ASBESTOS ABATEMENT SPECIFICATIONS

UNIVERSITY OF MANITOBA
WINNIPEG, MANITOBA

Submitted to:

University of Manitoba
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Attention: Mr. Ray Guay, Asbestos Project Coordinator

Submitted by:

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AMEC Project No. WX15581 (Phase 0004)
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Attach. Attachment A – Contractor Scope of Work
1.0 GENERAL

1.1 Related Work Specified Elsewhere:

1.1.1 Conform to requirements of this specification. This section is to apply in conjunction with all other sections and drawings listed in this document.

1.1.2 See Section 00005 for a list of related work specified elsewhere. Refer to those applicable Sections as per the University of Manitoba’s (herby referred to as the Owner) Project Scope of Work.

1.1.3 See the Owner’s Project Scope of Work (attached) for further project information.

1.2 Project Description

1.2.1 It is the intent of this Section to outline and describe the general conditions of an asbestos abatement project. This document shall be used in conjunction with a project scope of work prepared by the University of Manitoba Asbestos Coordinator or other approved personnel and shall be supplemented by the appropriate general asbestos abatement specifications for Type I, Type II, Type II Glovebag and/or Type III asbestos abatement activities.

1.2.2 These specifications are intended to provide Contractors invited to bid on the project with the general procedures and standards of workmanship which are expected to be followed and defines the Contractors’ responsibilities. It is the Contractor’s responsibility to determine the magnitude of work. The intent of the information contained in this document is to provide guidance to the successful Contractor in the performance of that work. The Contractor is to abide by all Federal, Provincial and Municipal regulations and is to complete the work to the satisfaction of the University of Manitoba and their Consultants (herby defined as the Owner and/or Owner’s Consultant).

1.3 Site Conditions

1.3.1 The site conditions identify the location and condition of all known asbestos-containing materials (ACM) to be disturbed by the work of this contract. This information is provided for reference purposes only and each contractor must confirm existing conditions within the work area as a part of this contract.

1.3.2 The Owner has identified the presence of various friable and non-friable asbestos-containing materials as being present throughout many of the buildings, tunnels and grounds owned, leased and/or otherwise occupied by the Owner, including the work area.
1.3.3 Every effort has been made by the Owner to identify known asbestos-containing materials within the areas of proposed work. As a precautionary measure, where material is encountered by Trades or Contractors that is suspected of containing asbestos fibres, the Trade or Contractor is to immediately stop work in the area and notify the Owner and the Owner’s Consultant. Do not resume work in the area until the asbestos content of the material has been determined and the Owner or Owner’s Consultant has granted authorization.

1.4 Outline of Work

1.4.1 Refer to the Owner’s project Scope of Work and Para. 1.2.2 of this Section for details regarding project requirements and specified personal protective measures for the safe handling, removal, and clean-up of the required asbestos-containing materials.

1.4.2 Do not remove any materials not specifically identified by the Owner or Owner’s Consultant. Where un-specified materials have been removed by the Abatement Contractor, the Abatement Contractor will be responsible for the re-installation of the removed materials to the satisfaction of the Owner, and at no cost to the Owner.

1.4.3 Determination of quantities, location, and nature of asbestos and other regulated work activities including, but not limited to, considerations for transportation, disposal, handling and storage of materials, availability of labour, worker and visitor protection, water, electric power, roads, uncertainties of weather or physical conditions at the site, is the responsibility of the Abatement Contractor.

1.4.4 The Abatement Contractor is not responsible for the re-installation of mechanical insulation within the work area unless otherwise instructed by the Owner.

1.4.5 The Abatement Contractor is responsible for determining an approved location of all venting for the specified negative air units prior to submittal of any bids. The Abatement Contractor must disclose all proposed venting details for consideration and approval as part of their bid package. The location of all venting will be discussed at the time of the mandatory contractor walk-through.

1.4.6 All work must be in compliance with all Federal, Provincial and local requirements, including the University of Manitoba’s Asbestos Management Program (AMP). In the event of conflict between these requirements and the specification document, the more stringent requirement shall apply.

1.4.7 It is the Contractor’s responsibility to be familiar with all duties and responsibilities assigned to their firm under the terms of the Owner’s AMP. Copies of the AMP are available from the Owner or online at the following address:

1.4.8 It is the Contractor’s responsibility to be familiar with all duties and responsibilities assigned to their firm under the terms of the Owner’s Contractors Safety and Orientation Manual. Copies of the Manual are available from the Owner or online at the following address:


1.5 Schedule

1.5.1 The Abatement Contractor is to assume that all work is to be performed during quiet times such as outside of regular business hours or when the area is unoccupied as determined by the Owner or Owner’s Consultant. Asbestos removal must not delay the performance of other trades.

1.5.2 Prior to any on-site activities, the Abatement Contractor shall submit a proposed schedule showing phasing and proposed workforce related to each work area enclosure or repair operation.

1.5.3 Prior to any on-site activities, the Abatement Contractor shall submit a proposed schedule showing phasing and proposed workforce related to each work area

1.5.4 Modifications to the project schedule would only be granted on approval by the Owner or Owner’s consultant.

1.6 General Requirements

1.6.1 Supply all labour, material, and equipment necessary to safely execute and complete all work specified, required, or implied in Para. 1.1.2 of this section.

1.6.2 Prepare and isolate the specified work area(s) from adjoining occupied and unoccupied areas.

1.6.3 Shut down and/or isolate any air moving equipment that could contribute to the dispersal of contaminants, including asbestos, from the work area.

1.6.4 Construct worker and waste decontamination facilities at the perimeter of the work area as further specified in the sections listed in Para. 1.1.2 of this section.

1.6.5 As required, allow for access to security and other alarm panels at all times.

1.6.6 Abatement Contractor is to ensure work area is secure.

1.6.7 After preparation and approval of the work areas and decontamination facilities, remove and dispose of all materials specified and/or as identified by the Owner or Owners consultant.
1.6.8 At the completion of work, the Abatement Contractor shall re-establish objects and systems as follows unless otherwise directed by the Owner:

.1 Clean and replace all mechanical and electrical equipment, ducting, building components, materials or other items removed to accommodate asbestos removal.

.2 Reconstruct items demolished that are to remain and reinstall objects and items in their proper positions, which were removed to facilitate asbestos disturbance operation. Reconstruction and reinstallation shall be by tradesmen qualified in work being reinstalled or reconstructed.

.3 Re-establish mechanical and electrical systems in proper working order. Arrange for, and pay costs of, electrical or mechanical repairs needed due to this work.

.4 Make good all damage at completion of work which was not identified in the pre-disturbance survey.

1.6.9 The Abatement Contractor will be responsible for the general upkeep of the site. Where available, workers and trades will use designated washrooms only. Designated washrooms must be kept clean at all times. All other facilities will be off limits.

1.6.10 All work will be subject to inspection inside and outside work area by Owner or Owner’s Consultant as further specified in the sections listed in Section 00005.

1.6.11 All containment structures, such as hoardings, platforms, etc., that are used to segregate the work area are to remain in place until directed by the Owner’s Consultant.

1.6.12 When directed by the Owner and/or Owner’s Consultant, decommission the work area and decontamination facilities.

1.6.13 All designated substances removed shall be transported and disposed of as further specified in the sections listed in Para. 3.0 of this Section.

1.7 Definitions

1.7.1 Amended Water: Water with a non-ionic wetting agent added to reduce water tension to allow wetting of fibres.

1.7.2 Airlock: System for permitting ingress or egress without permitting air movement between contaminated area and uncontaminated areas, typically consisting of 2 curtained doorways spaced minimum of 2 m (6’) apart.
1.7.3 **Asbestos-Containing Material (ACM):** Materials identified under Section 13080, Para. 1.3 Site Conditions and/or the Owner’s Scope of Work including fallen materials and settled dust.

1.7.4 **Asbestos Waste:** Materials identified under Section 13080, Para. 1.3 Site Conditions and/or the Owner’s Scope of Work that have been removed as specified under Sections 13081, 13082, 13083 and 13084 including fallen materials, debris, rubble, and settled dust, and materials and/or equipment deemed to be contaminated under this specification and/or by the Owner’s Consultant.

1.7.5 **Asbestos Work Area(s):** Area(s) where work takes place which will or may disturb asbestos-containing material, including fallen material or settled dust that may contain asbestos.

1.7.6 ** Authorized Visitor(s):** Owner’s Consultant or person(s) representing regulatory agencies, and person(s) authorized by them.

1.7.7 **Curtained Doorway:** Device to allow ingress or egress from enclosure while permitting minimal air movement, typically constructed by placing two overlapping flaps of polyethylene sheeting (2 sheets of polyethylene per flap) attached to head and one jamb of existing or temporarily constructed door frame. Secure vertical edge of one flap along one vertical side of door frame, and vertical edge of other flap along opposite vertical side of door frame. Reinforce free edges of polyethylene with tape.

1.7.8 **DOP Test:** A testing method used to determine the integrity of the negative pressure unit using dioctyl phthalate (DOP) HEPA filter leak test.

1.7.9 **Fitting:** Individual segments of a mechanical service line which may include hangers, tees, elbows, joints, valves, unions, etc.

1.7.10 **Flexible ducting:** Metal reinforced flexible ductwork, 300 mm (12”) diameter minimum.

1.7.11 **Friable Material:** Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.

1.7.12 **Glovebag:** Prefabricated polyvinylchloride Glovebag with a minimal thickness of 0.25 mm with integral gloves and elastic ports, equipped with a reversible double pull throw zipper on top, securing straps and an internal closure strip if intended to be used at multiple locations.

1.7.13 **Ground Fault Panel:** Portable electrical panel equipped with ground fault circuit interrupters (5 mA protection) of sufficient capacity to power all electrical equipment and lights in asbestos work enclosure. Panel complete with ground fault interrupter lights, test switch to ensure unit is working, and reset switch. Panel is to be installed
1.7.14 **HEPA Filter:** High Efficiency Particulate Aerosol filter at least 99.97 percent efficient in collecting 0.3 micrometer aerosol.

1.7.15 **HEPA Vacuum:** HEPA filtered vacuum with all necessary fittings, tools and attachments. Air must pass HEPA filter before discharge.

1.7.16 **Knife:** Knife with fully retractable blade for use inside glove bag.

1.7.17 **Negative Pressure:** Reduced pressure within specified work area(s) established by extracting air directly from work area, and discharging directly to exterior of building. Discharged air first passes through HEPA filter. Extract sufficient air to ensure constant reduced pressure at perimeter of work area with respect to surrounding areas. Air volume extracted should be sufficient to provide four (4) air changes per hour and maintain a reduced pressure of 5 Pascals (0.02 inches water column) within the work area in relation to the surrounding areas.

1.7.18 **Negative Air Unit:** Portable air handling system, which extracts air directly from asbestos work area and discharges air outside building. Unit shall be fitted with pre-filter and HEPA final filter. Air shall pass HEPA filter before discharge. Unit shall have pressure differential gauge to monitor filter loading. Unit shall have warning system for HEPA filter failure. HEPA filter shall have separate hold down clamps to retain filter in place.

1.7.19 **Occupied Area:** Any area of the site building or work site that is outside the work area.

1.7.20 **Polyethylene Sheeting:** Polyethylene sheeting of type and thickness unless specified sealed with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide continuous polyethylene membrane protection.

1.7.21 **Securing Straps:** For glove bag, reusable nylon straps at least 25 mm (1”) wide with metal tightening buckle for sealing ends of bags around pipe and/or insulation.

1.7.22 **Sprayer:** Garden reservoir type portable manual sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.

1.8 **Regulations and Guidelines**

1.8.1 Comply with applicable Building Codes, Electrical, Fire and Construction Safety Codes as well as Federal, Provincial, and local requirements pertaining to asbestos.
and other designated substances provided that in any case of conflict among these requirements or with these specifications the more stringent requirement shall apply. Work shall be performed under regulations in effect at the time work is performed.


1.8.3 Manitoba Environment Act, Chapter E125, Waste Disposal Grounds Regulation (MR 150/91) as it pertains to asbestos and other hazardous materials.


1.8.5 The Abatement Contractor shall ensure that:

.1 Measures and procedures prescribed under the Occupational Health & Safety Act and regulations are carried out.

.2 Every employee and every worker under their control complies with applicable Acts and Regulations.

.3 Health and Safety of workers and public are protected.

.4 Policies and procedures of the Owner are complied with including site specific safety, health and environment requirements.

.5 All material handling and associated equipment conform to and are operated in accordance with “Workplace Hazardous Materials Information System” (WHMIS).

.6 Notify sanitary landfill or waste disposal site as per Municipal and Provincial requirements.

1.8.6 Laws of Province of Manitoba shall govern this work. The Abatement Contractor shall observe all such laws and shall obtain and/or pay all permits, notices, fees, taxes, duties as may be required. Likewise, it is the responsibility of the contractor to comply with Worker’s Compensation and Workplace Safety and Health Acts.

1.9 **Quality Assurance**

1.9.1 Ensure work proceeds to schedule and meets all requirements of this section.

1.9.2 Perform work so airborne contaminants or wastewater run-off does not contaminate areas outside specified work areas.
1.9.3 Any contamination of surrounding areas, indicated by visual inspection or air monitoring, shall necessitate the enclosure of these areas and complete cleanup of affected areas in same manner as that applicable to work areas, at no cost to Owner. The Owner’s Consultant shall be notified as soon as possible following such an occurrence and informed of the measures being implemented to correct the situation.

