weighted sheets of 0.15 mm (6 mil) polyethylene from ceiling to floor. The width of these polyethylene sheets shall be sufficient to prevent air movement through the doorways when closed. These doorways shall be the only source of make-up air for the HEPA negative air filtration unit under normal circumstances.

5.8.2.3 Provide GFCI protection for all electrical equipment.

5.8.2.4 Provide temporary lighting inside the decontamination enclosure facility.

5.8.3 The Clean Room shall have a curtained doorway leading to the outside of the abatement work area leading to the Equipment Room.

5.8.3.1 The Clean Room shall contain clean disposable clothing, replacement filters for respirators, and other necessary personal protective equipment.

5.8.3.2 The Clean Room shall NOT be utilized for the storage of tools, equipment or materials (other than PPE), nor used as office space.
5.8.3.3 The Clean Room shall be equipped with a lockable door to secure the abatement work area during off-shift hours.

5.8.4 The Equipment Room shall be of sufficient size so as to accommodate at least one (1) worker to change clothes, and temporarily house any equipment which the contractor wishes to store when not in use. The area shall have facilities for decontaminating material and equipment, and a container lined with 0.15 mm (6 mil) polyethylene bag for collection of disposable coveralls and foot coverings.

5.9 Air Circulation Inside Containment Barrier

5.9.1 Formula for Quantity of Air-Filtration Units: This project will include the nonfriable removal of ACM, and as such, a minimum work area air exchange is not required. PARS recommends the use of negative air units by the Contractor during the project.

5.9.2 Supplemental Makeup Air Inlets: As necessary to achieve air flow throughout the abatement work area, locate auxiliary makeup air inlets as far away as possible from the air filtration units, preferably near the ceiling and away from barriers that separate the containment barriers and enclosures from surrounding areas. Cover inlet with plastic sheeting flaps to reseal automatically if the pressure differential system should shut down for any reason. Provide rigid framing around the opening. Spray the flap and around opening with spray adhesive so that if flap closes, the meeting surfaces are both covered with adhesive. Use adhesive that forms contact bond when dry. If used during clearance monitoring, tape or seal HEPA filters over inlets.

5.10 Placement of Air Filtration System Units

5.10.1 Equipment shall be located so as to optimize air movement throughout the abatement work area by positioning air filtration units as far away as practical from the access opening or other supplemental make-up air inlets.

5.10.2 The auxiliary air-filtration unit shall be located on Site and available and ready to run at any time.

5.10.3 Air movement shall be established in such a way that airborne fibers will be carried away from workers' breathing zones.

5.10.4 Dead air pockets shall be minimized by proper ducting of make-up air if necessary, and by optimum location of the negative air filtration units.

5.10.5 The air filtration units shall be placed so that access for changing the filters is inside the containment barrier. The unit is to run continuously during filter changing. A supply of filters shall be kept on site outside of containment area. If a unit must be turned off for servicing, an auxiliary unit must be in place and turned on.

5.10.6 Mount units to exhaust directly or through disposable ductwork. Use ductwork and fittings of same diameter or larger than discharge connection on fan unit. Use spiral
wire-reinforced flex duct in lengths not greater than 15 m. If direction of discharge from fan unit is not aligned with duct, use sheet metal elbow to change direction. Use six feet of spiral wire reinforced flex duct after direction change.

5.10.7 All HEPA units shall be tested in-place before removal begins. Test will be the responsibility of the Contractor.

5.11 Pressure Differential Isolation

5.11.1 The abatement work area and the decontamination enclosure system shall be maintained at a negative pressure relative to adjacent areas. The relative pressure differential when measured across any physical or critical barrier must continuously equal or exceed a static pressure of 0.5 mm of water. Measurement shall be by manometer or magnahelic gage.

5.11.2 Continuous HEPA filtered exhaust unit is to be in operation until job is completed.

5.11.3 Make-up air shall be obtained only through the decontamination enclosure facilities.

5.11.4 Where ACM covers an opening or joint, provide negative air pressure sufficient to draw air from the adjoining space into the containment barrier when the opening or joint is exposed after asbestos removal. Seal newly exposed openings and joints immediately to prevent contamination of adjoining spaces.

