MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

MBTA CONTRACT NO. A92CN01

FTA GRANT NO. xxxxxxx

OAK GROVE STATION IMPROVEMENTS
MALDEN, MASSACHUSETTS

ADDENDUM NO.5

The attention of the bidders for the above project is called to the following Addendum to the Bid Form, Specifications and Contract Drawings.

The items set forth herein, whether of omission, addition or substitution are to be included in and form a part of the Bid submitted.

THE NUMBER OF THIS ADDENDUM (NO.5) MUST BE ENTERED IN THE SPACE PROVIDED ON PAGE 00410-3 OF THE FORM FOR BID IN THE BID FORM.

Date: August 5, 2019

By: Steven Poftak
General Manager of the MBTA

CONSTRUCTION SPECIFICATION CHANGES

1. New Section 02080 ASBESTOS REMOVAL is added to this project, as attached to this Addendum-5. Please update Table of Contents accordingly.

CONTRACT DRAWING CHANGES

1. SKS-09 - FREESTANDING SIGN – STRUCTURAL DETAILS

RESPONSES TO QUESIONS BY PROSPECTIVE BIDDERS

Q126. SG-121 shows Details for Sign Frames F33.1 & F35.1 that appear to require Concrete Piers as part of the assembly. Please provide attachment details to the platform & reinforcing details for these concrete structures

A126. See attached SKS-09 to this addendum-5.

Q127. Sheet C-15, "Proposed Mill and Overlay Pavement Section", indicates a 12,948 SF area to be milled 4". Please indicate where this detail is to be used.

A127. The "Proposed Mill and Overlay Pavement Section" detail is for the existing parking lot on Washington Street.

Q128. Drawing E-401 show MTS-5 between the New Generator and the Generator Panel breakers. However, on drawing E-402 MTS-5 it is not shown? Please clarify.

A128. MTS-5 shall be between the generator and generator panel.

Q129. Please Clarify Plan Note #1 on drawing E-001. It looks as though MTS-5 is feeding existing Panel LP-2 in East Electrical Room # 109. However, the riser does not show this. Please clarify the pipe and feeder size.

A129. Note 1 and associated line is intended to indicate general routing of conduit not the connections between equipment

Q130.Drawing E-300, Plan note #13 states the Combo Motor/Starter is being fed from panel "EDP-1". This panel is all the way in Electric Rm #105. Is this the case? Please clarify.

A130. Yes, the exhaust fan will require generator power and main electrical room is located in Electrical room #105

Q131. Addendum #4, Q&A #120 answer referenced the GE Fanuc 90-30 series. This device is obsolete. Please provide an alternative. Also please provide Riser diagram that shows connection points and cable type.

A131. The contractor shall submit for approval by the MBTA and the Engineer an equal alternate to GE Fanuc 90-30 series. Riser diagram will not be provided.

Q132. Finish Schedule (A-501) and Terrazzo specs (09662 - RESINOUS MATRIX TERRAZZO FLOORING) both call only for cast in place Terrazzo flooring. Detail A-603 calls for Terrazzo cove base at the Lobby Window sill. If Terrazzo base is included, please clarify the details and scope of this base.

A132. The cove base detail as shown on A-603 shall be installed at the lobby level.

Q133. Terrazzo specs call for strip with a top width of 1/8". All TZ transition detail drawings (A-801/5-9) call for 1/4" wide strip. Please clarify.

A133. The strip shall be ¼" wide.

Q134. A-802/5 shows abrasive strips to be set into Terrazzo, but drawings do not show location or extent. Please clarify.

A134. Abrasive strips shall be fullwidth and in front of the existing doors to remain at the East Bus Entrance Lobby between gridlines A.2 and A.4, for a depth of 3 feet into the interior per Detail5/A-802.

Q135. Floor Finish Plan (A-740, A-742) appears to show Terrazzo at the landings of Stair 1, 2, and 4 but finish schedule does not include TZ at these stairs. Is the intention of landings at Stair 1, 2, and 4 to be Terrazzo?

A135. Yes, please refer to SKA-030 issued under Addendum-4.

Q136. Terrazzo specs currently include demo work and grinding down of concrete substrate. Please confirm this scope should be part of Item 02221 – Demolition?

A136. The installation of terrazzo requires coordination between trades. It shall be the Contractor's option to assign the furnishing and installation of terrazzo to the appropriate Subcontractor.

Q137.Per the response to Question 53 in Addendum 3 specification section "02080 – Asbestos Removal" was to be included as an attachment in Addendum 4; however, when released Addendum 4 not include Specification Section 02080 – Asbestos Removal. Additionally, Specification Section "02090 – Lead-Based Paint Abatement" section 1.1 paragraph C states that the contractor shall refer to Section "02080 - Asbestos Removal" as well as the "Hazardous Material Summary Report". Please provide these documents in order for the contractors to provide accurate pricing to the Authority.

A137. Refer to attached specification changes. Please delete all references to a "Hazardous Material Summary Report."

Q138. Section "02090 – Lead-Based Paint Abatement" states "This section specifies the minimum work practice requirements for the removal, containment, recovery, and disposal of leaded coatings and associated waste generated as a result of demolition or renovation activities as designated for disability access improvements at the Oak Grove Station on the Green Line". It is the contractor's understanding that Oak Grove Station is on the Orange Line, please provide clarification.

A138. Please correct a typo reference in the aforementioned quote from Section 02090 to read: "…access improvements at the Oak Grove Station on the Orange Line."

Q139. Section 02082 – Removal, Transportation and Disposal of Oil and Hazardous Material, para 1.2 B states "Work covered by this Section consists of furnishing all labor, equipment, materials, and services to remove and dispose of potentially hazardous materials encountered during the elevator renovations of Tufts and Andrew Stations and the substation renovation of Tufts Station.". Please provide more information as to the scopes of work being performed at Andrews and Tufts Stations as part of the Oak Grove Station Improvements.

A139. Please correct a typo reference in Section 02082, paragraph 1.2-B to read: "…hazardous materials encountered during the scope of work at Oak Grove Station Improvements."

Q140. Addendum 4 sketch SKS-003 show demolish slot at concrete platform for new canopy column, Is the Authority expect the Contractor to provide temporary shoring support and/or bracing underneath the concrete platform prior to demolish and concrete slab infill repair?

A140. Yes, contractor to provide temporary shoring as needed for demolition and repair work. Shoring to remain in place until sawcut repair has fully cured. Refer to SKS-003 "DEMOLITION – PLATFORM PLAN – AREA A – SKS-003".

Q141. Drawing A-631, detail 3 shown cast-in-place concrete infill at the bottom of louver at elevator 3/1 shaft. What is the detail for louver connection at top?

A141. Refer to 2/A-605 for louver connection at the top.

SECTION 02080

ASBESTOS REMOVAL

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section specifies the furnishing of all labor, materials, facilities, equipment, services, employee training and testing, permits and agreements necessary to perform the work required for asbestos removal in accordance with these Specifications, EPA, OSHA and NIOSH regulations, and any other applicable federal, state and local government regulations. Whenever there is a conflict or overlap of the above references the most stringent provision are applicable.

B. It is possible that asbestos containing materials are found on site. The Contractor shall review record plans from the MBTA and/or perform a pre-bid site inspection to become familiar with the potential for encountering asbestos containing materials.

C. Provide work training, respiratory protection and fit-testing, and OSHA required medical examinations.

D. Related Work includes but is not limited to:
Section 02410 – Selective Demolition

E. All asbestos-containing material must be removed prior to demolition activities. Materials removed shall be wetted with amended water throughout the removal process.

F. The Contractor or his designated subcontractor must have a current Massachusetts Department of Labor and Workforce Development (MDLWD) issued License authorizing them as asbestos abatement contractors, in accordance with 453 CMR 6.04. Each person engaged in or performing any work in connection with asbestos abatement for the Contractor, shall be duly certified in their appropriate discipline in accordance with 453 CMR 6.00.

G. The Contractor shall be responsible for field verification of all quantities for their work. The Contractor shall be provided with access to this facility to allow contractors to estimate their bid costs. The Contractor is encouraged to do all work necessary to assure their bid is accurate for the work outlined.

H. Contractor shall refer to Paragraph 3.01 for definition of total isolation.

I. The Contractor shall refer to Paragraph 3.06 for definition of containment bag removal. (Note: use of this removal procedure shall require pre-approval of The Engineer)

J. The requirements and sequences described herein are execution parameters for the abatement work and do not necessarily include all abatement requirements. The design and implementation of all engineering controls and work procedures for performing the abatement work must be submitted in the form of a work plan to the Engineer for review within 30 days after Notice to Proceed. Work shall not commence until the work plan is approved. The Contractor will be responsible for all items that may be necessary to complete the abatement work in accordance with the approved work plan, scope of work, and all applicable laws and regulations. No deviations from the work plan will be permitted without prior written approval from the Engineer.

K. The Asbestos Abatement Contractor is required to remove all asbestos-containing material (and specified non-asbestos-containing materials) from the facility. The referenced reports are provided for informational purposes only, and are based on the best information available at the time the Contract Documents were prepared. The information provided in this section may not be interpreted as limiting the scope of work otherwise required by this contract and related documents.

1. Contractor shall provide asbestos removal activities including removal and disposal of all asbestos containing materials (ACM).

2. The Contractor shall remove and dispose all ACM and specified non-ACM using the total isolation method of removal (or containment bag removal with Engineer approval). Any non-ACM which is contaminated with asbestos shall also be removed and disposed of as asbestos-containing.

3. A full description of the asbestos sampling and analysis is included in the reports titled Asbestos-Containing Building Material Inspection Report, DMJM, June 26, 1998 and Asbestos and Lead Survey Report, ATC Associates, July 10, 2003, which is available from the Authority.

L. The following is a definition of terms applicable to the specification and the asbestos abatement industry:

1. Abatement - Procedures to control fiber release from asbestos containing materials; includes removal, encapsulation, and enclosure.

2. Airlock - A system for permitting ingress and egress while assuring air movement to a contaminated area from an uncontaminated area.

3. Air Filtration Device (AFD) - See Negative Air Pressure Equipment.

4. Air Monitoring - The process of measuring the fiber content of a specific volume of air in a stated period of time.

5. Air Sampling Professional - A professional capable of conducting air monitoring and analysis schemes. This individual is responsible for recognition of technical deficiencies in worker protection equipment and procedures during both planning and on-site phases of an abatement project. This individual should be certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene Incorporated (ABIH) and have specialized experience in air sampling for asbestos. Other acceptable Air sampling Professionals include Environmental Engineers and Environmental Scientists with equivalent experience in asbestos/air monitoring and worker protection. Air sampling Professionals must hold a valid Asbestos Project Monitor's License from the Massachusetts Department of Labor and Workforce Development (MDLWD) in accordance with 453 CMR 6.00. Air sampling shall be in accordance with OSHA Standard 29 CFR 1926.1101.