1.9.4 Pay cost to Owner of inspection and air monitoring performed as result of failure to perform work satisfactorily.

1.9.5 Use only skilled and qualified workers for all trades required for this work.

1.10 Submittals

1.10.1 The Abatement Contractor shall ensure that the following has been submitted to the Owner prior to commencing work:

.1 Asbestos (Abatement) Contractor health & safety records are required to be provided to the Owner as per Section 1.0, Appendix J – Contractor Qualifications of the Owner’s AMP.

.2 Proof that all workers have attended the Owner’s mandatory 2 hour Construction Safety Orientation Training course. Failure to attend the course may result in the worker not being allowed to work on the Owner’s projects.

.3 Before commencing any work, Abatement Contractor shall submit, in writing, confirmation of good standing with Worker’s Compensation Board of Manitoba.

1.10.2 The Abatement Contractor shall ensure that the following has been submitted to the Owner and Owner’s Consultant at least five (5) days prior to commencing work:

.1 Provide proof that notification of asbestos work has been submitted to Manitoba Labour and Immigration.

.2 Obtain and submit all necessary permits for transporting and disposal of waste materials.

.3 Names of supervisory personnel who will be responsible for the specified work area(s).

.4 Proof that supervisory personnel have attended a training course on asbestos control (2 day minimum duration) and have performed supervisory function on at least 2 other asbestos control projects of similar nature.

.5 Satisfactory proof that every worker has had instruction and training in the hazards of asbestos and if requested, other designated substances exposure
including lead and mould, in personal hygiene and work practices, and in the use, cleaning, and disposal of respirators and protective clothing.

.6 A proposed schedule showing phasing and proposed workforce related to each work area enclosure or repair operation.

.7 A list of all pre-existing damage (pre-disturbance survey) for approval by the Owner or Owner’s Consultant.

.8 Negative air unit performance data and results of DOP test as required.

.9 Documentation for materials used in the course of the project including MSDS sheets or other data documenting compliance with specifications for such materials as, but not limited to sealants, encapsulants, wetting agents, and polyethylene sheeting.

.10 Waste manifest forms on a weekly basis and at the completion of the project.

.11 Prepare and provide a copy of the Contractor’s Site specific Health and Safety Plan to the Owner and Owner’s Consultant.

.12 Provide a written emergency access/egress plan for the work area for approval by the Owner and/or Owner’s Consultant.

.13 Where required, provide a written visitor entrance procedure for the work area for approval by the Owner and/or Owner’s Consultant.

1.11 **Supervision**

1.11.1 A minimum of one (1) supervisor is required for every ten (10) workers unless otherwise approved by the Owner or Owner’s Consultant.

1.11.2 An approved supervisor must remain within the designated work area at all times during the disturbance, removal, or other handling of designated substances.

1.11.3 Site supervision must only be replaced by approved replacement on approval by the Owner or Owner’s Consultant. The Owner reserves the right to request the replacement of the supervisor without explanation.

2.0 **PRODUCTS**

2.1 **Materials**

2.1.1 **Asbestos Waste Receptors:** Two separate containers of which at least one shall consist of 0.15 mm (6 mil) minimum thickness sealable polyethylene bag. Other
container may be 0.15 (6 mil) minimum thickness polyethylene bag. Other container shall be adequate to prevent perforating rips, or tears during filling, transport or disposal. Containers must be acceptable to disposal site selected and Manitoba Conservation, and shall have a pre-printed cautionary asbestos warning in both official languages, clearly visible when ready for removal to the disposal site. Labelling shall be as per the following:

CAUTION CONTAINS ASBESTOS FIBRES (25 mm high)
Do Not Mishandle (19 mm high).

2.1.2 Encapsulant: Standard of acceptance - Ocean No. 666, Ocean Fire Retardants Inc., or equivalent, coloured blue unless another colour is specified by Owner.

2.1.3 Polyethylene Sheeting: 0.15 mm (6 mil) minimum thickness unless otherwise specified. Sheet size shall be such to minimize joints.

2.1.4 Protective Coveralls: Disposable full body coveralls complete with elasticized hoods made of spun polyolefin material Tyvek by DuPont or non-woven material Kleenguard by Kimberly Clark or approved equal. All coveralls must be rated for asbestos abatement applications by the manufacturer.

2.1.5 Rip-Proof Polyethylene: 0.20 mm (8 mil) fabric made up from 0.13 mm (5 mil) weave and 2 layers 0.04 mm (1.5 mil) poly laminate, in sheet size to minimize joints.

2.1.6 Sealer (Lock down agent): Sealer for purpose of trapping residual fibre debris. Product must have flame spread and smoke development ratings both less than 25. Product shall leave no stain when dry. TC-55 (clear), A/D Fire Protection Systems Inc., Scarborough, Ontario or equivalent. For mechanical equipment, pipes, boilers, etc. use high temperature sealer only. Chil-Abate CP210 or equivalent, Childers Products Company, Mississauga, Ontario.

2.1.7 Tape: Tape suitable for sealing polyethylene to surface encountered under both wet conditions using amended water, and dry conditions. Standard of acceptance, Nashua 300 polyethylene coated cloth tape, Tyco Adhesives, or equivalent.

2.1.8 Wetting Agent: Non-foaming surface active agent; mixed with water in concentration to provide thorough wetting of asbestos fibre: Standard of acceptance, Asbesto-Wet, distributed by Asbetec Distributors, or equivalent.

3.0 WASTE TRANSPORT AND DISPOSAL

3.1 General Requirements and Procedures

3.1.1 Conform to all Federal, Provincial, Municipal and Local requirements for transporting and disposal of hazardous waste including the Owner’s AMP.
3.1.2 Check with local landfill operator or waste disposal site to determine type of waste containers acceptable.

3.1.3 Ensure shipment of containers to landfill or waste disposal site is by a waste hauler licensed by the Province of Manitoba to transport the specified waste materials.

3.1.4 Transportation of all waste and materials through occupied areas shall be covered and must never be left unattended. Clean-up waste route and loading area after each load. Use appropriate worker protection as required or requested by the Owner or Owner’s Consultant.

3.1.5 All ACMs and asbestos waste removed as part of this specification must be removed from the work area at the end of each work shift unless approved by the Owner or Owner’s Consultant.

3.1.6 Each load requires completion of bill of lading showing type and weight of hazardous waste being transported. Provide proof (copies of all waste manifests or other approved documentation) of proper disposal to the Owner and Owner’s Consultant on a weekly basis (at a minimum) and on completion of the project.

3.1.7 Cooperate with Manitoba Conservation inspectors and immediately carry out instructions for remedial work at landfill or waste disposal site to maintain environment, at no additional cost to the Owner.

3.1.8 Ensure landfill or waste facility operator is fully aware of substances being disposed of.

3.1.9 Ensure that containers used for disposal are locked and covered at all times.

4.0 INSPECTION AND AIR MONITORING

4.1 General Inspection

4.1.1 The following general inspection specifications shall be followed for all projects. See appropriate sections listed in Section 0005 for specific inspection requirements.

4.1.2 From commencement of work until completion of clean-up operations, the Owner’s Consultant is empowered by the Owner to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos and other work area(s).

4.1.3 The Owner’s Consultant is empowered to shut-down all work activities when leakage of asbestos or other designated substances from the work area has occurred or is likely to occur.
4.1.4 The Abatement Contractor is to allow inspection by the Owner’s Consultant and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Owner.

4.1.5 If the designated work area(s) or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Owner.

4.1.6 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

4.1.7 Provide a minimum of 24 hours written notice to the Owner’s Consultant of any request for scheduling milestone inspections or transportation of waste through an occupied area.

4.1.8 Do not proceed with next phase of work until written approval of each inspection is received from the Owner’s Consultant.

4.2 General Air Monitoring

4.2.1 The following general air sampling specifications shall be followed for all projects. See appropriate sections listed in Section 0005 for specific inspection requirements.

4.2.2 The requirement and schedule of air sampling is presented in the Owner’s AMP. Air sampling may include occupational and area samples including those areas within and immediately adjacent to each work area. Results obtained from all test monitoring shall be posted at the work site and provided to the Project Coordinator, applicable Health & Safety Officer and the Abatement Contractor.

4.2.3 All air samples must be collected and analysed in accordance with Manitoba Workplace Safety and Health Regulations and Guidelines.

4.2.4 If air monitoring or visual inspection indicates that areas outside current work area enclosures are contaminated above the designated action level of one half the Provincial Occupational Exposure Limit, clean these areas in same manner as that applicable to asbestos work areas, at no cost to Owner.

4.2.5 If air monitoring in work areas shows that removal procedures are not sufficient to maintain airborne levels of specified fibres below that appropriate for the level of personal protective equipment employed by the Abatement Contractor, all work is to stop within the work area and removal procedures re-assessed.

END OF SECTION
1.0 GENERAL

1.1 General Requirements

1.1.1 Conform to requirements of this specification. This section is to apply in conjunction with all other sections and drawings listed in this document.

1.2 Related Work Specified Elsewhere:

1.2.1 Refer to accompanying Section 00005 for a list of related work specified elsewhere.

1.3 Description of Work

1.3.1 Generally Type I or low risk asbestos abatement specifications shall apply to such activities as the removal or handling of non-friable manufactured products known to contain asbestos or working in close proximity to friable asbestos-containing materials in good condition (provided that the materials are not to be disturbed). Typical work practices and procedures for Type I asbestos abatement are presented in Section 7 of the University of Manitoba’s Asbestos Management Program. All Type I asbestos abatement activities must be reviewed and approved by one of the UofM’s Asbestos Program Officers.

1.3.2 Supply all labour, material, and equipment necessary to safely execute and complete all work of this section while in conjunction with work specified, required, or implied under Section 13080, Asbestos Abatement – General and/or the Owner’s Contractor Scope of Work document.

1.4 Worker and Visitor Protection

1.4.1 Instructions: Before entering asbestos work area(s), instruct workers and visitors in use of respirators if required and all aspects of work procedures and protective measures. Competent person as defined by Workplace Safety and Health Act shall provide instruction.

1.4.2 Respirators: Respiratory protection is not required unless specifically requested by the abatement worker, the Owner, and/or the Owner’s Consultant. If respirators are to be used, the following shall apply:

.1 All workers, supervisors, and authorized visitors requesting a respirator shall be provided with, at minimum, non-powered half-face respirators with minimum P100 filter cartridges in accordance with NIOSH Part 84 requirements. Filters shall be replaced daily or tested according to manufacturer’s specifications and replaced as necessary. All waste filters shall be disposed of as asbestos waste.

.2 Respirators shall be acceptable to the Workplace Safety and Health Branch of Manitoba Labour and Immigration.
.3 Provide instruction to workers and visitors in use of respirators including qualitative fit testing.

.4 No supervisor, worker or authorized visitor shall wear facial hair which may affect the seal between the respirator and face.

.5 Maintain respiratory protection equipment in proper functioning and clean condition.

1.4.3 **Protective Clothing:** Workers and visitors shall wear protective apparel required by Manitoba Labour and Immigration construction regulations. Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped. Provide new full body coveralls with integral hoods to all workers and visitors who request them. Once coveralls are worn in the asbestos work area, treat and dispose of as asbestos contaminated waste.

1.4.4 Before entering asbestos work area(s), don appropriate personal protective equipment.

1.4.5 To leave the asbestos work area(s), all persons shall:

   .1 HEPA vacuum or wet wipe clothing and respirator (if using) prior to leaving the asbestos work area.

   .2 Remove contaminated coveralls (if using) and place in receptacles for disposal with other asbestos-contaminated materials prior to leaving the asbestos work area.

   .3 Still wearing appropriate respirator (if using), proceed out of the established asbestos work area to the decontamination facility.

   .4 Using soap and warm water wash and remove respirator (if using) then thoroughly wash hands and face.

1.4.6 Do not eat, drink, smoke or chew gum or tobacco in asbestos work area.

1.4.7 Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.

1.4.8 At no time shall the Abatement Contractor use existing furnishings or mechanical equipment (including piping) to support personal.

1.4.9 A copy of the procedures described under Para. 1.4: Worker and Visitor Protection shall be posted at access points to the asbestos work area.
2.0 PREPARATION

2.1 Site Preparation

2.1.1 Complete isolation measures between the asbestos work area and occupied areas using tape barriers, saw-horses, or other barriers, or by closing any door, windows, etc. at the perimeter of the asbestos work area.

2.1.2 Install worker decontamination facilities at locations approved by the Owner and/or Owner’s Consultant.

2.1.3 Set-up clear warning signs at each entry point to the work area and at a distance from the work area if required. Signs shall read:

CAUTION (25 mm high)

Asbestos Hazard Area (19 mm high)
Unauthorized Entry Prohibited (19 mm high)
Wear Assigned Protective Equipment (19 mm high)
Breathing Asbestos Dust May Cause Serious Bodily Harm (19 mm high)

2.1.4 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from the asbestos work area. Ensure air-handling systems remain shut off for duration of work.

2.1.5 Clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.

2.1.6 Cover with polyethylene sheeting any furnishings or equipment that will remain in the asbestos work area. Clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.

2.1.7 Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.

2.1.8 If appropriate, lay polyethylene sheeting directly underneath asbestos-containing material to be disturbed.

2.1.9 Locate required tools, equipment, and waste receptors within the asbestos work area.

2.1.10 Provide fire extinguisher at the asbestos work area. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of the Owner.
2.2 **Workers’ Decontamination Facilities**

2.2.1 Set-up an isolated worker decontamination area adjacent to the asbestos work area consisting of a HEPA filtered vacuum, bucket of warm water, soap, rags, and disposal container for asbestos contaminated disposable coveralls.