5.11.5 Supply sufficient pre-filters to allow frequent changes.

5.11.6 Run the air filtration units continuously to maintain a constant pressure differential and air circulation until decontamination, cleaning, and encapsulation of the abatement work area is complete.

5.11.7 The HEPA-filtered units shall be left on continuously until after the final visual inspection, and PARS authorizes the shut-down of the units. Where feasible, the units shall be left on until the enclosure is completely removed.

5.11.8 A spare HEPA unit shall always be available to immediately restore negative air pressure should a unit fail.

5.12 Pre-Abatement Inspection, Testing, and Approval

5.12.1 Pre-Abatement Testing Requirements: As a minimum, the Contractor shall make all arrangements and demonstrate satisfactory equipment operation and set-up for compliance with these specifications.

5.12.1.1 Show proper condition of equipment seals including results of in-place HEPA-filter testing.
5.12.1.2 Show proper operation of safety and warning devices.

5.12.1.3 Show proper operation and calibration of instrumentation.

5.12.1.4 Show identification of equipment unit and fan capacity.

5.12.1.5 Show the installation method for pre-filters and the HEPA primary filter in the air filtration unit. Show supply of filters available on Site.

5.12.1.6 Demonstrate and record that a minimum 0.50 mm of water pressure differential has been achieved and can be maintained.

5.12.1.7 Demonstrate procedures for how workers will enter and exit the decontamination enclosure system.

5.12.1.8 Demonstrate procedures for handling emergencies and for the prevention of contamination of surrounding areas.

5.12.1.9 Use a pressure differential meter or manometer to demonstrate the required pressure differential at every barrier separating the abatement work area from the balance of the building, equipment, ductwork or outside.

5.12.1.10 Demonstrate that each air filtration unit is serviced by a dedicated minimum 115V-20A circuit with GFCI protection.

5.12.1.11 Demonstrate how asbestos will be removed and bagged for transport. Identify procedures and route for hauling waste from the work area to the waste containers.

5.13 Maintenance of Containment Barrier and Enclosures

5.13.1 Ensure that the containment barrier, sealed doors, vents, etc., and plastic linings are effectively sealed and taped for the duration of the abatement work.

5.13.2 Repair damaged barriers and remedy defects immediately upon discovery. Visually inspect enclosure at the beginning of each work period.

5.13.3 Damaged or deteriorating materials shall not be used and shall be removed from the premises. Material that becomes exposed to and contaminated with asbestos shall be decontaminated or disposed of in accordance with the applicable regulations and special requirements.

5.13.4 Clean debris and residue from inside of the decontamination area on a daily basis.

5.13.5 Maintain floors as dry as possible to minimize slips and trips.
5.14 Removal of Asbestos-Containing Materials

5.14.1 Prohibited Work Practices. The following methods shall not be used for work related to or disturbing asbestos, regardless of exposure level:

5.14.1.1 High-speed abrasive disc saws that are not equipped with point of cut ventilation or enclosures with HEPA-filtered exhaust air.

5.14.1.2 Compressed air used to remove asbestos, or materials containing asbestos, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.

5.14.1.3 Dry sweeping, shoveling or other dry cleanup of dust and debris containing ACM and PACM.

5.14.1.4 Employee rotation as a means of reducing employee exposure to asbestos.

5.14.2 Methods of Compliance. The following engineering controls and work practices shall be used, at a minimum, for all asbestos tasks:

5.14.2.1 HEPA-filtered vacuum cleaners.

5.14.2.2 Non-friable removal methods.

5.14.2.3 Prompt cleanup and disposal.

5.14.3 The following work shall be done only after the decontamination area has been constructed, the area has been isolated and can be maintained under negative air pressure as specified in the previous section, and arrangements have been made for disposing waste at an acceptable site.