6. Amended Water - Water to which a surfactant has been added.

7. Asbestos - Includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated and/or altered.

8. Asbestos Containing Material - (ACM) material composed of asbestos of any type and in an amount greater than 1% by volume, either alone or mixed with other fibrous or non-fibrous materials.

9. Asbestos Control Area - An area where asbestos abatement operations are performed which is isolated by physical boundaries to prevent the spread of asbestos dust, fibers, or debris.

10. Asbestos Fiber - Chrysotile, Amosite, Crocidolite and the fibrous forms of tremolite, anthophyllite, or actinolite that are five (5) micrometers or longer, with a length-to-diameter ratio of at least 3 to 1.

11. Authority - The Massachusetts Bay Transportation Authority (MBTA).

12. Authorized Person - Persons authorized by the Authority or Contractor as required by work duties to be present in regulated areas.

13. Clean Room - An uncontaminated room which is a part of the worker decontamination enclosure with provision for storage of workers street clothes and protective equipment.

14. Competent Person - Individual capable of identifying existing asbestos, tremolite, anthophyllite, or actinolite hazards and corrective measures to eliminate them as specified in 29 CFR 1926.32. Individual shall have attended approved EPA sponsored asbestos abatement course. The duties of the competent person include at least the following: Establishing the negative pressure enclosure, ensuring its integrity, and controlling entry to and exit from the enclosure; supervising employee exposure monitoring required by 29 CFR 1926.1101; ensuring that all employees working within such an enclosure wear the appropriate personal protective equipment, are trained in the use of appropriate methods of exposure control, and use the hygiene facilities and decontamination procedures specified; and ensuring that engineering controls in use are in proper operating condition and are functioning properly.

15. Containment Bag Technique - A method with limited application for removing small amounts of friable asbestos containing material from HVAC ducts, short piping runs, valves, joints, elbows, and other non-planar surfaces in a non-contained work area. The glovebag is constructed and installed in such a manner that it surrounds the subject or area to be decontaminated and contains all asbestos fibers released during the removal process.

16. Encapsulant (Sealant) - A liquid material which can be applied to asbestos containing material and which controls the possible release of asbestos fibers form the material either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant.)

17. Encapsulation - All herein specified procedures necessary to apply an encapsulant to asbestos containing building materials to control the possible release of asbestos fibers into the ambient air.

18. Enclosure - All herein specified procedures necessary to completely enclose asbestos containing materials behind air tight impermeable, permanent barriers.

19. Equipment Decontamination Enclosure - A decontamination enclosure system designed for controlled transfer of materials and equipment, typically consisting of a washroom and a holding area.

20. Equipment Room - A contaminated room which is part of the work Decontamination Enclosure with provisions for storage of contaminated clothing and equipment.

21. Fixed Object - A unit of equipment or furniture in the work area which cannot be removed form the work area.

22. Friable Asbestos Material - Any material that contains more than 1% asbestos by weight, that can be crumbled, pulverized or reduced to powder when dry, by hand pressure, and which release asbestos

particles to the environment. Covering by an impermeable intact surface precludes friability.

23. HEPA Filter - High efficiency particulate air (HEPA) filter is capable of trapping and retaining at least 99.97 percent of all monodispersed particles of 0.3 micrometer in diameter or larger.

24. HEPA Vacuum Equipment - Vacuum equipment with HEPA filter system for filtering the effluent air from the unit.

25. Holding Area - A chamber in the equipment decontamination enclosure located between the washroom and an uncontaminated area. The holding area is comprised of an air lock between work area and wash area.

26. Movable Object - A unit of equipment or furniture in the work area which can be removed from the work area.

27. Negative Air Pressure Equipment - A portable local exhaust system equipped with HEPA filtration used to create negative pressure in a contaminated area (negative with respect to adjacent uncontaminated areas) and capable of maintaining a constant, low velocity air flow into contaminated area from adjacent uncontaminated areas.

28. NESHAP - National Emission Standards for hazardous Air Pollutants, including asbestos, administered by the EPA.

29. NIOSH - National Institute for Occupational Safety and Health.

30. Permissible Exposure Limit - Exposure to an airborne concentration of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals in excess of 0.1 fibers per cubic centimeter of air as an eight (8) hour time-weighted average (TWA), as determined by the method prescribed in OSHA Standard 29 CFR 1926.1101.

31. Plasticize - To cover floors and walls with polyethylene sheeting as herein specified.

32. Regulated Area - Established area where airborne concentration of asbestos containing materials exceed or can reasonably be expected to exceed the permissible exposure limit.

33. Removal - All herein specific procedures necessary to remove asbestos containing materials from the designated areas and to dispose of these materials at an acceptable site.

34. Shower Room - A room between the clean room and the equipment room in the Worker decontamination enclosure with hot cold or warm running water and suitable arranged for complete showering during decontamination. The shower room is comprised of an air lock between contaminated and clean areas.

35. Stripping - Taking of asbestos materials from any building element including structural member, pipe, or HVAC equipment.

36. Surfactant - A chemical wetting agent added to water to improve penetration.

37. Washroom - A room between the work area and the holding area in the equipment decontamination enclosure with provisions for wet cleaning of exterior surface of disposal container and contaminated equipment.

38. 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, and by afterwards disposing of these cleaning items as asbestos contaminated waste.

39. Work Area - Designated rooms, spaces, or areas of the project in which asbestos abatement actions are to be undertaken or which may become contaminated as a result of such abatement actions. A contained work area is an area which has not been plasticized nor equipped with a decontamination enclosure system.

40. Worker Decontamination Enclosure System - hat portion of a decontamination enclosure system designed for controlled passage of workers and authorized visitors, typically consisting of a clean room, a shower room, and an equipment room.

1.2 STANDARD OPERATING PROCEDURES

A. The Contractor shall develop and implement a written standard procedure for abatement work to ensure maximum protection and safeguard from asbestos exposure of the workers, visitors, employees, general public, and the environment. The standard operating procedures shall ensure:

1. Tight security on a 24-hour basis from unauthorized entry into the work space.

2. Proper protective clothing and respiratory protection prior to entering the work space from the outside.

3. Safe work practices in the work area include provisions for, but are not limited to, inter-room communications, exclusion of eating, drinking, smoking, and proper equipment handling.

4. Proper exit practices from the work area to the outside through the decontamination facilities.

5. Removing, encapsulating or enclosing asbestos in ways that minimize release of fibers.

6. Packing, labeling, loading, transporting, and disposing of contaminated material in a way that minimized exposure and contamination.

7. Emergency evacuation routes and procedures are clearly defined so as to minimize exposure to workers and/or medical personnel.

8. Safety from accidents in the work area, especially from electrical shocks, slippery surfaces, and entanglements in loose hoses and equipment.

9. Provisions for effective supervision, air monitoring and personnel monitoring for exposure during the work.

10. Using engineering systems that minimize exposure to fibers in the work area.

1.3 NOTIFICATIONS, PERMITS, WARNING SIGNS, LABELS, AND POSTERS

A. Erect warning signs around the work space and at every point of potential entry from the south side. The warning signs shall be a bright color so that they will be easily noticeable. Warning signs shall meet Specifications set forth in 29 CFR 1926.59(k)(1)(ii). Warning signs shall be posted at the entrance to the work area and around its perimeter at intervals of no more than twenty-five (25) feet.

B. Provide the OSHA required labels for plastic bags and drums utilized to transport contaminated material to the landfill.

C. Provide other signs, labels, warnings, and posted instructions that are necessary to protect, inform and warn people of the hazard from asbestos exposure. Post in a prominent and convenient place for the workers a copy of the latest applicable regulations from OSHA, EPA, and NIOSH.

D. The Contractor or, his subcontractor must have a current MDLWD issued License authorizing them as asbestos abatement contractors, in accordance with 453 CMR 6.04. Each person engaged in or performing any work in connection with asbestos abatement for the Contract, shall be duly certified in their appropriate discipline in accordance with 453 CMR 6.00.

E. NEGATIVE AIR PATENT LICENSE REQUIREMENT: The system specified herein for asbestos containment and removal using reduced pressurization and filtration is covered by U.S. Patent No. 4,604,111 issued August 5, 1986 and reaffirmed by the United States Patent and Trademark Office before the Board of Patent appeals and Interferences on March 31, 1989. The Contractor must hold a current and valid license for the use of the system and must maintain this license throughout the duration of this Contract. Provide for the use of the above referenced patent, under this contract, by submitting written proof of a current license, prior to start of work.

Contractor may choose an alternative method to the one covered by the above referenced patent. Proposed alternative methods shall be included in the Contractor's work plan, and require the approval of the Engineer.

1.4 NOTIFICATION OF POLICE AND FIRE DEPARTMENT

A. Notify the local police and fire department of the asbestos abatement project. Coordinate with the police security aspects of the project and with the fire department emergency evacuation and safety aspects. Secure a certificate from both the police and fire department that they approve of the established security and safety procedures.

1.5 EMERGENCY PRECAUTIONS

A. Establish emergency and fire exists from the work area. Emergency exists shall be equipped with two full sets of protective clothing and respirators at all times.

B. Notify local medical emergency personnel, both ambulance crews and hospital emergency room staff, prior to commencement of abatement operations as to the possibility of having to handle contaminated or injured workmen, and be advised on safe decontamination.

C. Be prepared to administer first aid to injured personnel after decontamination. When an injury occurs, precautions shall be taken to reduce airborne fiber concentrations (i.e., misting of the air with water) until the injured person has been removed from the work area by qualified emergency personnel.