3.0 **EXECUTION**

3.1 **Do Not Commence Asbestos Removal Work Until:**

3.1.1 Arrangements have been made for disposal of waste.

3.1.2 Asbestos work areas and decontamination facilities are effectively segregated.

3.1.3 Tools, equipment and waste materials receptors are on hand.

3.1.4 Signs are displayed in areas where access to asbestos work area is possible.

3.1.5 The Owner and/or the Owner’s Consultant has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

3.2 **Asbestos-Containing Material Disturbance**

3.2.1 Before disturbing asbestos, prepare site as described previously.

3.2.2 All individuals involved with any portions of the disturbance process shall be equipped with appropriate respirators (if using) and protective equipment while working within the asbestos work area.

3.2.3 If appropriate, spray asbestos-containing materials with amended water using sprayer. Saturate asbestos to prevent release of airborne fibres during removal.

3.2.4 If removing, remove the saturated asbestos-containing material in small sections and place directly into waste containers. Do not allow saturated asbestos to dry out or fall to the floor. As it is being removed, pack the material in sealable plastic bags (6-mil minimum thickness) or other appropriate sealable container and place in labelled containers for transport.

3.2.5 If asbestos debris falls to the floor, spray asbestos debris on floor with amended water to prevent it from drying out and immediately remove from the floor and put in waste containers.

3.2.6 Seal filled containers, clean external surfaces thoroughly, and remove from working area to staging area.
3.2.7 After completion of asbestos-containing materials disturbance, clean surfaces with HEPA vacuum, or wet-wiping (as appropriate).

3.2.8 If required, apply sealer to all surfaces of from which asbestos-containing materials have been removed.

3.2.9 If required, apply heavy coat of encapsulant to exposed ends of asbestos material to remain.

3.2.10 Remove drop sheet and dispose of as contaminated waste.

3.2.11 On completion of removal activities, clean asbestos work area with HEPA vacuum or by wet wiping or mopping and request inspection by Owner’s Consultant.

4.0 DECOMMISSIONING

4.1 Dismantling Of Protection

4.1.1 Type I asbestos work may require air monitoring, based upon circumstances and the recommendations of the Owner’s Asbestos Program Officer. If air sampling by the Owner’s Consultant shows that fibre concentrations in the asbestos work area do not exceed the action level of 0.05 fibres/mL as determined by NIOSH 7400 Analytical Method, A Counting Rules, and when approved in writing by the Owner or Owner’s Consultant, proceed with final dismantling of the asbestos work area.

4.1.2 A final review may be carried out by the Owner and/or Owner’s Consultant to ensure that no dust or debris remains.

5.0 INSPECTION AND AIR MONITORING

5.1 Inspection

5.1.1 From commencement of work until completion of clean-up operations, the Owner’s Consultant is empowered by the Owner to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).

5.1.2 The Owner’s Representative or Owner’s Consultant will inspect both inside and outside the work area a minimum of once per day during active abatement.

5.1.3 The Owner’s Consultant is empowered to shut-down all work activities when leakage of asbestos from the work area has occurred or is likely to occur.

5.1.4 The Abatement Contractor is to allow inspection by the Owner’s Consultant and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Owner.
5.1.5 If asbestos work area(s) or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Owner.

5.1.6 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

5.2 **Air Monitoring (if required)**

5.2.1 In addition to clearance air monitoring for each work area, the Owner’s Consultant may collect random air samples for airborne fibre analysis during active asbestos abatement work throughout the work period. The samples may be collected both inside and outside of asbestos work area in accordance with NIOSH Analytical Method 7400.

5.2.2 If air monitoring or visual inspection indicates that areas outside current asbestos work area enclosures are contaminated above an action level of 0.05 fibre/mL, clean these areas in same manner as that applicable to asbestos work areas, at no cost to Owner.

5.2.3 If air sampling by Owner’s Consultant show that levels in asbestos work area do not exceed the action level of 0.05 fibres/mL, as determined by NIOSH 7400 Analytical Method (A Counting Rules), proceed with dismantling of asbestos work area.

5.2.4 Where required, the air clearance concentration shall not exceed the designated action level of 0.05 fibres/mL.

END OF SECTION
1.0 GENERAL

1.1 General Requirements

1.1.1 Conform to requirements of this specification.

1.2 Related Work Specified Elsewhere:

1.2.1 Refer to accompanying Section 00005 for a list of related work specified elsewhere.

1.3 Description Of Work

1.3.1 Generally Type II or moderate risk asbestos abatement specifications shall apply to the removal or disturbance of less than 1 m$^2$ of friable asbestos containing materials located outside a Type III and can not be effectively removed using Type II Glovebag procedures. Typical work practices and procedures for Type II asbestos abatement are presented in Section 7 of the University of Manitoba’s Asbestos Management Program. All Type II abatement activities must be reviewed and approved by one of the UofM’s Asbestos Program Officers.

1.3.2 Where applicable, Modified Type II procedures shall pertain to the removal of non-friable or other materials where moderate worker exposure risks are present, however a negative pressure isolation containment is not required. The use of Modified Type II precautions must be reviewed and approved by one of the UofM’s Asbestos Program Officers.

1.3.3 Supply all labour, material, and equipment necessary to safely execute and complete all work of this section while in conjunction with work specified, required, or implied under Section 13080, Asbestos Abatement – General and/or the Contractor Scope of Work document.

1.4 Worker And Visitor Protection

1.4.1 Instructions: Before entering asbestos work area(s), instruct workers and visitors in use of respirators (including fit testing), entry and exit from enclosures and all aspects of work procedures and protective measures including appropriate asbestos awareness and/or abatement training. A competent person, as defined by Workplace Safety and Health Act, shall provide instruction.

1.4.2 Respirators: Provide appropriate respiratory equipment for all persons entering asbestos work area enclosure including authorized visitors. The following shall apply to the use of respirators for Type II activities:
.1 During wet removal and clean-up in enclosed asbestos work area workers, supervisors, and authorized visitors shall wear, at a minimum, non-powered half-face respirators with minimum P100 filter cartridges in accordance with NIOSH Part 84 requirements. Where airborne fibre levels are expected to be greater than 1 fibres/ml, minimum powered air-purifying full-face respirator (PAPR) with P-100 filter cartridges shall be used. Filters shall be replaced daily or tested according to manufacturer’s specifications and replaced as necessary. All waste filters shall be disposed of as asbestos waste.

.2 Respirators shall be acceptable to the Workplace Safety and Health Branch of Manitoba Labour and Immigration.

.3 Provide instruction to workers and visitors in use of respirators including qualitative fit testing.

.4 No supervisor, worker or authorized visitor shall wear facial hair which may affect the seal between the respirator and face.

.5 Maintain respiratory protection equipment in proper functioning and clean condition.

1.4.3 **Protective Clothing:** Provide workers and visitors in full-enclosure asbestos work area with new full body coveralls with integral hoods. Once coveralls are worn in the asbestos work area, treat and dispose of as asbestos contaminated waste. Workers and visitors shall also wear other protective apparel required by Manitoba Labour and Immigration construction regulations. Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped.

1.4.4 At no time shall the Abatement Contractor use existing furnishings or mechanical equipment (including piping) to support personal.

1.4.5 Before entering full-enclosure asbestos work area(s), don appropriate respirator with new or tested filters, clean coveralls and head covers.

1.4.6 To leave the asbestos work area(s), all persons shall:

.1 HEPA vacuum or wet wipe clothing and respirator prior to leaving the asbestos work area.

.2 Enter the Staging Area, remove contaminated coveralls, and place in receptacles for disposal with other asbestos-contaminated materials.

.3 Still wearing appropriate respirator, proceed to the Clean Room or designated wash area.
Using soap and warm water wash and remove respirator then thoroughly wash hands and face.

Do not eat, drink, smoke or chew gum or tobacco in enclosures.

Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.

A copy of the procedures described under Para. 1.4: Worker and Visitor Protection shall be posted at access points to the asbestos work area.

Maintain one emergency access kit equipped with a respirator, protective clothing, etc. and post emergency access procedures at the decontamination facility access point to the asbestos work area for use by Owner or authorized visitors.

2.0 PREPARATION

2.1 Clean Site Preparation for Full-Enclosure Asbestos Work Areas

2.1.1 Clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.

2.1.2 Erect appropriate worker and waste decontamination facilities at locations approved by the Owner and/or Owner’s Consultant.

2.1.3 Erect hoarding walls where required and complete other isolation measures between asbestos work area and occupied areas. Where required, the hoarding walls shall be constructed as follows:

1. Build walls of 39 mm x 89 mm (2” x 4”) wood framing, 400 mm (16”) o.c. with continuous top and sill plates. Cover both side walls with rip-proof polyethylene sheeting. Walls exposed to non-construction occupied areas shall be covered with good one side 9 mm (3/8”) plywood unless stipulated by Owner or Owner’s Consultant. The exposed surface of the plywood shall be painted (minimum 2 coats) with colour of paint to be determined by Owner.

2.1.4 All wall and horizontal surfaces shall be pre-cleaned using damp cloth or sponge techniques prior to placement of polyethylene sheeting to any wall or floor surfaces. HEPA equipped vacuum cleaners may also be used to perform this task.

2.1.5 If necessary, caulk and seal ducts and duct shafts within work area which are to remain in service, as required, to make airtight. Cut and cap supply ducts with rigid sheet metal caps and seal. Seal joints and holes in HVAC ductwork to remain operational through an asbestos work area, using tape and rip-proof polyethylene to make airtight. Perform work at appropriate time under contaminated conditions if necessary.
2.1.6 Seal off all openings including but not limited to doorways, hatch openings, windows, vents, sump pits and associated components, floor drains, service holes in walls and grilles to non-operating ducts with two (2) layers of rip-proof polyethylene sheeting sealed with tape or with polyurethane foam as appropriate.

2.1.7 Pre-clean and cover with polyethylene sheeting all items that are to remain within the enclosure during the abatement work including but not limited to motors, heating units, fire apparatus, door closers, fans, tanks, benches, shelving, storage racks, valves, taps, controllers, lights, and other fixtures and furnishings within enclosure. Clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.

2.1.8 Install plywood enclosures, covered with rip-proof polyethylene, to protect equipment or fixtures in asbestos work area(s) that may be damaged.

2.1.9 Remove, clean and turn over to the Owner, all re-usable mechanical equipment, electrical equipment and building components that may interfere with the asbestos removal and associated clean-up. The removal of such materials is at the discretion of the Owner and/or Owner’s Consultant.

2.1.10 Where required, cover existing wall and floor surfaces with polyethylene sheeting sealed with tape. Provide two separately sealed layers of polyethylene sheeting. Separately seal floor drains or openings. Use sufficient layers (2) and necessary sheathing for walking surface to protect floors which may be damaged. Cover floors first so that polyethylene extends at least 300 mm (12”) up walls then cover walls to overlap floor sheeting. Provide additional protection for floors likely to be damaged by amended water by covering floor with rip-proof polyethylene sheeting sealed with tape.

2.1.11 Establish negative pressure in asbestos work area as described in Para. 1.7 of Section 13080 - General. Negative pressure units shall have total rated capacity with filters in place sufficient to provide a minimum of four air changes every hour. Volume of air shall be sufficient to ensure airflow is maintained from clean areas into asbestos work area.

2.1.12 Vent units to outside of building. Locate vents to discharge air away from building access points or sidewalks. Discharge vents a minimum of 5 m away from building entrances, open windows or air intakes. Do not discharge air into building interior. The location of venting must be approved by the Owner or Owner’s Consultant.

2.1.13 If requested, leak test negative air units prior to commencement of abatement at operating position, using DOP method. Provide reports for unit efficiency test results within 48 hours of testing, including calibration certificates for testing equipment.
2.1.14 Operate negative pressure units continuously from this time until completion of final air monitoring. Replace pre-filters as necessary to maintain airflow. Maintain negative air pressure of 5 Pascals (0.02 inches water column) pressure reduction within asbestos enclosure with respect to surrounding areas.

2.1.15 Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.

2.1.16 Ensure existing power supply to asbestos work area is isolated and disconnected where necessary. Do not disrupt power supply to remaining areas of building. Provide ground fault electrical system in accordance with applicable CSA standard prior to applying water to asbestos-containing materials. A minimum of one (1) ground fault electrical panel shall be provided for every 300 m$^2$ of asbestos work area. Supply all electrical apparatus from this ground fault system. Ensure safe installation of electrical lines and equipment.

2.1.17 Provide temporary lighting in asbestos work area to levels that will permit work to be done safely.

2.1.18 Provide fire extinguisher at each emergency exit, and in decontamination facilities. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of the Owner.

2.2 **Clean Site Preparation for Modified Type II Asbestos Work Areas**

2.2.1 Complete isolation measures between the asbestos work area and surrounding areas using tape barriers, saw-horses, or other barriers, etc. at the perimeter of the asbestos work area. A work enclose is not required for Modified Type II or outdoor work.

2.2.2 Clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.

2.2.3 Erect appropriate worker and waste decontamination facilities using similar process established in Para. 2.3 and 2.4 of this Section. As a minimum, a staging area and a clean room or wash-up area must be provided to allow for worker decontamination and changing into and from personal protective equipment. The location and configuration of the decontamination facilities must be approved by the Owner and/or Owner’s Consultant.