5.14.4 Start abatement work at a location farthest from the fan units and proceed toward them. If an electric power failure occurs, immediately stop all abatement work and do not resume until power is restored and negative air filtration units are operating again. Any torn or unsealed plastic sheeting shall be immediately repaired.

5.14.5 Non-Friable Removal

5.14.5.1 For the floor tile, utilize heat machines as instructed in the New Jersey Department of Health (NJDOH) guidance document “Removing Vinyl Asbestos Tile in New Jersey – A Contractor’s Guide for the Non-friable Removal of Vinyl Asbestos Floor Tiles”.

5.14.5.2 For the floor tile adhesive, utilize a low-VOC, low-odor, biodegradable solvent. The Contractor will apply and remove the solvent per manufacturer
direction. The resulting slurry should be collected with absorbent materials such as absorbent pads or via HEPA-equipped vacuums.

5.14.5.3 For the Transite™ transom panels, the Contractor will disassemble the door/window assembly as needed. The panels will be removed intact to the extent possible. Each panel will be wrapped in two layers of 6-mil polyethylene sheeting and sealed air-tight prior to removal from the work area.

5.14.6 Gross removal of dust and debris from contaminated material, material containers, and equipment shall be accomplished in the containment barrier before removal to the equipment decontamination room for wet sponging before leaving the abatement work site.

5.15 Post Removal: Cleaning and Clearance

5.15.1 Provide general clean-up of abatement work area concurrent with the removal of all asbestos-containing materials.

5.15.2 Do not perform dry dusting or dry sweeping.

5.15.3 Maintain the minimum required pressure differential of 0.50 mm of water inside the abatement work area enclosure at all times, and until PARS authorizes the Contractor to remove the enclosure.

5.15.4 Initial Phase Cleanup Sequence

(a) Remove all visible accumulations of ACM and debris.
(b) Wet clean and HEPA-vacuum all surfaces in the abatement work area.
(c) Clean all equipment (excluding that which will be needed for further cleaning phases) used in the abatement work area and remove from abatement work area via the Equipment Decontamination Enclosure.
(d) Remove the top layer (secondary barrier) of plastic sheeting, change all air filtration system pre-filters, and proceed with the second cleaning.
(e) Replace all HEPA-filters and pre-filters in air filtration air machines with clean filters. Clean all air filtration machines.
(f) Perform no activity in abatement work area for at least 12 hours in order to allow settlement of airborne fibers. No reduction in this settling period will be allowed.

5.15.5 Secondary Phase Cleanup Sequence

(a) Wet clean and HEPA-vacuum all surfaces in abatement work area at least one more time.
(b) Notify PARS for observation to evaluate completeness of cleaning.
(c) PARS will perform a visual observation of the abatement work area in general accordance with ASTM 1368, *Standard Practice for Visual Inspection of Asbestos Abatement Projects.*
(d) If visual clearance is not attained, then subsequent re-cleaning will be required. This sequence will continue until visual clearance is attained.  
(e) When visual clearance has been obtained, the plastic barriers down to the critical barriers may be removed.

5.15.6 Consider abatement work areas and all other decontaminated and cleaned areas clean when:

(a) All phases of clean-up have been completed and level of cleanliness is approved by PARS.

5.15.7 After area passes final visual inspection and final clearance samples are below the USEPA Re-occupancy Standard of 0.01 fibers per cubic centimeter (f/cc), dismantle Decontamination Enclosure Systems and thoroughly HEPA-vacuum and wet clean immediate areas.

5.15.8 Dispose of debris from removal operation, used cleaning materials, unsalvageable materials used for sturdy barriers, and any other remaining materials. Consider the materials to be contaminated, and dispose of accordingly.

5.16 Post Clearance: Application of Lockdown Encapsulant

5.16.1 Apply encapsulant, if applicable, only when environmental conditions in the abatement work area are as required by the manufacturer's instructions and PARS.

5.16.2 Apply encapsulant with an airless spray gun with air pressure and nozzle orifice or as otherwise recommended by the encapsulant manufacturer.