D. Post Emergency Telephone Numbers at the entrance to the Clean Room and at each emergency exit. At minimum, the following numbers should be included:

1. Contractor's Office
2. Police
3. Fire

4. Ambulance
5. The Engineer or his designee
6. MBTA Project Manager

1.6 SUBMITTALS

A. Refer to Section 01300 - Submittals for submittal requirements and procedures.

B. The Contractor shall present three (3) copies of the following to the Engineer at the pre-construction conference:

1. Notifications to Government Agencies;

2. Copies of Permits;

3. Insurance certificates for review by the Authority;

4. Bar chart indicating location, times (showing length and number of shifts per day), dates, and type of work to be performed for each location;

5. A written plan and shop drawings for preparation of work site;

6. Description of protective clothing and approved respirator to be used, make, model, NIOSH approval numbers;

7. Delineation of responsibility of work site supervision, including competent person, names, resumes, and home telephone numbers;

8. Explanation of decontamination sequence and isolation techniques;

9. Description of specific equipment to be utilized, including make, model, and serial number of air filtration devices, vacuums, sprayers, etc;

10. Description of any prepared methods, procedures, techniques, or equipment other then those specified in the contract documents;

11. Explanation of the handling of asbestos contaminated waste including the EPA identification numbers of hauler;

12. Description of the final clean-up procedures to be used;

13. Name and qualifications of asbestos contractor's air and bulk sample testing laboratory(s) including state certifications, AIHA accreditation and Proficient Participation in the NIST/NVLAP Quality Assurance Program for the identification of bulk and air samples;

14. Written description of emergency procedures to be followed in case of injury or fire. This section must include evacuation procedures, source of medical assistance (name and telephone number) and procedures to be used for access by medical personnel;

15. Written description and shop drawings for the Contractor's electrical requirements to include at a minimum necessary voltage and location for electrical outlets, transformers, lighting, etc. to complete

the project. Submittals shall provide for sufficient electrical requirements to serve as a contingency;

16. Material safety data sheets for encapsulants, sealants, firestopping foam, and any and all other potentially hazardous materials to be used on the project;

17. Names and qualifications of competent person(s) who may oversee the work;

18. OSHA required Negative Air Assessment;

19. Name of landfill(s) including EPA identification/approval where materials will be disposed;

20. Statement on how materials will be transported from work site to landfill, including, location and EPA approval of any temporary storage depot of this material;

21. Proof of required insurance.

C. All submittals must be provided at this meeting by the contractor to avoid project delays. Any submittal which is a substitute for products requested in this specification must be provided to allow required approval time.

D. Contractor shall submit copies of the following items to the Consultant during the work:

1. Daily security and safety logs showing names of person entering work space, date and time of entry and exit, record of any accident, emergency evacuation, and any other safety and/or health incident.

2. Progress logs showing number of workers, supervisors, hours of work, and tasks completed shall be submitted daily to the Consultant;

3. A floor plan, indicating Contractor's current work progress shall be submitted for review by the Consultant at the weekly job meetings;

4. Disposal Certificates and waste transportation manifests;

5. Required Permits, Clearances, Licenses, etc;

6. Contractor's air monitoring and inspection results.

1. 7 APPLICABLE STANDARDS

A. Applicable Standards listed in these Specifications include, but are not necessarily limited to standards promulgated by the following agencies and organizations:

1. EPA Environmental Protection Agency
Region I
Room 2311
JFK Federal Building
Boston, MA 02203

2. OSHA U. S. Department of Labor
Occupation Safety and Health
Administration

Region I
16 North Street
Boston, MA 02203

3. NIOSH National Institute for Occupational Safety and Health
DHHS Region I
JFK Federal Building
Boston, MA 02203

4. DEP Department of Environmental Protection
Division of Air Quality
1 Winter Street
Boston, MA 02108

5. ASTM American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103

6. MDLWD Massachusetts Department of Labor and Workforce Development - Division of Occupational Safety
Saltonstall Buildings
100 Cambridge Street
Boston, MA 02202

7. ANSI American National Standards Institute
1430 Broadway
New York, NY 10018

B. Assume responsibility of being familiar with the requirements of these agencies and satisfy completely these Specifications and referenced regulations, as amended.

1.8 AUTHORITY/CONTRACTOR RESPONSIBILITIES

A. The following procedure shall be followed for the removal of objects from the area:

1. The item is listed for reuse, the Contractor shall decontaminate the item and the Authority will remove it from the area.

2. The Contractor shall dispose of any item(s) not listed for reuse.

B. Items that are required to remain in the area to be reused, will be decontaminated, and wrapped in a double layer of 6 mil polyethylene sheeting.

C. Authority will stop all deliveries that may be scheduled for the work area while work is in progress.

D. Authority will have authorized personnel on site at all times or supply Contractor with means of contacting such personnel without unreasonable delay. Such personnel will have access to all areas and have knowledge of electrical any air handling equipment. Such personnel will assist Contractor in case of any power failure or breakdown to shut down air supply systems, to reset and control all protective systems

such as alarms, sprinklers, locks, etc. The Authority will ensure that no active systems including air or gas lines are operating within the work area.

E. The Authority will not occupy the portions of the building in which work is being performed during the entire asbestos removal operation, including completion of cleanup.

F. During this period, the Contractor shall assume responsibility in all areas affected by his operation for:

1. Building Security - Fire and smoke detection systems.

2. Maintaining the existing building and utility systems such as plumbing or electrical installations.

G. Should the failure of any utility occur, the Authority will not be responsible for loss of time or any other expense incurred by the Contractor.

H. The Authority will notify the Contractor of any planned electrical power shutdowns in order to ensure that there are no interruptions in the negative air pressure system.

I. Contractor shall remove all temporary service at the completion of work;

J. Contractor shall make all HVAC modifications necessary to assure the mechanical systems are shut-down, locked-out and isolated during abatement activities;

K. There shall be no modifications, replacements, or changes to the existing electrical lighting installations. Existing lights in the work areas shall be decontaminated and protected with plastic sheeting prior to asbestos removal. Existing lights shall not be used for construction purposes. Contractor shall supply his own lighting using ground fault circuit interrupt protection. No power receptacles etc. from inside work area may be used by Contractor.

1.9 PROTECTION AND DAMAGE

A. Replace or repair any items damaged, due to work performed under this contract, equal to their original construction and finish. Repaired or replaced items will be subject to the Engineer's approval.

B. No materials shall be thrown from windows or doors of buildings. The building waste system shall NOT be used to remove contaminated refuse.

C. Protect floors along removal routes from damage, wear and staining.

1.10 RESPIRATORY PROTECTION REQUIREMENTS

A. Respiratory protection shall be worn by all individuals who have the potential for exposure to asbestos fibers.

1. All respiratory protection shall be OSHA/NIOSH approved in accordance with the provisions of 30 CFR Part 11. All respiratory protection shall be provided by the Contractor and used by workers in conjunction with the written respiratory protection program.

2. Contractor shall provide respirators selected by an Industrial Hygienist that meet the following requirements:

a. Full facepiece Type C supplied-air respirators operated in pressure demand mode equipped with

an auxiliary positive pressure self-contained breathing apparatus shall be worn during gross removal, demolition, renovation and/or other disturbance of ACM whenever airborne fiber concentrations inside the work area are equal to or greater than 10.0 f/cc.

b. Full facepiece Type C supplied-air respirators operated in pressure demand mode with HEPA filter disconnect protection shall be worn during gross removal, demolition, renovation and/or other disturbance of ACM whenever airborne fiber concentrations inside the work area are equal to or greater than 2.0 f/cc and less than 10.0 f/cc.

c. Full facepiece powered air-purifying respirators (PAPR) equipped with HEPA filters shall be worn during the removal, encapsulation, enclosure, repair, and/or other disturbance of friable ACM whenever airborne fiber concentrations inside the work area are equal to or greater than 0.1 f/cc and less than 2.0 f/cc. A supply of charged replacement batteries, HEPA filters and flow test meter shall be available in the clean room for use with powered air-purifying respirators. HEPA filters shall be changed daily or as flow testing indicates change is necessary. Any Type C supplied-air respirator operated in continuous flow may be substituted for a powered air-purifying respirator.

d. Half-face and full-face air-purifying respirators with HEPA filters may be worn only during the preparation of the work area, performance of repairs (e.g., using glove bag techniques) and final clean-up procedures provided airborne fiber concentrations inside the work area are less than 0.1 f/cc.

e. AT NO TIME DURING ACTUAL REMOVAL OPERATIONS SHALL NEGATIVE PRESSURE DUAL CARTRIDGE AIR PURIFYING RESPIRATORS BE ALLOWED UNLESS A FULL 8-HOUR TWA AND CEILING CONCENTRATION HAVE BEEN CONDUCTED, AND REVIEWED BY THE ENGINEER. DURING REPAIR AND SEALING OF WORK CONSIDERED TO BE EMERGENCY IN NATURE, DUAL CARTRIDGE NEGATIVE PRESSURE AIR PURIFYING OR POWERED AIR PURIFYING RESPIRATORS MAY BE UTILIZED.

f. Use of single use dust respirators is prohibited for the above respiratory protection.

3. Workers shall be provided with personally issued and individually marked respirators. Respirators shall not be marked with any equipment that will alter the fit of the respirator in any way. Only waterproof identification markers shall be used.

4. Contractor shall ensure that the workers are qualitatively or quantitatively fit tested by an Industrial Hygienist initially and every six months thereafter with the type of respirator he/she will be using.

5. Whenever the respirator design permits, workers shall perform the positive and negative air pressure fit test each time a respirator is worn. Powered air-purifying respirators shall be tested for adequate flow as specified by the manufacturer.

6. No facial hairs (beards) shall be permitted to be worn when wearing respiratory protection that requires a mask-to-face seal.

7. Contact lenses shall not be worn in conjunction with respiratory protection on asbestos projects.

8. If a worker wears glasses, a spectacle kit to fit their respirator shall be provided by the contractor at the contractor's expense.

9. Respiratory protection maintenance and decontamination procedures shall meet the following requirements;

   a. Respiratory protection shall be inspected and decontaminated on a daily basis in accordance with OSHA 29 CFR 1910.134 (b); and

   b. HEPA filters for negative pressure respirators shall be changed after each shower; and

   c. Respiratory protection shall be the last piece of worker protection equipment to be removed. Workers must wear respirators in the shower when going through decontamination procedures as stated in Section 3.2; and

   d. Airline respirators with HEPA filtered disconnect shall be disconnected in the equipment room and worn into the shower.

   e. Powered air-purifying respirator facepieces shall be worn into the shower. Filtered/power pack assemblies shall be decontaminated in accordance with manufacturers recommendations; and

   f. Respirators shall be stored in a dry place and in such a manner that the facepiece and exhalation valves are not distorted; and

   g. Organic solvents shall not be used for washing of respirators.

1.11 PROTECTIVE CLOTHING

A. Provide to workers, foremen, superintendents and authorized visitors and inspectors protective disposable clothing consisting of full-body coveralls, head covers, gloves and 18-inch high boot type covers or reusable footwear in accordance with OSHA Asbestos Regulations 29 CFR, 1926.1101 (i) and USEPA Asbestos Regulations 40 CFR, Part 763 Subpart G.

B. Provide eye protection and hard hats as required by job conditions and safety regulations.

C. Use reusable footwear, hard hats and eye protection. Devices shall be left in the "Contaminated Equipment Room" until the end of the asbestos abatement work.

D. Use disposable protective clothing which shall be discarded and disposed of as asbestos waste every time the wearer exists from the work space to the outside through the Decontamination Facility. Reusable protective clothing may be permitted subject to approval of the Engineer.

1.12 AIR MONITORING - CONTRACTOR

A. Employ an independent industrial hygiene laboratory to analyze air samples in accordance with OSHA Regulations, 29 CFR, 1910.1001 (Asbestos Standard for General Industry), 1926.1101 (Asbestos Standards for Construction), and 1910.134 (Respirator Standard).