2.2.4 Lay polyethylene sheeting (drop sheet) directly underneath asbestos-containing material to be disturbed.
2.3  **Decontamination Enclosure System for Full-Enclosure Asbestos Work Areas**

2.3.1 Where required, construct worker and waste decontamination facilities at entrance to each asbestos work area as approved by the Owner and/or Owner’s Consultant. Decontamination facility shall be comprised of a minimum one room which serves as an air lock as described below. Where requested by the Owner or Owner’s consultant, a two room decontamination facility may be constructed.

2.3.2 Provide a set of curtain doorways between each room, and at both dirty and clean entrances to enclosure systems.

2.3.3 **Access Room / Container Cleaning Room:** When requested, build or establish an Access Room / Container Cleaning Room between asbestos work enclosure and Clean Room. Room shall be of sufficient size to accommodate largest item of equipment used and/or two (2) waste containers. Access Room / Container Cleaning Room is to be used for gross removal of dust and debris from waste containers and equipment, labelling and sealing of waste containers, and temporary storage pending removal, as well as changing out of protective clothing and storage of contaminated protective clothing and equipment. Minimum size of room is to be 1.5 m² with a minimum height of 1.9 m.

2.3.4 **Staging Area:** When a separate Access Room / Container Cleaning Room has not been constructed, the area within the Type II containment closest to the entranceway shall be considered the Staging Area. The Staging Area shall be used for gross removal of dust and debris from waste containers and equipment, labelling and sealing of waste containers, and temporary storage pending removal.

2.3.5 **Clean Room:** Build Clean Room to be used as change room (to and from street clothes) with washing facilities for hands and face. Install waste receptor, and storage facilities for worker’s shoes and any protective clothing to be re-worn in asbestos work areas. Clean Room shall be large enough to accommodate at least one worker and allow sufficient space to undress comfortably. Room shall also be of sufficient size to accommodate largest item of equipment used and/or two (2) waste containers. Minimum size of room is to be 1.5 m² with a minimum height of 1.9 m.

2.3.6 Where a separate clean room is not required by the Owner’s Consultant, a designated wash-up area must be provided within the work area. The wash-up area must be supplied with a HEPA filtered vacuum, wash basin with clean, warm water, soap, rags or towels, a disposal container for asbestos contaminated disposable coveralls and storage facilities for worker’s shoes and any protective clothing to be re-worn in asbestos work areas.

2.4  **Construction of Decontamination Enclosures (where required)**

2.4.1 **Floor:** Prior to erecting wall framing, lay one (1) sheet of rip-proof polyethylene sheeting over floor area to be covered by enclosures. The floor sheeting should
extend at least 600 mm (24") beyond the outside perimeter of the planned enclosure on all sides. After the construction of the enclosure walls, wrap the excess floor sheeting up the outside of the enclosure, overlapping the polyethylene sheeting covering perimeter walls. Provide second layer of rip-proof polyethylene to all floors, extending 600 mm up inside of enclosure walls.

2.4.2 **Walls:** Build load-bearing walls of 39 mm x 89 mm (2" x 4") wood framing, 400 mm (16") o.c. with continuous top and sill plates. Cover both sides of walls with rip-proof polyethylene sheeting. Walls exposed to non-construction occupied areas shall be covered with good one side 9 mm (3/8") plywood unless stipulated by Owner or Owner’s Consultant. The exposed surface of the plywood shall be painted (minimum 2 coats) with colour of paint to be determined by Owner.

2.4.3 **Roof:** Size of joists shall be determined by span, loads, use and Code. Use as a minimum 39 mm x 89 mm (2" x 4") joists. Cover joists with 19 mm (3/4") plywood sheeting and seal and tape joints. Cover with two (2) layers of rip-proof polyethylene, overlapping the perimeter walls by at least 600 mm (24"). Wrap the excess sheeting over the polyethylene sheeting covering perimeter walls. At underside of joists install one (1) layer of polyethylene sheeting.

2.4.4 **Doorways:** Build curtain doorways designed so that when workers or drums and equipment move through doorway, one (1) of two (2) barriers comprising doorway always remains closed.

2.5 **Maintenance of Enclosures**

2.5.1 Maintain enclosures in tidy condition. Thoroughly clean decontamination facilities at the end of each work shift and, if required, replace dust control mats as specified.

2.5.2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.

2.5.3 Visually inspect enclosures at beginning and end of each working period.

2.5.4 Use smoke methods to test the effectiveness of the isolation barriers when directed by the Owner’s Consultant.

3.0 **EXECUTION**

3.1 **Do Not Commence Asbestos Removal Work Until:**

3.1.1 Arrangements have been made for disposal of waste.

3.1.2 Asbestos work areas and decontamination enclosures are effectively segregated.

3.1.3 Negative pressure equipment is operating continuously (where required).
3.1.4 Tools, equipment and waste materials receptors are on hand.

3.1.5 Arrangements have been made with the Owner’s Consultant for work area security.

3.1.6 Signs are displayed in areas where access to sealed asbestos work area is possible. Signs shall read:

**CAUTION** (25 mm high)

Asbestos Hazard Area (19 mm high)
Unauthorized Entry Prohibited (19 mm high)
Wear Assigned Protective Equipment (19 mm high)
Breathing Asbestos Dust May Cause Serious Bodily Harm (19 mm high).

3.1.7 The Owner and/or Owner’s Consultant has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

3.2 **Contaminated Site Preparation**

3.2.1 Before performing any contaminated work, prepare site as previously described.

3.2.2 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from the asbestos work area enclosure(s). Ensure air-handling systems remain shut off for duration of work.

3.2.3 Seal holes or penetrations to provide airtight enclosure around asbestos work area(s).

3.2.4 Protect electrical, communication, life safety and control systems to remain in place in asbestos work area with polyethylene and tape.

3.3 **Asbestos-Containing Material Removal**

3.3.1 All individuals involved with any portions of the removal process shall be equipped with appropriate respirators and protective equipment while working within the enclosure.

3.3.2 Repeatedly mist the air throughout the performance of this work and maintain all surfaces within the asbestos work area in a damp state.

3.3.3 Spray asbestos-containing materials with amended water using airless spray equipment. Saturate asbestos to prevent release of airborne fibres during removal.
3.3.4 Remove the saturated asbestos-containing material in small sections and place directly into waste containers. Do not allow saturated asbestos to dry out or fall to the floor. As it is being removed, pack the material in sealable plastic bags 6-mil minimum thickness and place in labelled containers for transport.

3.3.5 Remove any non-asbestos-containing debris and rubble present throughout the work area that cannot be practically segregated from asbestos-containing or asbestos-contaminated materials.

3.3.6 If asbestos debris falls to the floor or drop sheet, spray asbestos debris on floor with amended water to prevent it from drying out and immediately remove from the floor or drop sheet and put in waste containers.

3.3.7 Seal filled containers, clean external surfaces thoroughly, and remove from working area to staging area.

3.3.8 After completion of removal of asbestos-containing materials, clean surfaces from which asbestos has been removed with stiff bristle brushes, vacuum, or wet-sponge (as appropriate) to remove all visible material.

3.3.9 Remove asbestos waste containers and decontaminated equipment and materials from the asbestos work area through the decontamination enclosure as follows:

.1 In the Staging Area, remove gross contamination from the surface of the item to be removed. The item shall then be cleaned, wet wiped, and double bagged and/or sealed in polyethylene prior to transferring to a second worker present in the Clean Room. Wash water shall be treated as asbestos-contaminated waste.

.2 The worker present in the Clean Room shall transfer the clean items outside the waste decontamination enclosure. Workers present in the work enclosure must not leave the asbestos work area until decontaminating as specified in Para. 1.4 of this section.

.3 Treat all removed materials exposed to asbestos, as asbestos-contaminated waste unless such materials can be properly decontaminated and are specified to be re-used.

3.3.10 After removing all visible asbestos, wet clean entire work area including but not limited to pipes, pipefittings, ducts, and similar items not covered with polyethylene sheeting and request visual inspection and acceptance.

3.3.11 Following inspection and acceptance, apply heavy coat of slow drying sealer to all surfaces from which asbestos has been removed. Apply thinned coat (sufficient to coat all surfaces) to interior of polyethylene enclosure. The work area shall not be disturbed for a minimum of 12 hours after application of sealer. If present, operate negative air units during this period.
4.0 DECOMMISSIONING

4.1 Dismantling Of Protection

4.1.1 If air sampling by The Owner’s Consultant shows that levels in asbestos work area do not exceed the action level of 0.05 fibres/mL, as determined by NIOSH 7400 Analytical Method, A Counting Rules, and when approved in writing by the Owner or Owner’s Consultant, proceed with final dismantling of decontamination and work enclosures as follows:

4.1.2 Remove polyethylene sheeting exposed during contaminated work including upper surfaces plus any underlying sheeting contaminated by water leaks, rips, tears, or exposed by failure of upper layer. Wear appropriate respirator and disposable coveralls during removal of sheeting. Carefully roll sheeting away from walls to centre of asbestos work area. As sheeting is rolled away from walls and corners, HEPA vacuum visible debris.

4.1.3 While removing top layer of sheeting from surfaces protected by two (2) layers of sheeting, cut lower sheeting so as to expose horizontal surfaces that may be contaminated with asbestos debris. HEPA vacuum any visible debris.

4.1.4 Place polyethylene sheeting, seals, tape, cleaning material, clothing, and other contaminated waste in asbestos waste receptors for transport. Remove with HEPA vacuum any debris which may have fallen behind sheeting.

4.1.5 Remove hoardings, temporary lighting, equipment and facilities provided for work.

4.1.6 Complete final general cleaning of worksite and ensure no dust and debris remain.

4.1.7 As per Section 8 and Appendix X of the Owner’s AMP site inspections and air monitoring shall be conducted for all Type II asbestos work including a final review of the work area by the Owner and/or Owner’s Consultant to ensure that no dust or debris remains.

5.0 INSPECTION AND AIR MONITORING

5.1 Inspection

5.1.1 As per Section 8 and Appendix X of the Owner’s AMP, site inspections and air monitoring shall be conducted for all internal (by UofM employees) and external (outside Abatement Contractor) Type II asbestos work.

5.1.2 From commencement of work until completion of clean-up operations, the Owner’s Consultant is empowered by the Owner to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).
5.1.3 The Owner’s Representative or Owner’s Consultant will inspect both inside and outside the work area a minimum of once per 10 hour work shift during active abatement.

5.1.4 The Owner’s Consultant is empowered to shut-down all work activities when leakage of asbestos from the work area has occurred or is likely to occur.

5.1.5 The Abatement Contractor is to allow inspection by the Owner’s Consultant and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Owner.

5.1.6 If asbestos work area(s) or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Owner.

5.1.7 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

5.1.8 Provide a minimum of 24 hours written notice to the Owner’s Consultant of any request for scheduling milestone inspections or transportation of asbestos water through an occupied area.

5.1.9 The following milestone inspections are to take place during work:

.1 **Clean Site Preparation**: Inspection of site preparations and set-up prior to contaminated work.

.2 **Visual Clearance**: Inspection of asbestos work area after removal of asbestos but before the application of sealer.

.3 **Final Air Sampling Clearance**: Inspection and air sampling after application of sealer but prior to the removal of hoarding and perimeter seals from within the asbestos work area.

.4 **Owner and Owner’s Consultant Joint Visual Clearance**: Inspection of asbestos work area by Owner, Owner’s Consultant and Contractor’s site supervisor following Final Air Sampling Clearance but before the removal of hoarding and perimeter seals from within the asbestos work area.

.5 **Final Dismantling Inspection**: Inspection after the removal of hoarding, perimeter seals and decontamination facility from the asbestos work area.

5.1.10 Do not proceed with next phase of work until written approval of each inspection is received from the Owner’s Consultant.
5.2 **Air Monitoring**

5.2.1 As per Section 8.2 of the Owner’s AMP, air sampling shall be performed a minimum of once per 10 hour work shift within and immediately adjacent to each active asbestos work area. Results obtained from all test monitoring shall be posted at the work site and provided to the UofM Project Coordinator, the UofM Environmental Health & Safety office and the Abatement Contractor.

5.2.2 All air samples must be collected in accordance with NIOSH Analytical Method 7400.

5.2.3 If air monitoring or visual inspection indicates that areas outside current asbestos work area enclosures are contaminated above the designated action level of 0.05 fibres/mL, clean these areas in same manner as that applicable to asbestos work areas, at no cost to Owner.

5.2.4 If air monitoring in work areas shows that removal procedures are not sufficient to maintain airborne fibre levels below 2.5 fibres/ml, all work is to stop within the work area and removal procedures re-assessed.

5.2.5 If air sampling by Owner’s Consultant show that levels in asbestos work area do not exceed the action level of 0.05 fibres/mL, as determined by NIOSH 7400 Analytical Method (A Counting Rules), proceed with dismantling of asbestos work area.

5.2.6 The air clearance concentration shall not exceed the designated action level of 0.05 fibres/mL.

END OF SECTION
1.0 GENERAL

1.1 General Requirements

1.1.1 Conform to requirements of this specification.

1.2 Related Work Specified Elsewhere:

1.2.1 Refer to accompanying Section 00005 for a list of related work specified elsewhere.

1.3 Description of Work

1.3.1 Generally Type III or high risk asbestos abatement specifications shall apply to activities that pose a high risk of exposure to airborne asbestos and a corresponding higher risk of health effects if handled improperly. No UofM employee shall undertake Type III work. All Type III work must be undertaken by competent outside contractors. This specification shall apply to such activities as the removal or disturbance of greater than 1 m$^2$ of friable asbestos containing mechanical insulation. All Type III abatement activities must be reviewed and approved by one of the UofM’s Asbestos Program Officers.