5.17 Containment Barrier Removal

5.17.1 Following area final clearance and lockdown encapsulation, leave pressure differential units running as long as feasible during containment barrier removal.

5.17.2 Equipment, machinery, scaffolding, tools, etc., within the abatement work area shall not be removed without first being thoroughly cleaned with amended water or in the case of delicate items susceptible to rust, an acceptable substitute.

5.17.3 After the abatement work area is found to be in compliance, the remaining sealed areas and exits are unsealed and the plastic sheeting, tape, and any other trash and debris are disposed of in sealable plastic bags and treated as asbestos waste. PARS will conduct a final walkthrough and document results.

5.17.4 Before removal from the abatement work area, remove and properly dispose of pre-filter, decontaminate exterior of machine and seal intake to the machine with 0.15 mm (6 mil) polyethylene to prevent environmental contamination from the filters.
5.18 Waste Disposal

5.18.1 Asbestos-contaminated waste that has been containerized shall be transported out of the abatement work area. Waste load-out procedures shall be performed by two teams. The team inside the abatement work area shall clean the outside of properly labeled asbestos waste using HEPA vacuums and/or wet wiping. No personnel from the inside team shall exit any further from the abatement work area. No unprotected personnel from the outside team shall enter the abatement work area.

5.18.2 Water not disposed of with the ACM shall be filtered to remove asbestos fibers and debris before disposal into the sanitary sewer.

5.18.3 Do not store waste outside of the abatement work area. Take waste from the abatement work area directly to a sealed truck or dumpster.

5.18.4 Bulk and containerized asbestos waste shall be packed, labeled, and transported according to DOT Regulations 49 CFR 173.216 and 49 CFR 173.240. All removed ACM, plastic sheeting, tape, cleaning material, clothing, and all other disposable material or items used in the abatement work area shall be packed into double bagged sealable 0.15 mm (6 mil) plastic bags or double containerized with one bag and one drum. The bags shall be marked with the labels required by OSHA 29 CFR 1910.1001 and/or 1910.1200, and 1926.1101.

5.18.4.1 If the asbestos waste can reasonably be expected to damage double bagged 0.15 mm (6 mil) plastic bags, the following barrel decontamination procedures shall be followed.

   (a) Line barrels with a 0.15 mm (6 mil) plastic liner to prevent leaking of contaminated material from the containers.
   (b) As bags are moved out through the decontamination system, wet wipe bags to remove all contamination from them before they are moved into an uncontaminated space.
   (c) Place bagged waste into appropriately labeled barrels for transport to landfill.
   (d) After bagged contaminated waste is placed in barrels, seal lids on barrels.
5.18.4.2 Minimum labeling required:

First Label:

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DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST
================================

Second Label:

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PROVIDE IN ACCORDANCE WITH U.S. DEPARTMENT OF
TRANSPORTATION REGULATION ON HAZARDOUS WASTE MARKING.
49 CFR PART 172, SUBPART D: "RQ ASBESTOS NA 2212". PROVIDE A
"CLASS 9" LABEL, PER 49 CFR PART 172, SUBPART E.
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5.18.4.3 An appropriately licensed waste hauler shall transport the approved
sealed bags/drums to an approved waste disposal site.

5.18.4.4 Allow only sealed plastic bags or impermeable containers to be
deposited in landfill. Leave damaged, broken, or leaking plastic bags in the
impermeable container and deposit entire barrel in landfill.

5.18.4.5 Ensure that there are no visible emissions to the outside air from Site
where materials and waste are deposited.

5.15.5 The Contractor shall submit a disposal certificate from the EPA approved landfill
confirming final disposal in accordance with EPA standards and regulations before final
payment. Retain receipts from landfill or processor for materials disposed of. At
completion of hauling and disposal of each load, submit copy of waste manifest, chain of
custody form, and landfill receipt to PARS.

5.19 Job Close-Out
5.19.1 The Contractor shall remove from the site all other debris and rubbish resulting
from removal and disposal operations.