B. The Testing Laboratory shall be a current proficient participant in the AIHA PAT Program and shall be under the direction of an ABIH Certified Industrial Hygienist.

C. Testing Laboratory shall also be a current proficient participant in the EPA Quality Assurance Program for the identification of bulk samples.

D. Require a Competent Person from the Testing Laboratory to monitor the set up of the work area enclosure

and ensure its integrity.

E. Submit to the Engineer credential of the designated Competent person for approval.

F. Air monitoring and inspection shall be conducted under the supervision of approved competent person.

G. Continuous monitoring and inspection shall include work area samples and personnel samples form the breathing zone of a worker to accurately determine the employees 8-hour TWA.

H. Work area samples and employee personnel samples shall be taken using pumps whose flow rates can be determined to an accuracy of +5% at a minimum of 2 liters per minute. This must be demonstrated at the job site.

I. Sampling and analysis methods shall be as per NIOSH 7400A.

J. Air sample results shall be provided orally to the Engineer within 24 hours, with written results delivered to the job site and posted in plain view in the Clean Room of the Decontamination Unit within 48 hours. These may be hand written.

K. Air monitoring conducted per OSHA Regulation 1926.1101 shall include two hour exposure and full shift personal time weighted average monitoring (unless Type C respirators are utilized) and shall include but not NECESSARILY be limited to:

1.	Inside Work Area Stationary (Area) Sample (2)	Min. Volume per sample sufficient to achieve a detection limit of 0.1 f/.cc
2.	Clean Room of Decontamination Unit (2)	2000 liters minimum

Daily monitoring shall commence from the time the regulated area is established and continue until satisfactory post test air samples are achieved.

L. Competent person shall conduct inspections and provide written reports daily. Inspections will include checking the Standard Operating Procedures, engineering control systems, respiratory protection land decontamination systems, packaging and disposal of asbestos waste, and any other aspects of the project which may effect the health and safety of the people and environment.

M. All costs for required air monitoring and analysis by the Competent person shall be the responsibility of the Contractor.

N. As soon as air monitoring tests are completed, the testing Laboratory shall send the results on such tests to the Authority, the Contractor, and the Engineer.

O. The Authority reserves the right to conduct air and surface dust sampling in conjunction with and separate from the Contractor's Testing Laboratory for the purpose of Quality Assurance.

1.13 AIR MONITORING - AUTHORITY

A. Contractor will employ the services of a licensed Industrial Hygiene firm (Authority's Asbestos Q/A Provider) and/or AIHA Accredited Testing Laboratory and PATS participant which is a current, proficient participant in the AIHA PAT Program and be NIST/NVLAP approved. Firm(s) providing these services will be designated by the Authority, and paid by the Contractor under the work of this section.

B. The Authority's Testing Laboratory will provide continuous monitoring and inspection to include work area samples, and samples outside of the work area to ensure that these areas remain free from contamination. Acceptable levels outside the work area will be 0.01 fibers/cc by Phase Contract Microscopy. The Q/A Provider/Testing Laboratory will conduct both the final visual inspection, and clearance air testing at a minimum for all work done under this specifications.

C. Inspections will include checking the Standard Operating Procedures, engineering control systems, respiratory protection and decontamination systems, packaging and disposal of asbestos waste, and any other aspects of the project which may affect the health and safety of the people and environment.

D. Costs incurred with the required laboratory work will be paid by the under the work of this section. Any subsequent testing required due to limits exceeded during initial testing shall be paid for by the responsibility of the Contractor.

E. Prior to beginning work in the area, the Authority's Testing laboratory will collect preliminary air samples for use as background levels to determine the present airborne fiber concentrations. Samples collected will be collected and analyzed according to the following criteria:

1. For each work area less than 10,000 sq. ft. perform the following:

    a. Collect within the work area at minimum, three large volume air samples to be analyzed via Phase Contract Microscopy.

2. For each work area greater than 10,000 sq. ft. perform the following:

    a. Collect within the work area at minimum five large volume air samples to be analyzed via Phase Contract Microcopy.

    b. Collect, at minimum, one air sample outside the building in a location representative of ambient air to be analyzed via Phase Contrast Microscopy.

    c. At least two of the interior air samples (those with the most volume) and the ambient air samples for a total of three will be analyzed via Phase Contrast Microscopy.

F. Prior to beginning work in the area, the Engineer will install a pressure monitoring system according to the following criteria (at minimum):

1. Authority Representative will install four 1/4 inch pneumatic polyethylene tubing through penetration of the work floor to the occupied floor above.

2. Tubing will run from access penetration along interface of ceiling land core wall to approximate center of each quadrant.

3. Two 1/4 inch pneumatic tubing will be installed through penetrations to the occupied floor below the work floor. Tubing will run from access to approximate cent of opposite quadrants.

4. Two 1/4 inch pneumatic tubing lines will be installed in the work area to approximate the average pressure in the work area.

5. The following areas will be monitored (at minimum):

    a. Work area vs. each of four quadrants of occupied floor above.

    b. Work area vs. each of two quadrants of floor below.

    c. Clean room of decontamination chamber vs. work area.

    d. Stairwells vs. work area (critical barrier).

6. Manometer reading will be monitored and recorded two times per shift. Documentation of continuous readings will be submitted with daily monitoring reports.

7. Manometer/pressure reading instruments will be inclined manometer capable of 0-3 inch wg increments (.01 inch wg increments) with continuous readout devices/strip chart recorder as approved by consultant.

8. Manometer tubing will be installed with minimum impact upon architectural surfaces in occupied areas.

9. Manometer will be zeroed and leveled prior to each shift.

G. If at any time during the course of the work, airborne fiber concentrations exceed either the background concentration or .01 fibers/cc outside of the work area, the Contractor shall be required to halt removal activities and take corrective measures to reduce airborne fiber concentrations (misting the air, wet wiping, and HEPA vacuuming, etc.). Work shall not commence until the source of the contamination has been identified and additional air samples have been collected indicating airborne fiber concentrations are below .01 fibers/cc or the background level.

H. If at any time during the work the Engineer or the Authority's Q/A Provider find any violations of government regulations or requirements of these specifications, the Contractor will be notified verbally of the violations. The Contractor shall then take immediate corrective action(s) to bring the violation(s) into compliance. If Contractor fail to take immediate action, or if the Engineer or Authority's Q/A Provider deems the violation(s) serious enough, the Contractor will be ordered to cease all work until violations/are corrected. All verbal notifications shall be followed up in writing by the Engineer.

I. After a thorough and final cleaning of the work area, the Contractor shall notify the Engineer and Authority's Q/A Provider that the work area is ready for final visual inspections and clearance air testing.

J. Clearance Air Testing will consist of air samples collected in the work area under aggressive sampling conditions (i.e. fans, leaf blower). Collect a minimum volume of air sufficient to achieve a detection limit of 0.01 fibers/cc, but not less than 1200 liters of air. Air samples shall be collected and analyzed according to the following criteria:

1. For each work area(s) (enclosed or partially isolated) less than 5,000 sq. ft. perform the following:

    a. Collect within the work area, at minimum, five large volume air samples to be analyzed via Phase Contrast Microscopy.

2. For each work area greater than 5,000 sq. ft. perform the following:

   a. Collect within the work area at minimum five large volume air samples plus one additional sample per 1000 sq. ft. to be analyzed via Phase Contrast Microscopy.

   b. Collect, at minimum, one air sample outside the building in a location representative of ambient air to be analyzed via Phase Contrast Microscopy or Transmission Electron Microscopy.

   c. At least two of the interior air samples (those with the most volume) and the ambient air samples for a total of three shall be analyzed via Phase Contract Microscopy.

K. Dust samples may be collected from the work area and analyzed via Polarized Light Microscopy for the confirmation of asbestos surface dusts.

L. Should surface dust samples reveal the positive presence of asbestos or should airborne fiber concentrations exceed 0.01 fibers/cc, the Contractor shall re-clean the work area via wet-wiped and HEPA vacuuming techniques until the area is found to be in compliance.

M. If Authority's Q/A Provider finds during his final visual inspection enough indications that there still remain Asbestos Containing Materials to be removed, and the noted ADM cannot be removed within one hour, and the Q/A Provider must leave the area and return at a later time, the Q/A Provider shall declare the inspection a failure. The Contractor shall bear all costs associated with the reinspection(s) and any work resulting from these inspections.

N. Should the fiber level detected during Final Clearance Air Testing described above exceed 0.01 f/cc, the work area shall be considered to have failed Clearance Air Testing, and the Contractor shall follow initial cleaning procedures. The Contractor shall be responsible for all costs of cleaning and retesting for Clearance Air.

O. After the area has been found to be in compliance, the Contractor may remove critical barriers and perform final cleaning as specified in 453 CMR 6.00.

P. As soon as the air monitoring tests are completed, the Testing Laboratory shall send the results of such tests to the Authority and the Contractor.

Q. The Contractor shall cooperate fully with all aspects of air monitoring operations.

1.14 TAMPERING WITH TEST EQUIPMENT

A. All parties to this Contract are hereby notified that any tampering with testing equipment will be considered an attempt at falsifying reports and records to federal and state agencies and each offense will be prosecuted under applicable state and federal criminal codes to the fullest extent possible.

1.15 SPECIFICATIONSAND DRAWINGS

A. Unless otherwise noted, any provided drawings are diagrammatic and intended to convey the location of work and general arrangement of work locations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. WETTING AGENTS: The wetting agent shall be approved by the Engineer.

B. SEALANTS: Sealing material shall be both penetrating and bridging and may be applied by a one or two coat system and shall meet the following criteria:

1. ASTM Standard E84-84
2. Underwriter's Laboratory approval for Class 1A
3. Fire Rating: Class A
4. Flame Spread: 0-25

    a. Flame Spread: 0-25
    b. Fuel Contribution: 10
    c. Smoke Density: 5

Acceptable sealants shall be:

1. Tri-Cote AE as manufactured by United Products Corp. of Little Rock, AK.

2. A-B-C Asbestos Binding Compound as manufactured by California Products Corp. of Cambridge, MA.

3. Fosters Protektor and Bridging Encapsulants as manufactured by H.B. Fuller Co. of Houston, TX.

C. Containment Bags: Upon approval of the Engineer, containment bags may be utilized for the removal of pipe insulation. Removal shall be as manufacturer's instruction and as described in these specifications.