1.3.2 Supply all labour, material, and equipment necessary to safely execute and complete all work of this section while in conjunction with work specified, required, or implied under Section 13080, Asbestos Abatement – General and/or the Contractor Scope of Work document.

1.4 Worker and Visitor Protection

1.4.1 Instructions: Before entering asbestos work area(s), instruct workers and visitors in use of respirators (including fit testing), entry and exit from enclosures and all aspects of work procedures and protective measures including appropriate asbestos awareness and/or abatement training. A competent person, as defined by Workplace Safety and Health Act, shall provide instruction.

1.4.2 Respirators: Provide appropriate respiratory equipment for all persons entering asbestos work area enclosure including authorized visitors. The following shall apply to the use of respirators for Type III activities:

.1 During wet removal and clean-up in enclosed asbestos work area workers, supervisors, and authorized visitors shall wear, as a minimum, powered air-purifying full-face respirator (PAPR) with P-100 filter cartridges in accordance with NIOSH Part 84 requirements. Use of other types of respiratory protection can only be used on written approval by the Owner’s consultant. Filters shall be replaced daily or tested according to manufacturer’s specifications and replaced as necessary. All waste filters shall be disposed of as asbestos waste.
.2 Respirators shall be acceptable to the Workplace Safety and Health Branch of Manitoba Labour and Immigration.

.3 Provide instruction to workers and visitors in use of respirators including qualitative fit testing.

.4 No supervisor, worker or authorized visitor shall wear facial hair which may affect the seal between the respirator and face.

.5 Maintain respiratory protection equipment in proper functioning and clean condition.

1.4.3 **Protective Clothing:** Provide workers and visitors in full-enclosure asbestos work area with new full body coveralls with integral hoods. Once coveralls are worn in the asbestos work area, treat and dispose of as asbestos contaminated waste. Workers and visitors shall also wear other protective apparel required by Manitoba Labour and Immigration construction regulations. Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped.

1.4.4 At no time shall the Abatement Contractor use existing furnishings or mechanical equipment (including piping) to support personal.

1.4.5 Before entering full-enclosure asbestos work area(s), remove street clothes in clean change room and don appropriate respirator with new or tested filters, new disposable coveralls and head covers before entering equipment and access areas or asbestos work area. Store street clothes, uncontaminated footwear, towels etc. in clean change room.

1.4.6 Persons leaving full-enclosure asbestos work area(s) shall remove gross contamination from clothing before leaving asbestos work area. Proceed to equipment and access room and remove all clothing except respirator. Place contaminated work suit in receptacles for disposal with other asbestos contaminated materials. Footwear, clothing, hardhats, protective eyewear, etc., shall be left in equipment and access room to dry for later use. Still wearing appropriate respirator, proceed naked to showers. Clean respirator to ensure that visible contamination is removed. After having thoroughly washed hair and body with shampoo and soap, remove respirator. Remove filters and dispose of as asbestos waste in container provided for this purpose or test filters according to manufacturer's recommendation. Dispose of filters as necessary. Wet clean inside of respirator. Upon completion of asbestos abatement, dispose of footwear as contaminated waste or clean before removing from equipment and access room, or carry in sealed plastic bag to next site.
1.4.7 Following showering, proceed to clean room, dry off and dress in street clothes. Store respirators in such a fashion to allow them to be put on prior to entering asbestos work area at start of next shift without contaminating clean area. If re-entry to asbestos work area is to take place, follow procedures in Para. 1.4.5.

1.4.8 Removal of waste and equipment from holding room of waste decontamination enclosure system shall be performed as per Para. 3.3.14 of this section. No worker shall use this system as means to leave or enter asbestos work area.

1.4.9 Do not eat, drink, smoke or chew gum or tobacco in enclosures.

1.4.10 Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.

1.4.11 A copy of the procedures described under Para. 1.4: Worker and Visitor Protection shall be posted at access points to the asbestos work area.

1.4.12 Maintain one emergency access kit equipped with a respirator, protective clothing, etc. and post emergency access procedures at the decontamination chamber access point to the asbestos work area for use by Owner or authorized visitors. The emergency access respirator shall be a PAPR Full Face Respirator during hours of active asbestos abatement work and, at a minimum, a half face respirator with minimum P100 filter cartridges after shift-end when active abatement in not being conducted.

2.0 PREPARATION

2.1 Clean Site Preparation for Full-Enclosure Asbestos Work Areas

2.1.1 Clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.

2.1.2 Erect worker and waste decontamination enclosures at locations approved by the Owner and/or Owner’s Consultant.

2.1.3 Complete isolation measures between the asbestos work area and occupied areas. If required, erect hoarding walls and complete other isolation measures between asbestos work area and occupied areas. The hoarding walls shall be constructed as follows:

.1 Build walls of 39 mm x 89 mm (2” x 4”) wood framing, 400 mm (16”) o.c. with continuous top and sill plates. Cover both side walls with rip-proof polyethylene sheeting. Walls exposed to non-construction occupied areas shall be covered with good one side 9 mm (3/8”) plywood unless stipulated by Owner or Owner’s Consultant. The exposed surface of the plywood shall be painted (minimum 2 coats) with colour of paint to be determined by Owner.
2.1.4 If directed by the Owner or Owner’s Consultant, erect tunnels and/or walkways as specified in Para. 2.5 of this section, to maintain or provide uncontaminated access through or below the asbestos work area. The location of such tunnels or walkways will be provided to the Abatement Contractor, if required.

2.1.5 All wall and horizontal surfaces shall be pre-cleaned using damp cloth or sponge techniques prior to placement of polyethylene sheeting to any wall or floor surfaces. HEPA equipped vacuum cleaners may also be used to perform this task.

2.1.6 If necessary, caulk and seal ducts and duct shafts within work area which are to remain in service, as required, to make airtight. Cut and cap supply ducts with rigid sheet metal caps and seal. Seal joints and holes in HVAC ductwork to remain operational through an asbestos work area, using tape and rip-proof polyethylene to make airtight. Perform work at appropriate time under contaminated conditions if necessary.

2.1.7 Seal off all openings including but not limited to sump pits and associated components, floor drains, doorways, hatch openings, windows, vents, service holes in walls and grilles to non-operating ducts with two (2) layers of rip-proof polyethylene sheeting sealed with tape or with polyurethane foam as appropriate.

2.1.8 Pre-clean and cover with polyethylene sheeting all items that are to remain within the enclosure during the abatement work including but not limited to motors, heating units, fire apparatus, door closers, fans, tanks, benches, shelving, storage racks, valves, taps, controllers, lights, and other fixtures and furnishings within enclosure. Clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.

2.1.9 Install plywood enclosures, covered with rip-proof polyethylene, to protect equipment or fixtures in asbestos work area(s) that may be damaged.

2.1.10 Remove, clean and turn over to the Owner, all re-usable mechanical equipment, electrical equipment and building components that may interfere with the asbestos removal and associated clean-up. The removal of such materials is at the discretion of the Owner and/or Owner’s Consultant.

2.1.11 Where required, pre-clean and cover existing wall and floor surfaces with polyethylene sheeting sealed with tape. Provide two separately sealed layers of polyethylene sheeting. Separately seal floor drains or openings. Use sufficient layers (2) and necessary sheathing for walking surface to protect floors which may be damaged. Cover floors first so that polyethylene extends at least 300 mm (12”) up walls then cover walls to overlap floor sheeting. Provide additional protection for floors likely to be damaged by amended water by covering floor with rip-proof polyethylene sheeting sealed with tape.
2.1.12 Establish negative pressure in asbestos work area as described in Para. 1.7 of Section 13080 - General. Negative pressure units shall have total rated capacity with filters in place sufficient to provide a minimum of four air changes every hour. Volume of air shall be sufficient to ensure airflow is maintained from clean areas into asbestos work area.

2.1.13 Vent units to outside of building. Locate vents to discharge air away from building access points or sidewalks. Discharge vents a minimum of 5 m away from building entrances, open windows or air intakes. Do not discharge air into building interior. The location of venting must be approved by the Owner or Owner’s Consultant and must be disclosed as part of the Abatement Contractor’s bid package.

2.1.14 If requested, leak test negative air units prior to commencement of abatement at operating position, using DOP method. Provide reports for unit efficiency test results within 48 hours of testing, including calibration certificates for testing equipment.

2.1.15 Operate negative pressure units continuously from this time until completion of final air monitoring. Replace pre-filters as necessary to maintain airflow. Maintain negative air pressure of 5 Pascals (0.02 inches water column) pressure reduction within asbestos enclosure with respect to surrounding areas.

2.1.16 Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.

2.1.17 Ensure existing power supply to asbestos work area is isolated and disconnected where necessary. Do not disrupt power supply to remaining areas of building. Provide ground fault electrical system in accordance with applicable CSA standard where application of amended water is required for wetting asbestos-containing materials. A minimum of one (1) ground fault electrical panel shall be provided for every 300 m² of asbestos work area. Supply all electrical apparatus from this ground fault system. Ensure safe installation of electrical lines and equipment.

2.1.18 Provide temporary lighting in asbestos work area to levels that will permit work to be done safely.

2.1.19 Provide fire extinguisher at each emergency exit, and in decontamination facilities. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of the Owner.

2.2 Workers’ Decontamination Enclosure System

2.2.1 Construct workers’ decontamination enclosure at entrance to each asbestos work area as approved by the Owner and/or Owner’s Consultant. Worker decontamination enclosure system shall be comprised of three interconnecting rooms (chambers) as described below.
2.2.2 Provide a set of curtain doorways between each room, and at both dirty and clean entrances to enclosure systems.

2.2.3 **Equipment and Access Room:** Build room between shower room and asbestos work area. Install waste receptor, and storage facilities for worker’s shoes and any protective clothing to be re-worn in asbestos work areas. Equipment and access room shall be large enough to accommodate specified facilities and other equipment needed, and at least one worker allowing sufficient space to undress comfortably. Minimum size 3 m$^2$ with a minimum height of 1.9 m.

2.2.4 **Shower Room:** Build room between clean room and equipment and access room of suitable size (minimum height 1.9 m) and install one (1) shower for every five (5) workers. Provide constant separate supplies of hot and cold water capable of maintaining a water temperature of between 40 and 50 $^\circ$C. Provide valves controllable at shower(s) to regulate water temperature. Provide rigid piping with watertight connections and connect to water sources and drains. Provide soap, clean towels and appropriate containers for disposal of used respirator filters. Direct wastewater to sanitary sewer drains. When requested or where required by Provincial or Municipal law, direct wastewater to sewer via water filtering system consisting of a minimum 2-stage filtering system (25-micron and 5-micron filters) or other approved means of filtering.

2.2.5 **Clean Room:** Build room between shower room and clean areas outside of enclosures with a minimum height of 1.9 m. At doorway to clean room, provide vented wood door, with locking passage set. Provide hangers for workers’ street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install water heater, if required. If requested by Owner or Owner’s Consultant, dust control (‘sticky’) floor mats shall be placed outside the clean room and replaced a minimum of once every two (2) shifts (or more often if required).

2.3 **Waste and Equipment Decontamination Enclosure System**

2.3.1 Construct system comprised of three linked rooms: Purpose of this system is to provide means to decontaminate drums, scaffolding, material containers, vacuum and spray equipment; and other tools and equipment for which worker decontamination system is not suitable.

2.3.2 Provide curtain doorways between rooms and at both dirty and clean entrances to the Enclosure System.

2.3.3 **Staging Area:** Establish a staging area within the asbestos work area for gross removal of dust and debris from waste containers and equipment and temporary storage pending removal to container cleaning room. Minimum size of 3 m$^2$. 
2.3.4 **Container Cleaning Room:** Build container cleaning room between the Staging Area and Holding Room. Room shall be of sufficient size to allow proper washing or otherwise decontaminating equipment, drums and other waste containers and double bagging and labelling of asbestos waste. Treat wash water as asbestos contaminated waste. Minimum size of 1.5 m$^2$ with a minimum height of 1.9 m.

2.3.5 **Holding Room:** Build Holding Room between Container Cleaning Room and Transfer Room. Room shall be of sufficient size to accommodate largest item of equipment used and two (2) rigid waste containers or five (5) waste bags. Minimum size of 1.5 m$^2$ with a minimum height of 1.9 m.

2.3.6 **Transfer Room:** Build Transfer Room between Holding Room and uncontaminated area. At doorway to holding room, provide vented wood door, with locking passage set or other means of security. Keys must be provided to Owner and Owner’s Consultant. Minimum size of 1.5 m$^2$ with a minimum height of 1.9 m. If requested, dust control ('sticky') floor mats shall be placed outside the holding room and replaced a minimum of once every two (2) shifts (or more often if required).

2.4 **Construction of Decontamination Enclosures**

2.4.1 **Floor:** Prior to erecting wall framing, lay one (1) sheet of rip-proof polyethylene sheeting over floor area to be covered by enclosures. The floor sheeting should extend at least 600 mm (24") beyond the outside perimeter of the planned enclosure on all sides. After the construction of the enclosure walls, wrap the excess floor sheeting up the outside of the enclosure, overlapping the polyethylene sheeting covering perimeter walls. Provide second layer of rip-proof polyethylene to all floors, extending 600 mm up inside of enclosure walls.

2.4.2 **Walls:** Build load-bearing walls of 39 mm x 89 mm (2" x 4") wood framing, 400 mm (16") o.c. with continuous top and sill plates. Cover both sides of walls with rip-proof polyethylene sheeting with caulk sealed and taped joints or seams. If requested, the exterior of walls exposed to occupied area shall be covered with min. 9 mm (3/8") plywood sheeting or hardboard and painted or otherwise finished to meet the Owner’s requirements.

2.4.3 **Roof:** Size of joists shall be determined by span, loads, use and Code. Use as a minimum 39 mm x 89 mm (2" x 4") joists. Cover joists with 19 mm (3/4") plywood sheeting and seal and tape joints. Cover with two (2) layers of rip-proof polyethylene, overlapping the perimeter walls by at least 600 mm (24"). Wrap the excess sheeting over the polyethylene sheeting covering perimeter walls. At underside of joists install one (1) layer of polyethylene sheeting.

2.4.4 **Doorways:** Build curtain doorways designed so that when workers or drums and equipment move through doorway, one (1) of two (2) barriers comprising doorway always remains closed.
2.5 **Construction of Access Tunnels Through Asbestos Work Area**

2.5.1 Construction of an access tunnels and/or walkways may be required to provide and maintain uncontaminated access through the asbestos work. The location and specific construction specifications of such tunnels or walkways will be provided to the Abatement Contractor, if required.

2.5.2 Floors, walls and roofs of the tunnels will be constructed as specified in Para. 2.4.1, 2.4.2 and 2.4.3 of this section.

2.5.3 Tunnels are to be constructed with a minimum clearance height of 2.0 m (79"). Width of the tunnels will be the greater of the width of any connecting exit doors or 1.8 m (72").

2.5.4 Provide and install temporary, recessed lighting into the roof of the tunnels as required.

2.6 **Maintenance of Enclosures**

2.6.1 Maintain enclosures in tidy condition. Thoroughly clean decontamination facilities at the end of each work shift and, if required, replace dust control mats as specified.

2.6.2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.

2.6.3 Visually inspect enclosures at beginning and end of each working period.

2.6.4 Use smoke methods to test the effectiveness of the isolation barriers when directed by the Owner’s Consultant.

3.0 **EXECUTION**

3.1 **Do Not Commence Asbestos Removal Work Until:**

3.1.1 Arrangements have been made for disposal of waste.

3.1.2 Asbestos work areas and decontamination enclosures are effectively segregated.

3.1.3 Negative pressure equipment is operating continuously.

3.1.4 Tools, equipment and waste materials receptors are on hand.

3.1.5 Arrangements have been made with the Owner’s Consultant for work area security.

3.1.6 Signs are displayed in areas where access to sealed asbestos work area is possible. Signs shall read:
**CAUTION** (25 mm high)

Asbestos Hazard Area (19 mm high)
Unauthorized Entry Prohibited (19 mm high)
Wear Assigned Protective Equipment (19 mm high)
Breathing Asbestos Dust May Cause Serious Bodily Harm (19 mm high).

3.1.7 Provide proof that notification of asbestos work has been submitted to Manitoba Labour and Immigration.

3.1.8 The Owner and/or Owner’s Consultant has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

3.2 **Contaminated Site Preparation For Full-Enclosure Asbestos Work Area**

3.2.1 Before performing any contaminated work, prepare site as previously described.

3.2.2 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from the asbestos work area enclosure(s). Ensure air-handling systems remain shut off for duration of work.

3.2.3 Seal holes or penetrations to provide airtight enclosure around asbestos work area(s).

3.2.4 Protect electrical, communication, life safety and control systems to remain in place in asbestos work area with polyethylene and tape.

3.3 **Asbestos-Containing Material Removal**

3.3.1 Before removing asbestos, prepare site as described previously.

3.3.2 All individuals involved with any portions of the removal process shall be equipped with appropriate respirators and protective equipment while working within the enclosure.

3.3.3 Repeatedly mist the air throughout the performance of this work and maintain all surfaces within the asbestos work area in a damp state.

3.3.4 Spray asbestos-containing materials with amended water using sprayer. Saturate asbestos to prevent release of airborne fibres during removal. Fully saturated asbestos may be placed directly into waste containers or may be allowed to fall to the floor.
3.3.5 Remove the saturated asbestos-containing material in small sections. Do not allow saturated asbestos to dry out. As it is being removed, pack the material in sealable plastic bags 6-mil minimum thickness and place in labelled containers for transport.

3.3.6 Spray asbestos debris on floor with amended water to prevent it from drying out. Remove asbestos debris from the floor and put in waste containers at regular intervals as the work progresses and at the end of every shift.

3.3.7 Seal filled containers, clean external surfaces thoroughly, and remove from working area to staging area.

3.3.8 After completion of removal of asbestos-containing materials, clean surfaces from which asbestos has been removed with stiff bristle brushes, vacuum, or wet-sponge (as appropriate) to remove all visible material.

3.3.9 Removal of asbestos waste containers and decontaminated equipment and materials from the asbestos work area shall be removed through the waste decontamination enclosure as follows:

.1 Remove gross contamination from the surface of the item to be removed within the staging area.

.2 Pass the item to a second worker present in the container cleaning room. The item shall be cleaned, wet wiped and double bagged and/or sealed in polyethylene prior to transferring to a third worker present in the holding room. Wash water shall be treated as asbestos-contaminated waste.

.3 The worker present in the holding room shall transfer the clean items to a fourth worker located outside the waste decontamination enclosure. The fourth worker must not enter the waste decontamination enclosure. Those workers present in the enclosure must leave the asbestos work area through the worker decontamination chamber only.

.4 Treat all removed materials exposed to asbestos, as asbestos-contaminated waste unless such materials can be properly decontaminated and are specified to be re-used.

3.3.10 After removing all visible asbestos, wet clean entire work area including but not limited to pipes, pipefittings, ducts, and similar items not covered with polyethylene sheeting. Request visual inspection and acceptance.

3.3.11 Following inspection and acceptance, apply heavy coat of slow drying sealer to all surfaces from which asbestos has been removed. Apply thinned coat (sufficient to coat all surfaces) to interior of polyethylene enclosure. Do not disturb the work area for a minimum of 12 hours after the application of sealer. Operate negative air units during this period.
4.0 DECOMMISSIONING

4.1 Dismantling of Protection

4.1.1 All containment structures, such as hoardings, platforms, etc., which are used to segregate the work area, are to remain in place until directed by the Owner’s Representative.

4.1.2 If air sampling by The Owner’s Consultant shows that levels in asbestos work area do not exceed 0.01 fibres/mL as determined by NIOSH 7400 Analytical Method, A Counting Rules, and when approved in writing by the Owner or Owner’s Consultant, proceed with final dismantling of decontamination and work enclosures as follows:

4.1.3 Remove polyethylene sheeting exposed during contaminated work including upper surfaces plus any underlying sheeting contaminated by water leaks, rips, tears, or exposed by failure of upper layer. Wear appropriate respirator and disposable coveralls during removal of sheeting. Carefully roll sheeting away from walls to centre of asbestos work area. As sheeting is rolled away from walls and corners, HEPA vacuum visible debris.

4.1.4 While removing top layer of sheeting from surfaces protected by two (2) layers of sheeting, cut lower sheeting so as to expose horizontal surfaces that may be contaminated with asbestos debris. HEPA vacuum any visible debris.

4.1.5 Place polyethylene sheeting, seals, tape, cleaning material, clothing, and other contaminated waste in asbestos waste receptors for transport. Remove with HEPA vacuum any debris which may have fallen behind sheeting.

4.1.6 Remove hoardings, temporary lighting, equipment and facilities provided for work.

4.1.7 Visible debris discovered on the course of the site dismantlement is to be promptly cleaned using a damp cloth and/or HEPA vacuum.

4.1.8 As per Section 8 and Appendix X of the Owner’s AMP site inspections and air monitoring shall be conducted for all Type III asbestos work including a final review of the work area by the Owner and/or Owner’s Consultant to ensure that no dust or debris remains.

5.0 INSPECTION AND AIR MONITORING

5.1 Inspection

5.1.1 As per Section 8 and Appendix X of the Owner’s AMP, site inspections and air monitoring shall be conducted for all Type III asbestos work.
5.1.2 From commencement of work until completion of clean-up operations, the Owner’s Consultant is empowered by the Owner to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).

5.1.3 The Owner’s Representative or Owner’s Consultant will inspect both inside and outside the work area a minimum of once per 10 hour work shift during active abatement.

5.1.4 The Owner’s Consultant is empowered to shut-down all work activities when leakage of asbestos from the work area has occurred or is likely to occur.

5.1.5 The Abatement Contractor is to allow inspection by the Owner’s Consultant and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Owner.

5.1.6 If asbestos work area(s) or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Owner.

5.1.7 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

5.1.8 Provide a minimum of 24 hours written notice to the Owner’s Consultant of any request for scheduling milestone inspections or transportation of asbestos water through an occupied area.

5.1.9 The following milestone inspections are to take place during work:

.1 **Clean Site Preparation**: Inspection of site preparations and set-up prior to contaminated work.

.2 **Contaminated Perimeter Preparation**: Inspection of contaminated preparations at perimeter of asbestos work area prior to any bulk removal.

.3 **Before Bulk Removal (Contaminated Site Preparation)**: Inspection of asbestos work area following Contaminated Perimeter Preparation but before start of main asbestos removal.

.4 **Visual Clearance**: Inspection of asbestos work area after removal of asbestos but before the application of sealer.

.5 **Final Air Sampling Clearance**: Inspection and air sampling after application of sealer but prior to the removal of hoarding and perimeter seals from within the asbestos work area.
.6 Owner and Owner’s Consultant Joint Visual Clearance. Inspection of asbestos work area by Owner, Owner’s Consultant and Contractor’s site supervisor following Final Air Sampling Clearance and removal of non-critical barriers (i.e. non-perimeter seals such as floor) and seals (i.e. non-perimeter seals such as floor) but before the removal of hoarding and perimeter seals from within the asbestos work area.

.7 Final Dismantling Inspection: Inspection after the removal of hoarding, perimeter seals and decontamination facility from the asbestos work area.

5.1.10 Do not proceed with next phase of work until written approval of each inspection is received from the Owner’s Consultant.

5.2 Air Monitoring

5.2.1 As per Section 8.2 of the Owner’s AMP, air sampling shall be performed a minimum of once per 10 hour work shift within and immediately adjacent to each active asbestos work area. Results obtained from all test monitoring shall be posted at the work site and provided to the UofM Project Coordinator, the UofM Environmental Health & Safety office and the Abatement Contractor.

5.2.2 All air samples must be collected in accordance with NIOSH Analytical Method 7400.

5.2.3 If air monitoring or visual inspection indicates that areas outside current asbestos work area enclosures are contaminated above the designated action level 0.05 fibre/mL clean these areas in same manner as that applicable to asbestos work areas, at no cost to Owner.

5.2.4 If air monitoring in work areas shows airborne fibre levels exceed normal levels for wet removal, workers shall use positive pressure supplied air respirators with full-face piece.

5.2.5 If air monitoring in work areas shows airborne fibre levels above 10 fibre/mL, all work is to stop within the work area, workers are to exit the work area following worker decontamination procedures and the Abatement Contractor’s workers will not be allowed to re-enter for a period of eight hours or until authorized by the Owner’s Consultant. On re-entry into the work area, the air and any fallen debris or exposed surfaces shall be misted with amended water.

5.2.6 If air sampling by Owner’s Consultant show that levels in asbestos work area do not exceed 0.01 fibres/mL as determined by NIOSH 7400 Analytical Method (A Counting Rules), proceed with dismantling of enclosures.

5.2.7 Clearance level is ≤0.01 fibres/mL.

END OF SECTION
1.0 GENERAL

1.1 General Requirements

1.1.1 Conform to requirements of this specification.

1.2 Related Work Specified Elsewhere:

1.2.1 Refer to accompanying Section 00005 for a list of related work specified elsewhere.

1.3 Description of Work

1.3.1 Generally Type III or high risk asbestos abatement specifications shall apply to activities that pose a high risk of exposure to airborne asbestos and a corresponding higher risk of health effects if handled improperly. No UofM employee shall undertake Type III work. All Type III work must be undertaken by competent outside contractors. This specification shall apply to such activities as the removal or disturbance of greater than 1 m² of friable asbestos containing plaster, spray-on insulation or other asbestos-containing finish materials. All Type III abatement activities must be reviewed and approved by one of the UofM’s Asbestos Program Officers.

1.3.2 Supply all labour, material, and equipment necessary to safely execute and complete all work of this section while in conjunction with work specified, required, or implied under Section 13080, Asbestos Abatement – General and/or the Contractor Scope of Work document.

1.4 Worker and Visitor Protection

1.4.1 Instructions: Before entering asbestos work area(s), instruct workers and visitors in use of respirators (including fit testing), entry and exit from enclosures and all aspects of work procedures and protective measures including appropriate asbestos awareness and/or abatement training. A competent person, as defined by Workplace Safety and Health Act, shall provide instruction.

1.4.2 Respirators: Provide appropriate respiratory equipment for all persons entering asbestos work area enclosure including authorized visitors. The following shall apply to the use of respirators for Type III activities:
.1 During wet removal and clean-up in enclosed asbestos work area workers, supervisors, and authorized visitors shall wear, as a minimum, powered air-purifying full-face respirator (PAPR) with P-100 filter cartridges in accordance with NIOSH Part 84 requirements. Use of other types of respiratory protection can only be used on written approval by the Owner’s consultant. Filters shall be replaced daily or tested according to manufacturer’s specifications and replaced as necessary. All waste filters shall be disposed of as asbestos waste.