D. Framing Materials and Doors: As required to construct temporary decontamination facilities and critical barriers.

E. Fire retardant clear Polyethylene sheeting, minimum thickness 6 mil.

F. Fire retardant black Plastic Sheeting, minimum thickness 6 mil.

G. Drums: Asbestos transporting drums, sealable and clearly marked with warning labels as required by OSHA and EPA.

H. Plastic Bags: Sealable, asbestos disposal bags, min. 6 mil. Thick and labeled.

I. Signs: Asbestos warning signs for posting at a perimeter of work area, as specified in 29 CFR 1926.1101(k) (iii).

J. Tape: Tape shall be high quality polyethylene film as approved by the Engineer.

K. Contamination Control Flooring; As approved by the Engineer.

L. Spray Adhesive: As approved by the Engineer.

M. Respirators: NIOSH approved with HEPA cartridges.

N. Disposable Coveralls: As approved by the Engineer.

2. 2 TOOLS AND EQUIPMENT

A. Asbestos Filtration Device (AFD): Asbestos Filtration Devices shall be equipped with High Efficiency Particulate Absolute (HEPA) filtration systems.

B. Scaffolding: Scaffolding, as required to accomplish the specified work, shall meet all applicable safety regulations.

C. Transportation Equipment: Transportation Equipment, as required, shall be suitable for loading, temporary storage, transit and unloading of contaminated waste without exposure to persons or property. Waste material shall be stored in 30 cubic yard closed dumpsters.

D. Vacuum Equipment: All vacuum equipment utilized in the work area shall utilize HEPA filtration systems. Vacuum equipment shall be as manufactured by Nilfisk of America of Malvern, Pennsylvania, Norclean Vacuum Systems distributed by Power Products and Services Co., Inc., Forest, Virginia or an approved equivalent.

E. Vacuum Attachments: Soft brush attachment, Asbestos Scraper Tool, Drill Dust Control Kit.

F. Electric Sprayer: An electric airless sprayer suitable for application of encapsulating material.

G. Water Sprayer: The water sprayer shall be an airless or other low pressure sprayer for amended water application.

H. Portable Shower: For personnel decontamination.

I. Water Atomizer: Powered air misting device, equipped to operate continuously.

J. Other Tools and Equipment; Provide other suitable tools for the stripping, removal, encapsulation, and disposal activities including but not limited to: hand-held scrapers, wire brushes, sponges, rounded-edge shovels, brooms, and carts.

PART 3 - EXECUTION

3. 1 WORK AREA PREPARATION (TOTAL ISOLATION)

A. The area(s) of asbestos removal shall be totally isolated from portions of the building not included in the work. Work area isolation and preparation shall be as described herein.

B. The Authority will be responsible for removing all portable, personal and sensitive items from the work areas as deemed necessary. Items shall not be removed from any location without written permission from the Engineer.

C. Any items to be removed form the work area shall be thoroughly cleaned by the Contractor using HEPA vacuum and wet-wiping techniques and stored in a location designed by the Engineer.

D. Authority will provide a list of items that cannot be removed and need special attention

E. Post OSHA required warning signs at entrances to the work area and along work limit of the site or along the perimeter of the sections of the site where asbestos-containing waste material was deposited at intervals of 25 feet or less. The signs shall be posted in such a manner and locations that a person easily may read the legend:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

F. Isolation of work area heating and ventilating system shall be carried out by the Contractor first to prevent contamination and fiber dispersal to other areas of the building.

G. Isolate the work area for the duration of the work by completely sealing off all drains, vents, walls, floors, windows, skylights, cabinets, equipment, etc. with two (2) layers of 6 mil. polyethylene sheeting.

H. The work area shall be isolated by sealing all openings including windows, doors, ventilation openings, drains, grilles, and grates with 6 mil. thick (minimum) plastic sheeting and duct tape or the equivalent to prevent the passage of asbestos fibers. For asbestos abatement projects or asbestos associated projects which are performed in an occupied facility, as defined in 453 CMR 6.02, excepting those projects in occupied facilities in which glove bags are used as the sole method of removal or repair in accordance with 453 CMR 6.14 (4), larger openings such as open doorways, elevator doors, and passageways shall be first sealed as a critical barrier. The Critical barrier, as defined by 453 CMR 6.02, shall constitute the outermost boundary of the asbestos abatement project work area. Critical barriers may be erected of suitable solid construction materials such as plywood, sheet-rock, gypsum board, or consist of existing suitable barriers and partitions. Plastic sheeting on open framing is not a suitable critical barrier. Cracks, seams and openings in critical barriers shall be caulked or otherwise sealed, so as to prevent the movement of asbestos fibers out of the work area.

I. The clean side of these barriers shall be monitored by the Authority's representative. If at any time airborne concentrations exceed .01 fibers/cc, Contractor shall halt operations and completely clean areas as directed by the Authority's representative.

J. The entire work area shall then be protected with plastic sheeting. Floor covering of two layers of 6 mil. polyethylene sheeting shall be used. Floor sheeting shall be extended up sidewalls at least 24 inches. Sheeting shall be sized so as to minimize the number of seams necessary. No seams shall be located at the joints between walls and floors.

K. Wall sheeting shall consist of two layers of 6 mil. polyethylene sheeting. It shall be installed to minimize joints and shall overlap floor sheeting by at least 18 inches. No seams shall be located at the corner or wall-to-floor joints. Plastic wall coverings shall be taped first to the upper most edge of the wall and shall hang straight down.

L. All electricity in rooms where asbestos is being removed shall be disconnected or turned off by Authority at panel distribution box to reduce the hazard of electrical shock to workers. Any electrical outlets to equipment which is to be operated without power interruption shall be marked by Authority. All electrical

connections for the work shall be brought in from a source outside the work area and Ground Fault Circuit Interrupter (GFCI) protected.

3.2 DECONTAMINATION FACILITY

A. In locations where asbestos removal is to take place, set up a decontamination facility consisting of a change room, shower area, and equipment area.

B. Decontamination facility shall be constructed of 2 x 4 inch wooden studs and plywood, covered with two layers of 6 mil. Plastic sheeting.

C. Airlocks shall be installed between contaminated area and equipment room and shower room, shower room and clean room. Airlock shall consist of three layers of 6 mil. polyethylene sheeting attached on alternate sides of opening with arrow painted on each sheet to direct persons in the proper direction for entry or exit.

D. The shower area shall be located between the change room and the equipment room. Hot and cold water shall be provided along with towels and soap.

E. It shall be the responsibility of the Contractor to provide temporary connections for piping, hoses, etc., as required for hot and cold water. Provisions shall be made to adequately dispose of shower water, through a filtration system capable of filtering down to 5.0 microns of asbestos from water flowing to drain or to be recycled. Unfiltered water shall be disposed of as contaminated waste.

F. Electrical sources shall originate outside of work area; no plugs lights etc. located inside the work area shall be used. GFCI's shall be provided for all circuits.

G. Provide an equipment room where work equipment, footwear, and contaminated work clothing are left. This area is a change and transit area for workers. Workers shall be able to proceed from equipment room directly into shower room.

H. Location of decontamination facility will be determined by the Engineer and will have the approval of the Authority before it is set up. It shall be located in such a manner as to provide a minimum of inconvenience to the Authority.

3.3 DECONTAMINATION SEQUENCE

A. All authorized personnel must sign in on the Daily Log before entering containment. Workers and other authorized persons who enter the work area shall remove street clothes and don protective clothing with respirator in change room. Workers shall then pass through showers to equipment room.

B. Additional clothing and equipment shall be left in equipment room. Workers shall provide themselves with additional warm garments. These must be treated as contaminated clothing and left in the equipment room and disposed of at the end of the project.

C. Before leaving the work area, workers shall remove gross contamination and debris from the coveralls. This is to be accomplished by one worker assisting another in brushing each other off or vacuuming with HEPA filter equipment vacuums approved for asbestos clean-up.

D. Workers then shall proceed to equipment room and remove clothing except respiratory protection equipment. Contaminated extra clothing may be placed in a bag for disposal with other material. Workers

then proceed immediately into shower room. Respiratory protection equipment shall be removed after workers have completely showered to prevent inhalation of fibers.

E. After showering, all personnel must sign out on the Daily Log before leaving the Clean Room. Workers shall move to the clean room and dress in either new protective clothing for another entry or street clothes if leaving.

F. Workers shall not eat, drink, smoke, chew gum, or tobacco in work area. To do any of the above, worker shall follow the complete decontamination sequence.

G. Work footwear shall remain inside work area (equipment room) until completion of the project and then disposed of or cleaned by washing in shower at the end of the project.

H. Contractor shall be responsible for assigning a worker to collect contaminated respirators, clean them, and re-filter them after each use.

I. Everyone entering the work area must follow this procedure completely every time he/she enters and leaves the work area.

J. The Contractor, in order to prevent contamination of the environment, shall be responsible for controlling access at the work site and shall maintain a daily log of personnel entering the work area.

3.4 ASBESTOS FILTRATION DEVICES (NEGATIVE AIR)

A. In all areas, an alternate ventilation system shall be installed. Portable air Filtration Devices, capable of moving large quantities of air through HEPA (High Efficiency Particulate air filter capable of 99.97% efficiency at .3 microns) shall be installed. No homemade or factory modified AFD units shall be allowed.

B. HEPA filtration and HSPA filters shall be accompanied by a Certification. Certification shall consist of a test performed when the unit is setup on site and within 100 use hours on the particular HEPA filter or when it is changes. Testing shall be dioctlyphthalate (DOP) smoke challenge procedure and shall conform to Federal Standard 209B and Air Force Technical Order No. 00-25-203. Certification and test reports shall be submitted. Testing shall be at every main filter change or when the unit is relocated.

C. There shall be sufficient number of units to provide minimum of eight (8) air changes per hour in the work area and exhaust the filtered air to maintain a negative pressure inside (work area) and of sufficient flow through the decontamination chambers to prevent escape of airborne fibers.

1. The size and position of AFD’s in accordance with "Continued Evaluation of Asbestos Removal Technologies and Recommended Specifications for Negative Pressure Systems;" a report prepared for EPA, Chemical Control Division, Research Triangle Park, North Carolina, in April 1982.

2. Portable AFD and positioning shall conform to ANSI 2 9.2- 1979.

3. Calculate the volume of each zone area, provide number of AAFD's to guarantee no less than eight complete air changes per hour.

D. The negative pressure systems shall produce a pressure differential of negative 0.05 inches of water in the work zone (with full makeup air) relative to the adjacent areas. The negative pressure systems shall operate on a 24 hour basis throughout the removal and cleanup phases of the project.

E. The Engineer will measure the pressure differential and confirm adequate conditions PRIOR to the Contractor beginning any asbestos removal.

3. 5 METHOD OF ASBESTOS REMOVAL

A. Following total isolation, protection and authorization to proceed, the work shall proceed in the following sequence.

1. Install a Water Atomizer Device (WAD) within the work area and operate the WAD during removal operations.

a. The WAD(s) shall be situated within a ten foot radius of any asbestos removal work or there shall be no less than one WAD per every 1000 cu. ft. of work area.

b. The WAD(s) shall be supplied with sufficient amended water to ensure continuous and uniterrupted operation through the duration of asbestos removal work.

c. WAD(s) shall not be shut down until all removal work is completed and until initial cleaning is performed to the satisfaction of the Engineer.

d. Provide for additional WAD(s) as necessary to be utilized as standby units in the event of breakdown or contamination outside of the containment area.