.2 Respirators shall be acceptable to the Workplace Safety and Health Branch of Manitoba Labour and Immigration.

.3 Provide instruction to workers and visitors in use of respirators including qualitative fit testing.

.4 No supervisor, worker or authorized visitor shall wear facial hair which may affect the seal between the respirator and face.

.5 Maintain respiratory protection equipment in proper functioning and clean condition.

1.4.3 **Protective Clothing:** Provide workers and visitors in full-enclosure asbestos work area with new full body coveralls with integral hoods. Once coveralls are worn in the asbestos work area, treat and dispose of as asbestos contaminated waste. Workers and visitors shall also wear other protective apparel required by Manitoba Labour and Immigration construction regulations. Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped.

1.4.4 At no time shall the Abatement Contractor use existing furnishings or mechanical equipment (including piping) to support personal.

1.4.5 Before entering full-enclosure asbestos work area(s), remove street clothes in clean change room and don appropriate respirator with new or tested filters, new disposable coveralls and head covers before entering equipment and access areas or asbestos work area. Store street clothes, uncontaminated footwear, towels etc. in clean change room.

1.4.6 Persons leaving full-enclosure asbestos work area(s) shall remove gross contamination from clothing before leaving asbestos work area. Proceed to equipment and access room and remove all clothing except respirator. Place contaminated work suit in receptacles for disposal with other asbestos contaminated materials. Footwear, clothing, hardhats, protective eyewear, etc., shall be left in equipment and access room to dry for later use. Still wearing appropriate respirator, proceed naked to showers. Clean respirator to ensure that visible contamination is removed. After having thoroughly washed hair and body with shampoo and soap, remove respirator.
Remove filters and dispose of as asbestos waste in container provided for this purpose or test filters according to manufacturer's recommendation. Dispose of filters as necessary. Wet clean inside of respirator. Upon completion of asbestos abatement, dispose of footwear as contaminated waste or clean before removing from equipment and access room, or carry in sealed plastic bag to next site.

1.4.7 Following showering, proceed to clean room, dry off and dress in street clothes. Store respirators in fashion to allow them to be put on prior to entering asbestos work area at start of next shift without contaminating clean area. If re-entry to asbestos work area is to take place after having left, follow procedures in Para. 1.4.5.

1.4.8 Removal of waste and equipment from holding room of waste decontamination enclosure system shall be performed as per Para. 3.3.14 of this section. No worker shall use this system as means to leave or enter asbestos work area.

1.4.9 Do not eat, drink, smoke or chew gum or tobacco in enclosures.

1.4.10 Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.

1.4.11 A copy of the procedures described under Para. 1.4: Worker and Visitor Protection shall be posted at access points to the asbestos work area.

1.4.12 Maintain one emergency access kit equipped with a respirator, protective clothing, etc. and post emergency access procedures at the decontamination chamber access point to the asbestos work area for use by Owner or authorized visitors. The emergency access respirator shall be a PAPR Full Face Respirator during hours of active asbestos abatement work and, at a minimum, a half face respirator with minimum P100 filter cartridges after shift-end when active abatement in not being conducted.

2.0 PREPARATION

2.1 Clean Site Preparation for Full-Enclosure Asbestos Work Areas

2.1.1 Clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.

2.1.2 Erect worker and waste decontamination enclosures at locations approved by the Owner and/or Owner’s Consultant.
2.1.3 Complete isolation measures between the asbestos work area and occupied areas. If required, erect hoarding walls and complete other isolation measures between asbestos work area and occupied areas. The hoarding walls shall be constructed as follows:

.1 Build walls of 39 mm x 89 mm (2” x 4”) wood framing, 400 mm (16”) o.c. with continuous top and sill plates. Cover both side walls with rip-proof polyethylene sheeting. Walls exposed to non-construction occupied areas shall be covered with good one side 9 mm (3/8”) plywood unless stipulated by Owner or Owner’s Consultant. The exposed surface of the plywood shall be painted (minimum 2 coats) with colour of paint to be determined by Owner.

2.1.4 If directed by the Owner or Owner’s Consultant, erect tunnels and/or walkways as specified in Para. 2.5 of this section, to maintain or provide uncontaminated access through or below the asbestos work area. The location of such tunnels or walkways will be provided to the Abatement Contractor, if required

2.1.5 All wall and horizontal surfaces shall be pre-cleaned using damp cloth or sponge techniques prior to placement of polyethylene sheeting to any wall or floor surfaces. HEPA equipped vacuum cleaners may also be used to perform this task.

2.1.6 If necessary, caulk and seal ducts and duct shafts within work area which are to remain in service, as required, to make airtight. Cut and cap supply ducts with rigid sheet metal caps and seal. Seal joints and holes in HVAC ductwork to remain operational through an asbestos work area, using tape and rip-proof polyethylene to make airtight. Perform work at appropriate time under contaminated conditions if necessary.

2.1.7 Seal off all openings including but not limited to sump pits and associated components, floor drains, doorways, hatch openings, windows, vents, service holes in walls, and grilles to non-operating ducts with two (2) layers of rip-proof polyethylene sheeting sealed with tape or with polyurethane foam as appropriate.

2.1.8 Pre-clean and cover with polyethylene sheeting all items that are to remain within the enclosure during the abatement work including but not limited to motors, heating units, fire apparatus, door closers, fans, tanks, benches, shelving, storage racks, valves, taps, controllers, lights, and other fixtures and furnishings within enclosure. Clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.

2.1.9 Install plywood enclosures, covered with rip-proof polyethylene, to protect equipment or fixtures in asbestos work area(s) that may be damaged.
2.1.10 Remove, clean and turn over to the Owner, all re-usable mechanical equipment, electrical equipment and building components that may interfere with the asbestos removal and associated clean-up. The removal of such materials is at the discretion of the Owner and/or Owner’s Consultant.

2.1.11 Where required, pre-clean and cover wall and floor surfaces with polyethylene sheeting sealed with tape. Provide two separately sealed layers of polyethylene sheeting. Separately seal floor drains or openings. Use sufficient layers (2) and necessary sheathing for walking surface to protect floors which may be damaged. Cover floors first so that polyethylene extends at least 300 mm (12") up walls then cover walls to overlap floor sheeting. Provide additional protection for floors likely to be damaged by amended water, by covering floor with rip-proof polyethylene sheeting sealed with tape.

2.1.12 Establish negative pressure in asbestos work area as described in Para. 1.7 of Section 13080 - General. Negative pressure units shall have total rated capacity with filters in place sufficient to provide a minimum of four air changes every hour. Volume of air shall be sufficient to ensure airflow is maintained from clean areas into asbestos work area.

2.1.13 Vent units to outside of building. Locate vents to discharge air away from building access points or sidewalks. Discharge vents a minimum of 5 m away from building entrances, open windows or air intakes. Do not discharge air into building interior. The location of venting must be approved by the Owner or Owner’s Consultant and must be disclosed as part of the Abatement Contractor’s bid package.

2.1.14 If requested, leak test negative air units prior to commencement of abatement at operating position, using DOP method. Provide reports for unit efficiency test results within 48 hours of testing, including calibration certificates for testing equipment.

2.1.15 Operate negative pressure units continuously from this time until completion of final air monitoring. Replace pre-filters as necessary to maintain airflow. Maintain negative air pressure of 5 Pascals (0.02 inches water column) pressure reduction within asbestos enclosure with respect to surrounding areas.

2.1.16 Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.

2.1.17 Ensure existing power supply to asbestos work area is isolated and disconnected where necessary. Do not disrupt power supply to remaining areas of building. Provide ground fault electrical system in accordance with applicable CSA standard where application of amended water is required for wetting asbestos-containing materials. A minimum of one (1) ground fault electrical panel shall be provided for every 300 m$^2$ of asbestos work area. Supply all electrical apparatus from this ground fault system. Ensure safe installation of electrical lines and equipment.
2.1.18 Provide temporary lighting in asbestos work area to levels that will permit work to be done safely.

2.1.19 Provide fire extinguisher at each emergency exit, and in decontamination facilities. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of the Owner.

2.2 **Workers’ Decontamination Enclosure System**

2.2.1 Construct workers’ decontamination enclosure at entrance to each asbestos work area. Worker decontamination enclosure system shall be comprised of three interconnecting rooms (chambers) as described below.

2.2.2 Provide a set of curtain doorways between each room, and at both dirty and clean entrances to enclosure systems.

2.2.3 **Equipment and Access Room**: Build room between shower room and asbestos work area. Install waste receptor, and storage facilities for worker’s shoes and any protective clothing to be re-worn in asbestos work areas. Equipment and access room shall be large enough to accommodate specified facilities and other equipment needed, and at least one worker allowing sufficient space to undress comfortably. Minimum size 3 m² with a minimum height of 1.9 m.

2.2.4 **Shower Room**: Build room between clean room and equipment and access room of suitable size (minimum height 1.9 m) and install one (1) shower for every five (5) workers. Provide constant separate supplies of hot and cold water capable of maintaining a water temperature of between 40 and 50 °C. Provide valves controllable at shower(s) to regulate water temperature. Provide rigid piping with watertight connections and connect to water sources and drains. Provide soap, clean towels and appropriate containers for disposal of used respirator filters. Direct wastewater to sanitary sewer drains. When requested or where required by Provincial or Municipal law, direct wastewater to sewer via water filtering system consisting of a minimum 2-stage filtering system (25-micron and 5-micron filters) or other approved means of filtering.

2.2.5 **Clean Room**: Build room between shower room and clean areas outside of enclosures with a minimum height of 1.9 m. At doorway to clean room, provide vented wood door, with locking passage set. Provide hangers for workers’ street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install water heater, if required. If requested by Owner or Owner’s Consultant, dust control (‘sticky’) floor mats shall be placed outside the clean room and replaced a minimum of once every two (2) shifts (or more often if required).
2.3 Waste and Equipment Decontamination Enclosure System

2.3.1 Construct system comprised of three linked rooms: Purpose of this system is to provide means to decontaminate drums, scaffolding, material containers, vacuum and spray equipment; and other tools and equipment for which worker decontamination system is not suitable. Provide curtain doorways between rooms and at both dirty and clean entrances to the Enclosure System.

2.3.2 Provide curtain doorways between rooms and at both dirty and clean entrances to the Enclosure System.

2.3.3 Staging Area: Establish a staging area within the asbestos work area for gross removal of dust and debris from waste containers and equipment and temporary storage pending removal to container cleaning room. Minimum size of 3 m².

2.3.4 Container Cleaning Room: Build container cleaning room between the Staging Area and Holding Room. Room shall be of sufficient size to allow proper washing or otherwise decontaminating equipment, drums and other waste containers and double bagging and labelling of asbestos waste. Treat wash water as asbestos contaminated waste. Minimum size of 1.5 m² with a minimum height of 1.9 m.

2.3.5 Holding Room: Build Holding Room between Container Cleaning Room and Transfer Room. Room shall be of sufficient size to accommodate largest item of equipment used and two (2) rigid waste containers or five (5) waste bags. Minimum size of 1.5 m² with a minimum height of 1.9 m.

2.3.6 Transfer Room: Build Transfer Room between Holding Room and uncontaminated area. At doorway to holding room, provide vented wood door, with locking passage set or other means of security. Keys must be provided to Owner and Owner’s Consultant. Minimum size of 1.5 m² with a minimum height of 1.9 m. If requested, dust control (‘sticky’) floor mats shall be placed outside the holding room and replaced a minimum of once every two (2) shifts (or more often if required).

2.4 Construction of Decontamination Enclosures

2.4.1 Floor: Prior to erecting wall framing, lay one (1) sheet of rip-proof polyethylene sheeting over floor area to be covered by enclosures. The floor sheeting should extend at least 600 mm (24”) beyond the outside perimeter of the planned enclosure on all sides. After the construction of the enclosure walls, wrap the excess floor sheeting up the outside of the enclosure, overlapping the polyethylene sheeting covering perimeter walls. Provide second layer of rip-proof polyethylene to all floors, extending 600 mm up inside of enclosure walls.

2.4.2 Walls: Build load-bearing walls of 39 mm x 89 mm (2” x 4”) wood framing, 400 mm
(16") o.c. with continuous top and sill plates. Cover both sides of walls with rip-proof polyethylene sheeting with caulk sealed and taped joints or seams. If requested, the exterior of walls exposed to occupied area shall be covered with min. 9 mm (3/8") plywood sheeting or hardboard and painted or otherwise finished to meet the Owner’s requirements.

2.4.3 **Roof:** Size of joists shall be determined by span, loads, use and Code. Use as a minimum 39 mm x 89 mm (2” x 4”) joists. Cover joists with 19 mm (3/4") plywood sheeting and seal and tape joints. Cover with two (2) layers of rip-proof polyethylene, overlapping the perimeter walls at least 600 mm (24”). Wrap the excess sheeting over the polyethylene sheeting covering perimeter walls. At underside of joists install one (1) layer of polyethylene sheeting.

2.4.4 **Doorways:** Build curtain doorways designed so that when workers or drums and equipment move through doorway, one (1) of two (2) barriers comprising doorway always remains closed.

2.5 **Construction of Access Tunnels Through Asbestos Work Area**

2.5.1 Construction of an access tunnels and/or walkways may be required to provide and maintain uncontaminated access through the asbestos work. The location and specific construction specifications of such tunnels or walkways will be provided to the Abatement Contractor, if required.