2. The asbestos material shall be sprayed with water containing a wetting agent to enhance penetration (amended water). A fine low pressure spray of this solution shall be applied to prevent fiber disturbance during removal. Saturate the material sufficiently to prevent emission of airborne fibers in excess of the exposure limits prescribed in the OSHA regulations. The wetted or amended water shall be sprayed on as many times and as often as necessary to ensure that the asbestos material is adequately wetted throughout (especially that asbestos nearest the substrate) to prevent dust emission as specified in the OSHA regulations.

3. Removal of the asbestos material shall be done in small sections by two person teams on staging platforms if needed. As a method of organizing the asbestos removal work, workers shall begin working on the area nearest to the decontamination unit and work towards the air filtration units.

4. Asbestos-containing material located more then 15 feet above the floor shall be dropped into inclined chutes, or dropped onto scaffolding, or contained at that height for eventual disposal. Asbestos-containing materials shall not be dropped or thrown to the floor from 15 feet or greater. For materials located at heights greater than 40 feet above the floor, a dust-tight, enclosed chute shall be constructed to transport removed material directly to containers located on the floor.

5. The wet material which has been removed shall be packed and sealed into containers.

B. Asbestos and asbestos-contaminated waste shall be properly packaged. Packaged waste and large equipment shall pass through the waste removal chamber. During waste removal the following procedures shall be employed:

1. Contaminated workers shall clean the outside of the bags or drums and equipment in the equipment room with HEPA vacuum and wet wiping techniques. Workers shall then place cleaned bag inside a second bag prior to being passed into a "clean" area.

2. Contaminated workers then pass the bags drums/equipment out through the Airlock to "clean" workers wearing disposable suites and proper respiratory protection.

3. During this phase, the representative of the Authority's Q/A Provider will have the Authority to halt this operation should the Contractor be in violation of work practices established by this specification.

4. The location of enclosed dumpsters for the storage of asbestos wastes shall be at the discretion of the Authority.

C. After completion of this removal phase (stripping), surfaces from which asbestos has been removed shall be scrubbed using nylon or bristle brushes and wet sponges or cleaned by an equivalent method to remove visible asbestos-containing material. During this work the surfaces being cleaned shall be kept wet using amended water. Disposable equipment shall be packaged for disposal. Containers shall be washed with amended water and shall have exterior particulate matter removed prior to removal from the contaminated area.

D. Prior to the application of any sealant material and after asbestos material has been removed the Engineer/Authority's Q/A Provider will perform a pre-sealant inspection. Notify the Engineer 24 hour prior to the time the work shall be ready for inspection. The Authority Representative will perform this inspection only during daylight hours.

E. When asbestos removal is completed, the locations from which asbestos has been removed shall be sprayed or painted with one coat of a bridging sealant. The surfaces to be coated shall also include 6 mil. Plastic sheeting that has been used on walls, floors, and non-removable fixtures and equipment. Rough or corrugated edges which remain, such as in locations where a pipe enters a wall, shall receive a heavy layer of sealant which shall be "buttered" on. Asbestos-containing pipe insulation shall be removed from the pipe as far as can be accessed by the Authority Representative.

F. Accessory equipment shall be moved to the Equipment Room and decontaminated for removal.

G. Free water in contaminated area shall be retrieved and placed in plastic-lined leak-tight drums or filtered through 5 micron filters and recycled to be used as a wetting agent or dispose of in sanitary system or as contaminated waste.

H. Plastic sheeting used to protect floors and walls shall be carefully removed and rolled up with the contaminated portion inside, and packaged for disposal.

I. Final cleanup of work area may commence.

3.6 REMOVAL PROCEDURE UTILIZING CONTAINMENT BAGS (WHERE APPLICABLE)

A. The use of Containment bags will be permitted only upon the approval of the Engineer and may be halted by the Engineer at any time. At a minimum work must be performed under total isolation as described in 3.01 unless specified differently in this section.

B. Workers and other person who will enter the work area shall put on clean coveralls and respirator before entering the work area. NOTE: At no time shall a worker leave the work area while wearing coveralls.

C. The removal of asbestos by use of the containment bag shall be limited to the removal of asbestos-containing insulation from pipe fittings, elbows, and pipe.

D. The preparation of the work area for containment bag removal shall include the following:

1. A minimum of two person are required to perform a containment bag removal project. A third person may be required to conduct air monitoring and assist with supplies.

2. The work area where the technique is to be utilized shall be isolated within a tent enclosure and warning signs posted on the perimeter to prevent unauthorized personnel from entering the work area. Negative air pressure utilizing AFDs shall be established. Tent enclosures must be constructed of 2"x4" framing and 2 layers of 6-mil polyethylene sheeting.

3. Contractor shall also construct a two-stage decontamination attached to the enclosure but separated by airlocks constructed of two layers of 6-mil polyethylene sheeting.

4. All necessary materials and supplies shall be brought into the work area before any removal begins.

5. All movable objects shall be removed.

E. The following is a list of recommended equipment and tools for the removal of asbestos by the containment bag technique:

1. The containment bag which consists of a 6 mil. bag fitted with long sleeve gloves, a tool punch and a two-inch opening used for water application;

2. A pump-up sprayer (garden type) with a two or three gallon capacity;

3. Amended water (water with a surfactant);

4. 6 mil. polyethylene disposal bags with the proper markings for asbestos waste;

5. A HEPA filtered vacuum with a capillary tube for insertion into the containment bag;

6. Tools such as: A small scrub brush, a utility knife for cutting the insulation, a stapler, wire cutters, smoke tubes with aspirator bulk, a bone saw, tin snips, duct tape and wettable clothes.

7. A roll of 6 mil. polyethylene

8. An encapsulant (tinted).

F. Removal procedures shall be conducted as follows:

1. A visual inspection of the pipe where the work will be performed shall be made to determine if any damaged pipe covering (broken lagging, hanging, etc.) exists. If there is, the pipe shall be wrapped in polyethylene plastic and fully secured with duct tape. This procedure will prevent high airborne fiber concentrations from occurring during the containment bag work caused by pipe lagging, handling several feet or even several yards away which may be jarred loose by the activity. Debris on the floor and other surfaces which has accumulated and contains asbestos shall be cleaned up as necessary. If the pipe is undamaged, one layer of duct tape shall be placed around the pipe and each end of where the containment bag will be attached. This permits a good surface to seal the ends of the containment bag, and it minimizes the change of releasing fibers when the tape at the ends of the containment bag is peeled off at the completion of the job.

2. Slit the top of the bag open (if necessary) and cut down the sides to accommodate the size of the pipe (about two inches longer than the pipe diameter).

3. Place the necessary tools into the pouch located inside the bag. This will include the bone saw, utility knife, rages, scrub brush, wire cutters, tin snips and pre-cut wettable cloth. Cut out a donut shape in the cloth with the inner diameter one-half inch smaller than the diameter of the pipe beneath the insulation. The outer diameter of the donut should be three inches longer than the diameter of the pipe insulation being removed. Finally, cut a slit in each of the two donuts so they can be slipped around the pipe.

4. One strip of duct tape shall be placed along the edge of the open top slit of the bag for reinforcement.

5. Place the bag around the section of pipe to be worked on and staple the top together through the reinforcing duct tape. Staple at intervals of approximately one inch. Next, fold the stapled top flap back and tape it down with a strip of duct tape. This should provide an adequate seal along the tip. Next, duct tape the ends of the bag to the pipe itself, previously covered with plastic or duct tape (see step 1 above.)

6. Using the smoke tube and aspirator bulb, place the tube into the water sleeve (two-inch opening to containment bag). By squeezing the bulb, fill the bag with visible smoke. Remove the smoke tube and twist the water sleeve closed. While holding the water sleeve tightly, gently squeeze the bag and look for smoke leaking out, especially at the top and ends of the bag. If leaks are found, they shall be taped closed using duct tape and the bag shall be retested.

7. Insert the wand from the water sprayer through the water sleeve. Using duct tape, tape the water sleeve tightly around the wand to prevent leakage.

8. One person shall place both hands into the long-sleeved gloves while the second person directs the water spray at the work.

9. If the section of pipe is covered with an aluminum jacket, this is removed first using the wire cutters to cut any bands and the trip snips to remove the aluminum. It is important to fold the sharp edges in to prevent cutting the bag when it is placed in the bottom. A box may be put in the bottom of the bag when the tools are placed in, and the metal placed in the box to further protect the bag from being cut.

10. With the insulation exposed, using the bone saw, cut the 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, water is sprayed on the cutting area to keep dust to a minimum.

11. One the ends are cut, the section of insulation shall be split from end to end using the utility knife. The cut shall be made along the bottom of the pipe and water continuously supplied. Again, care should be taken when using the knife not to puncture the bag. Some insulation may have wire to be clipped as well. Again, a box may be used here as in step nine above to protect the bag from puncture.

12. Rinse all tools with water inside the bag and place back into pouch.

13. The insulation can now be lifted off the pipe and gently placed in the bottom of the bag, while the side of the insulation adjacent to the pipe is being thoroughly wetted.

14. During the removal of asbestos elbows, valves, and fittings from fiberglass insulated pipe, remove 3

inches of fiberglass insulation on each side of the elbows, valves, or fittings.

15. Using the scrub brush, rags and water, scrub and wipe down the exposed pipe.

16. Wet the donut-shaped pieces of wettable cloth over the exposed ends of insulation remaining on the pipe.

17. Remove the water wand from the water sleeve and attach the small nozzle from the HEPA - Filtered vacuum. Turn on the vacuum only briefly to collapse the bag.

18. Remove the vacuum nozzle and twist the water sleeve closed and seal with duct tape.

19. From outside the bag, pull the tool pouch away from the bag. Place duct tape over the twisted portion and then cut the tool bag from the containment bag, cutting through the twisted/taped section. In this manner, the contaminated tools may be placed directly in the next containment bag without cleaning. Alternatively, the tool punch with the tools can be placed in a bucket of water, opened underwater, and the tools cleaned and dried without releasing asbestos into the air. Rags and the scrub brush cannot be cleaned in this manner and should be discarded with the asbestos waste. If more than one adjacent section of pipe is to be removed, the containment bag be loosened at each end and slid along the pipe to the next section. In this case, the tools would remain in the bag for continued use.

20. 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 containment bag from the pipe.

21. Slip a 6 mil. Disposal bag over the containment bag (still attached to the pipe). Remove the tape and open the top of the containment bag and fold it down into the disposal bag.

22. Surfaces in the work shall be cleaned using disposable cloths wetted with amended water. These cloths shall be disposed of or rinsed thoroughly to eliminate visible accumulation of debris. Then, when these surfaces have been allowed to dry, surfaces shall be cleaned again using a HEPA filtered vacuum.

23. Place any contaminated articles, debris, etc. into the bag with the waste.

24. Twist the top of the bag closed, fold this over, and seal with duct tape. Place this bag into a second 6 mil. Disposable bag, and seal as in the above manner. Label the bag with a warning label as specified previously.

25. Asbestos-containing material shall be disposed of in accordance with EPA and applicable regulations.

26. Air sampling shall be conducted after completion of containment bag projects to determine if undetected leakage occurred. Once the area has been found to be safe for re-entry by unprotected personnel, the barriers may be removed.

3.7 EMERGENCY CLEAN-UP OF CONTAMINATED AREAS

A. Utilize the following procedures during any situation considered by the Engineer to be of an emergency nature:

1. Affected areas will be evacuated by and at the direction of the Engineer.

2. HVAC systems servicing the area will be shut down by the Authority's personnel.

3. Respond immediately to the directions of the Engineer.

4. Personnel entering the affected area shall be required to wear full body and respirator protection as described in this section of these specifications.

5. Seal off the area by closing all doors and post warning signs along the perimeter of the area.

6. Install portable AFD's in the affected area to continuously scrub clean the air during clean-up operations.

7. Immediately mobilize and operate continuously one Water Atomizer Device per every one thousand cubic feet of the affected area throughout the duration of the emergency cleanup operations, as directed by the Engineer.

8. The entire area shall be cleaned via HEPA vacuum and wet wiping techniques starting from the uppermost area(s) and working down to ground level. All items in the affected area are to be thoroughly cleaned and decontaminated, including light fixtures, HVAC systems, books, personal items, etc., to the satisfaction of the Engineer.

B. Authority's testing laboratory will provide air monitoring during and after clean-up operations are completed. Testing laboratory shall perform air sampling and surface dust sampling to ensure that all asbestos fibers have been removed from the area. Airborne concentrations shall not exceed .01 fibers/cc of air when analyzed by NIOSH 7400. The Authority may also elect to analyze air samples via Transmission Electron Microscopy. Under this method the concentration of asbestos fibers shall not exceed .01 fibers/cc. Should analysis show concentrations above this level or surface dust samples reveal the presence of asbestos, reclean the entire work area until it meets with the standard listed herein.

3. 8 CONTAINMENT, REMOVAL, AND STORAGE OF CONTAMINATED WASTE

A. Routes through the building, elevators, stairways, etc. to be used for the transportation of contaminated wastes to the storage area shall be at the direction of the Engineer.

B. Waste shall be transported through the building in enclosed vehicles (handtruck, cart, etc.) which shall be lined with one layer of 6 mil. Polyethylene sheeting.

C. Contaminated waste shall be disposed of at a time coordinated with the Authority. At no time shall random removal of contaminated waste from the work site be allowed.

D. No materials shall be thrown from windows or doors of buildings. Building waste system shall NOT be used to remove refuse.

E. Debris shall be removed from the site daily. Premises shall be left neat and clean after each work shift, so that businesses may proceed the next regular workday without interruption.

F. Federal Regulations, 40 CFR 61.152 (b) (iii) prescribes a leak-tight container, the integrity of which is the Contractor's responsibility until after deposition at a sanitary landfill which is run in accordance with 40 CFR 61.156. Therefore, caution shall be used in the choice of container types and consideration given to the method of unloading at the landfill. Asbestos or asbestos contaminated materials shall be packaged and sealed in leakproof containers.

1. Double bag waste material utilizing 6 mil. Polyethylene bags. Bags shall not be overfilled. Air within the bags shall be evacuated with a HEPA filter equipped vacuum. The seal at the top of the bags shall be accomplished by twisting the open end and then typing an overhead knot in the twisted material. Do not seal bags with cord or wire. Bags shall be placed in steel or fiber drums and sealed with locking ring tops.

2. Contaminated material containing sharp-edge items such as metal lath, metal ductwork, screws, ceiling grid and vinyl asbestos tile, etc. shall be cut to size while adequately wet, placed in plastic bag lined boxes. Seal bag, close and seal box. Place box in a labeled plastic bag or tightly wrap and seal box in plastic sheeting.

3. Large sized contaminated material such as transite panels which have been removed intact may be wrapped in two layers of 6 mil. Polyethylene sheeting and secured with duct tape. The wrapped material shall be sealed air and water tight. Required warning labels shall be applied to outside of plastic sheeting.

4. Disposal drums shall be constructed out of metal or plastic-lined fiberboard with locking ring tops.

5. Bags and drums shall be marked with a preprinted label as prescribed by Section 61.152 (b) (1) (iv) or the EPA regulations; by section 29 CFR 1926.1101 (k) (2) of the OSHA regulations and by 49 CFR Parts 171 and 172 of the Department of Transportation regulations.

G. Asbestos-containing or asbestos- contaminated materials shall be stored in a securely locked dumpster or storage area. Dumpster or storage area shall be approved by the Engineer prior of its use. Required warning labels shall be affixed to the outside of the dumpster or storage area.

1. The container used for the storage of bagged contaminated waste shall be an enclosed dumpster. Dumpster shall have a solid metal roof, solid metal door with padlock. No unbagged contaminated waste or non-asbestos waste shall be stored in these dumpster. Ensure that bags placed in dumpsters are undamaged. Warning signs shall be posted on the dumpster in accordance with Sections 29 CFR 1926.1101 (k) (1) of the OSHA regulations.

2. Provide a secured storage area for the storage of drummed contaminated waste prior to transport to the waste disposal site. The storage area shall be equipped with lockable doors. Only asbestos waste enclosed in drums or in dumpsters shall be stored in the secure area. Ensure that drums stored in this area are undamaged. Warning signs shall be posted outside on the perimeter of the secured storage area in accordance with Section 29 CFR 1926.1101 (k) (1) of the OSHA regulations.

3. 9 DECONTAMINATION OF WORK AREA (ALL PHASES)

A. The following procedures shall be accomplished utilizing protective clothing:

1. Water Atomizer Device(s) shall operate continuously during initial cleaning operations.

2. Air filtration system shall continue to operate to provide air changes as specified, and exhaust air shall be monitored.

3. After completion of cleaning surfaces in the work area, spray coat dried exposed surfaces with a sealant. The sealant shall be applied by an electric air less spray gun. Spray injection equipment will be designed saturation spray at PSI application pressures ranging from 800 to 3300 psi. Consult

manufacturer's specifications. The surfaces to be coated shall include surfaces from which asbestos containing materials have been removed and polyethylene sheeting which has been used to cover walls, floors, nonremovable fixtures and equipment.

4. After completion of cleaning surfaces in the work area, spray coat dried exposed surfaces with a bridging encapsulant. The surfaces to be spray coated shall include surfaces from which asbestos-containing materials have been removed (such as ceilings), and polyethylene which has been used to cover walls, floors and nonremovable fixtures and equipment.

5. The plastic sheeting used to protect floors, walls fixtures and equipment shall be carefully removed and rolled-up, with the contaminated portion on the inside, and packaged for disposal. Tape and any other debris shall also be disposed of in sealed double plastic bags labeled as asbestos-contaminated waste.

6. Wet clean with amended water, walls, floors, woodwork, ceilings, electric light fixtures and other surfaces. Allow surfaces to dry. Cloths or sponges used in the cleaning operation shall be disposed of as contaminated waste.

7. Plastic used to maintain critical barriers between work areas and clean areas such as those in doorways, windows and air vents shall be sprayed with encapsulant, but not removed until monitoring is completed and satisfactory results have been obtained.

8. After completion of the cleaning operations, perform the following:

    a. Notify the Engineer that a cleanup inspection can be performed to ensure all visible asbestos has been removed and the area is dust free.

    b. Request air monitoring of the work area.

9. Air monitoring results shall indicate asbestos concentrations of no more than 0.01 f/cc within the work area. These results must be achieved before critical barrier removal and reconstruction activities may begin. If the test results show asbestos fiber concentrations above the acceptable criteria, then cleanup shall be repeated until compliance is achieved by recleaning all surfaces using wet methods and operating HEPA equipped AFD's to exhaust air outside the work area to filter the air.

10. If the test results exceed the limits specified, clean-up and testing shall be repeated until compliance is achieved.

B. After the work area is found to be in compliance with the acceptable criteria, the following steps may be performed without utilizing protective clothing, however, respiratory protection is required.

1. After the work is found to be in compliance with item 3.09.A.9, Perform the following tasks:

    a. Critical barriers may be removed;

    b. Plastic sheeting, tape and other debris shall be disposed of in sealable plastic bags labeled as contaminated waste;

    c. The inside of windows shall be washed;

    d. Woodwork, trim, floor, furniture, and plumbing fixtures shall be cleaned;

e. Cloths and sponges used in the cleaning operation shall be disposed of as contaminated waste;

f. There shall be no residue left on floors or other surfaces;

g. Walls, floors, trim, doors, furniture or other items damaged during the work shall be repaired and refinished to match the existing materials;

C. After the work described in item 3.09.B. is completed, the Testing Laboratory will monitor the air quality to determine continued compliance with item 3.09.A.9.

D. If Air quality Monitoring results are not in compliance with item 3.09.A.11, all steps covered in item 3.09.B, shall be repeated, until compliance is obtained. No costs for additional testing required to determine compliance shall be charged to the Authority.

3.10 DISPOSAL OF ASBESTOS WASTE

A. Asbestos materials, wastes, shower water, plastic, disposable equipment and supplies shall be disposed of as contaminated waste, in accordance with the EPA regulation (40 CFR, Section 61.152-61.156) and those requirements of the Massachusetts Department of Labor and Industries.

B. Transport sealed drums to a sanitary landfill disposal site approved by the Applicable State Agency of Environmental Protection and the EPA. Transportation shall be performed by a state registered waste hauler, where required.

C. Notify the waste site, at least 24 hours prior to transportation of contaminated waste to be delivered. Determine if a longer notification period is required.

D. At the site the waste hauler's trucks shall approach the dump location as close as possible for unloading asbestos waste. Containers shall be carefully placed in the ground. Do not throw containers from truck.

E. Inspect containers as they are unload at the disposal site. Material in damaged containers shall be repacked in empty containers, as necessary.

F. The waste hauler shall not remove Asbestos-containing waste material from drums unless required to do so by the disposal site owner. Used drums shall be disposed of as Asbestos-Contaminated Waste.

G. Personnel engaged in unloading of the containers at the waste site shall wear protective clothing. The disposable clothing shall include head, body and foot protection. Minimum respiratory protection shall be half face, dual cartridge, air purifying respirators with HEPA filters (see section 1.12). Workers shall remove their protective clothing at the disposal site, place it in labeled disposal bags and leave the bags with the deposited waste shipment.

H. For the compaction operation, ensure that disposal site personnel have been provided with personal protective equipment by the disposal operator. If the disposal site owner has not provided this protective equipment, supply protective clothing and respirator protection for the duration of this operation (powered air purifying respirators are mandatory).

I. If containers are broken or damaged, the waste hauler shall, using personnel who are properly trained and wearing proper protective equipment, repackage the waste in properly labelled containers. Then clean the

entire truck and its contents using HEPA equipped vacuums and wet wiping cleaning techniques until no visible residue is observed.

J. Following the removal of containerized waste, decontaminate the truck cargo area using HEPA Vacuums and/or wet wiping techniques until no residue is observed. All 6 mil. polyethylene sheeting shall be removed and discarded as Asbestos-containing waste material along with contaminated cleaning material and protective clothing, in containers at the disposal site.

3.11 TRANSPORTATION OF CONTAMINATED WASTE

A. Asbestos materials shall be prepared for transportation in accordance with this specification and all applicable Federal, State, County and City Regulations. Submit the following documentation:

1. Where applicable, and EPA Generator's identification numbers have been obtained for the EPA for asbestos waste generated from the project.

2. Applicable State haulers license and registration numbers.

3. Federal Hazardous Materials haulers numbers.

4. Designated landfill EPA Permit numbers.

B. Prior to loading asbestos waste the enclosed cargo area dumpster shall be prepared as follows:

1. Clean via HEPA vacuum and wet wipe techniques the enclosed cargo areas of visible debris prior to preparing with plastic.
2. Line the cargo area with two layers of 6 mil. polyethylene sheeting to prevent contamination from damaged or leaking containers. Floor sheeting shall be installed first and shall extend up the sidewalls 24 inches minimum. Wall sheeting shall be overlapped and taped securely into place.

C. Asbestos waste shall be placed on level surfaces in the cargo area of the dumpster and shall be packed tightly to prevent any shifting or tipping of the waste during transportation.

D. Asbestos-containing waste shall not be thrown into or dropped from the dumpster. Material shall be handles carefully to prevent rupture of the containers.

E. Personnel engaged in handling and loading of contaminated waste outside of the work area shall wear protective clothing. The disposable clothing shall include head, body and foot protection and color of clothing shall be different from abatement personnel in the work area. Minimum respiratory protection shall be half face, dual cartridge, air purifying respirations with HEPA filters (see article 1.11 of this Section.)

F. Immediately clean any debris or residue observed on containers or surfaces outside of the work area. Cleaning shall be via HEPA equipped wet/dry vacuums only.

G. Asbestos-containing waste shall be transported form the abatement to the landfill by a registered waste hauler.

H. Waste transport documents shall conform to the requirements of the U.S. Department of Transportation, Hazardous Materials Transportation Regulation, 49 CFR Part 173. Shipping documents shall be clearly marked with the required designation "R-Q-Asbestos." Provide a copy of this document to the Engineer.

I. Prepare and sign a uniform hazardous waste manifest each time there is a shipment of a dumpster load of Asbestos-Containing Waste Material. The uniform hazardous waste manifest shall include the names and addresses of the Transporter, the Contractor, and the landfill operator with formation on the type and number of asbestos-waste containers, time and date. Provide the Engineer with signed copies of the waste manifest before each departure.

J. The Contractor and his registered hazardous waste hauler shall transport Asbestos-containing waste Material from the abatement site directly to the specified disposal site. The Contractor or his waste hauler shall not accept material from any other site when transporting Asbestos-Containing Waste Material from the abatement site. The Engineer reserves the right to travel with the Contractor's waste hauler to the Waste disposal site. No intermediate storage of waste material (i.e., Contractor's warehouse) shall be permitted.

K. Final or progress application for payment will not be processed unless all hazardous waste manifests have been received and reviewed by the Engineer.

PART 4 - MEASUREMENT AND PAYMENT

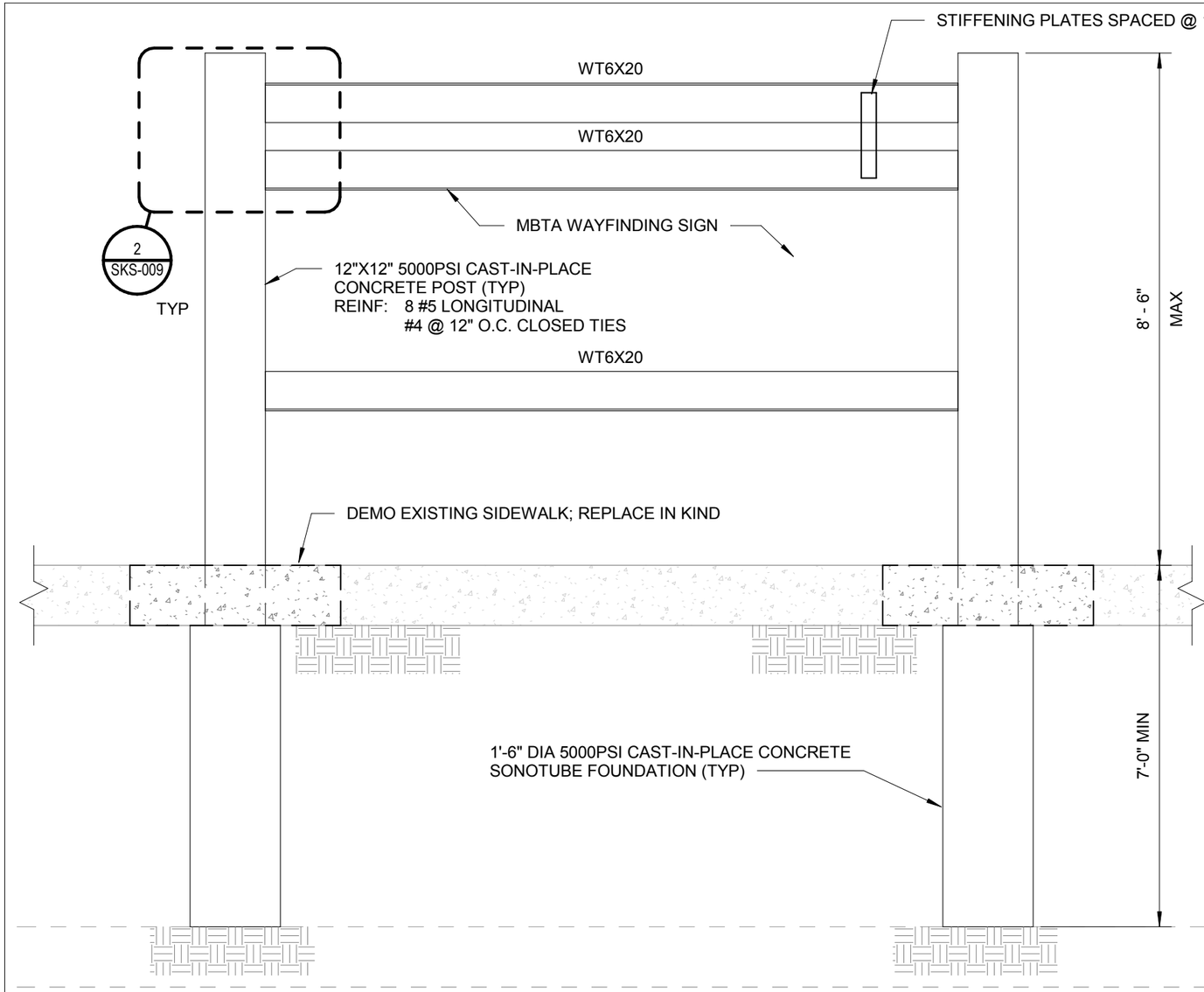
4.1 GENERAL

Payment for the work of this section will be made at the contract unit price for the item to which the work pertains.

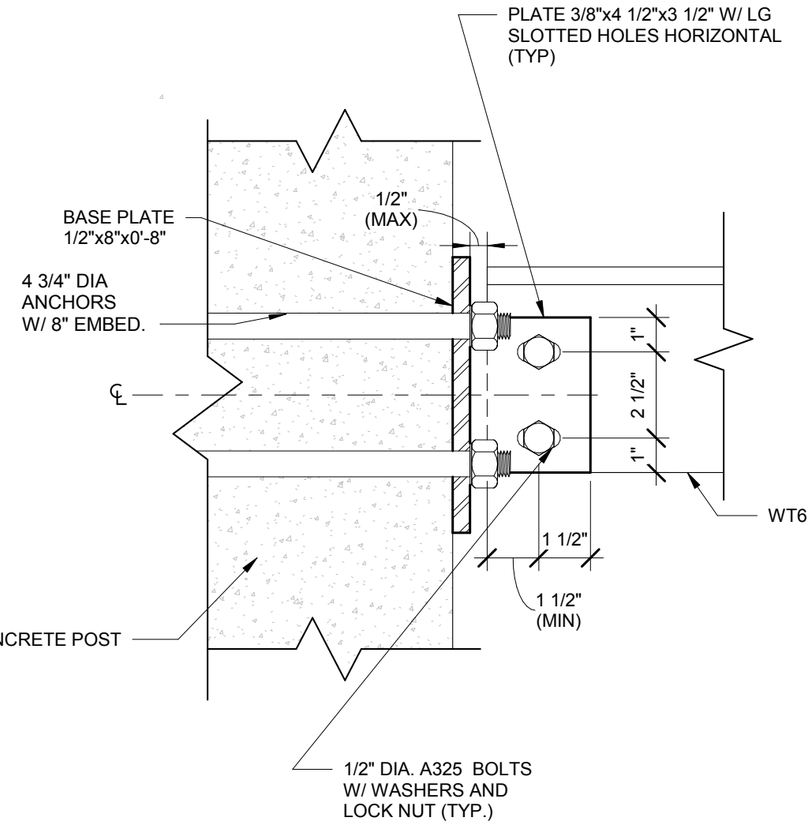
4.2 PAY ITEMS

Item No.	Description	Unit
0222.398	REMOVE AND DISPOSE OF HAZARDOUS WASTE	AN

END OF SECTION



1 FREESTANDING SIGN - ELEVATION
1/2" = 1'-0"



2 FREESTANDING SIGN - CONNECTION DETAIL
3" = 1'-0"

AECOM
ONE FEDERAL ST, #800,
BOSTON, MA 02110
T: (617) 723-1700

Sketch Title: FREESTANDING SIGN - STRUCTURAL DETAILS				Sketch No: SKS-009 AECOM Proj No: 60563410
Project: OAK GROVE STATION IMPROVEMENTS			MBTA Contract No: A92CN01	Ref Sheet: -
Scale: As indicated	Drawn by: MM/EH	Checked by: AA	Date: 08/01/19	Ref Item: ADD-04