2.5.2 Floors, walls and roofs of the tunnels will be constructed as specified in Para. 2.4.1, 2.4.2 and 2.4.3 of this section.

2.5.3 Tunnels are to be constructed with a minimum clearance height of 2.0 m (79”). Width of the tunnels will be the greater of the width of any connecting exit doors or 1.8 m (72”).

2.5.4 Provide and install temporary, recessed lighting into the roof of the tunnels as required.

2.6 **Maintenance of Enclosures**

2.6.1 Maintain enclosures in tidy condition. Thoroughly clean decontamination facilities at the end of each work shift and, if required, replace dust control mats as specified.

2.6.2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.

2.6.3 Visually inspect enclosures at beginning and end of each working period.
2.6.4 Use smoke methods to test the effectiveness of the isolation barriers when directed by the Owner’s Consultant.

3.0 EXECUTION

3.1 Do Not Commence Asbestos Removal Work Until:

3.1.1 Arrangements have been made for disposal of waste.

3.1.2 Asbestos work areas and decontamination enclosures are effectively segregated.

3.1.3 Negative pressure equipment is operating continuously.

3.1.4 Tools, equipment and waste materials receptors are on hand.

3.1.5 Arrangements have been made with the Owner’s Consultant for work area security.

3.1.6 Signs are displayed in areas where access to sealed asbestos work area is possible. Signs shall read:

CAUTION (25 mm high)

Asbestos Hazard Area (19 mm high)
Unauthorized Entry Prohibited (19 mm high)
Wear Assigned Protective Equipment (19 mm high)
Breathing Asbestos Dust May Cause Serious Bodily Harm (19 mm high).

3.1.7 The Owner and/or Owner’s Consultant has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

3.2 Contaminated Site Preparation for Full-Enclosure Asbestos Work Area

3.2.1 Before performing any contaminated work, prepare site as previously described.

3.2.2 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from asbestos work area enclosure(s). Ensure air-handling systems remain shut off for duration of work.

3.2.3 Seal holes or penetrations to provide airtight enclosure around asbestos work area(s).

3.2.4 Protect electrical, communication, life safety and control systems to remain in place in asbestos work area with polyethylene and tape.
3.2.5 Any fixtures secured to ceilings or walls, including but not limited to lights, exit lamps, piping, heat sensors, etc., shall be handled as follows by trained asbestos workers unless otherwise directed:

.1 Separate the fixture from the plaster finish to allow access to the materials requiring removal.

.2 On completion of the material removal, permanently re-install the fixture to the remaining ceiling or wall structure.

3.3 **Asbestos-Containing Material Removal**

3.3.1 All individuals involved with any portions of the removal process shall be equipped with appropriate respirators and protective equipment while working within the enclosure.

3.3.2 Repeatedly mist the air throughout the performance of this work and maintain all surfaces within the asbestos work area in a damp state.

3.3.3 Using full protective procedures including amended water and HEPA vacuum, install upper seals and/or isolation hoarding at the perimeter of the asbestos work area as follows:

.1 Remove a 0.3 m (12") line of asbestos-containing ceiling finish and associated metal lathe in order to access upper decking and beams.

.2 Remove asbestos-containing materials using wet techniques and place directly into asbestos waste container. Do not allow material to fall to floor.

.3 Clean area of perimeter seals using wet techniques and/or HEPA vacuum prior to installation of upper seals and/or isolation hoarding.

.4 Install upper seals and/or isolation hoarding as specified.

3.3.4 Cover upper perimeter walls or other structures with two layers of rip-proof polyethylene sheeting in area separating an occupied space from the asbestos work area. Cover other walls with one (1) layer of polyethylene sheeting.

3.3.5 Promptly seal holes or penetrations, as revealed during removal, in structure above ceiling (ducts, etc.) to provide airtight enclosure around asbestos work area(s).

3.3.6 Clean and protect from damage all ceiling and wall components that are to remain including but not limited to furring, channels, hangers, wires and clips.

3.3.7 Spray asbestos-containing materials with amended water using sprayer. Saturate asbestos to prevent release of airborne fibres during removal. Fully saturated
asbestos may be scraped directly into waste containers or may be allowed to fall to the floor.

3.3.8 Remove the saturated asbestos-containing material in small sections. Do not allow saturated asbestos to dry out. As it is being removed, pack the material in sealable plastic bags 6-mil minimum thickness and place in labelled containers for transport.

3.3.9 Remove any non-asbestos-containing debris and rubble present throughout the work area that cannot be practically segregated from asbestos-containing or asbestos-contaminated materials as asbestos waste.

3.3.10 Spray asbestos debris on floor with amended water to prevent it from drying out. Remove asbestos debris from the floor and put in waste containers at regular intervals as the work progresses and at the end of every shift.

3.3.11 Seal all holes or penetrations in deck, shafts, walls, columns, etc. when exposed during asbestos removal.

3.3.12 Seal filled containers, clean external surfaces thoroughly, and remove from working area to staging area.

3.3.13 After completion of removal of asbestos-containing materials, clean surfaces from which asbestos has been removed with stiff bristle brushes, vacuum, or wet-sponge (as appropriate) to remove all visible material.

3.3.14 Removal of asbestos waste containers and decontaminated equipment and materials from the asbestos work area shall be removed through the waste decontamination enclosure as follows:

.1 Remove gross contamination from the surface of the item to be removed within the staging area.

.2 Pass the item to a second worker present in the container cleaning room. The item shall be cleaned, wet wiped and double bagged and/or sealed in polyethylene prior to transferring to a third worker present in the holding room. Wash water shall be treated as asbestos-contaminated waste.

.3 The worker present in the holding room shall transfer the clean items to a fourth worker located outside the waste decontamination enclosure. The fourth worker must not enter the waste decontamination enclosure. Those workers present in the enclosure must leave the asbestos work area through the worker decontamination chamber only.
4. Treat all removed materials exposed to asbestos as asbestos-contaminated waste unless such materials can be properly decontaminated and are specified to be re-used.

3.3.15 After vacuuming to remove visible asbestos, wet clean entire enclosure, including equipment and floor and wall surfaces, ducts and similar items not covered with polyethylene sheeting. Request visual inspection and acceptance.

3.3.16 Following inspection and acceptance, apply heavy coat of slow drying sealer to all surfaces from which asbestos has been removed. Apply thinned coat (sufficient to coat all surfaces) to interior of polyethylene enclosure. Do not disturb the work area for a minimum of 12 hours after the application of sealer. Operate negative air units during this period.

4.0 DECOMMISSIONING

4.1 Dismantling of Protection

4.1.1 All containment structures, such as hoardings, platforms, etc., which are used to segregate the work area, are to remain in place until directed by the Owner’s Representative.

4.1.2 If air sampling by The Owner’s Consultant shows that levels in asbestos work area do not exceed 0.01 fibres/mL as determined by NIOSH 7400 Analytical Method, A Counting Rules, and when approved in writing by the Owner or Owner’s Consultant, proceed with the removal of worker and waste decontamination enclosures as follows:

4.1.3 Remove polyethylene sheeting exposed during contaminated work including upper surfaces plus any underlying sheeting contaminated by water leaks, rips, tears, or exposed by failure of upper layer. Wear appropriate respirator and disposable coveralls during removal of sheeting. Carefully roll sheeting away from walls to centre of asbestos work area. As sheeting is rolled away from walls and corners, HEPA vacuum visible debris.

4.1.4 While removing top layer of sheeting from surfaces protected by two (2) layers of sheeting, cut lower sheeting so as to expose horizontal surfaces that may be contaminated with asbestos debris. HEPA vacuum any visible debris.

4.1.5 Place polyethylene sheeting, seals, tape, cleaning material, clothing, and other contaminated waste in asbestos waste receptors for transport. Remove with HEPA vacuum any debris which may have fallen behind sheeting.

4.1.6 Remove hoardings, temporary lighting, equipment and facilities provided for work.

4.1.7 Visible debris discovered on the course of the site dismantlement is to be promptly
4.1.8 As per Section 8 and Appendix X of the Owner’s AMP site inspections and air monitoring shall be conducted for all Type II asbestos work including a final review of the work area by the Owner and/or Owner’s Consultant to ensure that no dust or debris remains.

5.0 INSPECTION AND AIR MONITORING

5.1 Inspection

5.1.1 As per Section 8 and Appendix X of the Owner’s AMP, site inspections and air monitoring shall be conducted for Type III asbestos work.

5.1.2 From commencement of work until completion of clean-up operations, the Owner’s Consultant is empowered by the Owner to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).

5.1.3 The Owner’s Representative or Owner’s Consultant will inspect both inside and outside the work area a minimum of once per 10 hour work shift during active abatement.

5.1.4 The Owner’s Consultant is empowered to shut-down all work activities when leakage of asbestos from the work area has occurred or is likely to occur.

5.1.5 The Abatement Contractor is to allow inspection by the Owner’s Consultant and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection and no cost to the Owner.

5.1.6 If asbestos work area(s) or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Owner.

5.1.7 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

5.1.8 Provide a minimum of 24 hours written notice to the Owner’s Consultant of any request for scheduling milestone inspections or transportation of asbestos water through an occupied area.

5.1.9 The following milestone inspections are to take place during work:

1. **Clean Site Preparation.** Inspection of site preparations and set-up prior to contaminated work.
2. Contaminated Perimeter Preparation. Inspection of contaminated preparations at perimeter of asbestos work area prior to any bulk removal.

3. Contaminated Site Preparation (Contaminated Site Preparation). Inspection of asbestos work area following Contaminated Perimeter Preparation but before start of main asbestos removal.

4. Visual Clearance. Inspection of asbestos work area after removal of asbestos but before the application of sealer.

5. Final Air Sampling Clearance. Inspection and air sampling after application of sealer but prior to the removal of hoarding and perimeter seals from within the asbestos work area.

6. Owner and Owner’s Consultant Joint Visual Clearance. Inspection of asbestos work area by Owner, Owner’s Consultant and Contractor’s site supervisor following Final Air Sampling Clearance and removal of non-critical barriers (i.e. non-perimeter seals such as floor) and seals (i.e. non-perimeter seals such as floor) but before the removal of hoarding and perimeter seals from within the asbestos work area.

7. Final Dismantling Inspection. Inspection after the removal of hoarding, perimeter seals and decontamination facility from the asbestos work area.

5.1.10 Do not proceed with next phase of work until written approval of each milestone is received from the Owner’s Consultant.

5.2 Air Monitoring

5.2.1 As per Section 8.2 of the Owner’s AMP, air sampling shall be performed a minimum of once per 10 hour work shift within and immediately adjacent to each active asbestos work area. Results obtained from all test monitoring shall be posted at the work site and provided to the UofM Project Coordinator, the UofM Environmental Health & Safety office and the Abatement Contractor.

5.2.2 All air samples must be collected in accordance with NIOSH Analytical Method 7400.

5.2.3 If air monitoring or visual inspection indicates that areas outside current asbestos work area enclosures are contaminated above the designated action level 0.05 fibre/mL clean these areas in same manner as that applicable to asbestos work areas, at no cost to Owner.
5.2.4 If air monitoring in work areas shows airborne fibre levels exceed normal levels for wet removal, workers shall use positive pressure supplied air respirators with full-face piece.

5.2.5 If air monitoring in work areas shows airborne fibre levels above 10 fibre/mL, all work is to stop within the work area, workers are to exit the work area following worker decontamination procedures and the Abatement Contractor's workers will not be allowed to re-enter for a period of eight hours or until authorized by the Owner's Consultant. On re-entry into the work area, the air and any fallen debris or exposed surfaces shall be misted with amended water.

5.2.6 If air sampling by Owner's Consultant shows that levels in asbestos work area do not exceed 0.01 fibres/mL as determined by NIOSH 7400 Analytical Method (A Counting Rules), proceed with dismantling of enclosures.

5.2.7 Clearance level is ≤0.01 f/mL.

END OF SECTION
1.0 GENERAL

1.1 General Requirements

1.1.1 Conform to requirements of this specification.

1.2 Related Work Specified Elsewhere:

1.2.1 Refer to accompanying Section 00005 for a list of related work specified elsewhere.

1.3 Description of Work

1.3.1 Generally Type II Glovebag asbestos abatement specifications shall apply to the removal of asbestos-containing pipe insulation outside of a sealed Type II or Type III enclosure. Typical work practices and procedures for Type II Glovebag asbestos abatement are presented in Section 7 of the University of Manitoba's Asbestos Management Program. All Type II Glovebag abatement activities must be reviewed and approved by one of the UofM's Asbestos Program Officers.

1.3.2 Supply all labour, material, and equipment necessary to safely execute and complete all work of this section while in conjunction with work specified, required, or implied under Section 13080, Asbestos Abatement – General and/or the Contractor Scope of Work document.

1.4 Worker and Visitor Protection

1.4.1 Instructions: Before entering asbestos work area(s), instruct workers and visitors in use of respirators and all aspects of work procedures and protective measures. Competent person as defined by Workplace Safety and Health Act shall provide instruction.

1.4.2 Respirators: Provide appropriate respiratory equipment for all persons entering asbestos work area including authorized visitors. The following shall apply to the use of respirators for Type II Glovebag activities:

.1 During glovebag removal all workers, supervisors, and authorized visitors shall wear, at minimum, non-powered half-face respirators with minimum P100 filter cartridges in accordance with NIOSH Part 84 requirements. Filters shall be replaced daily or tested according to manufacturer's specifications and replaced as necessary. All waste filters shall be disposed of as asbestos waste.

.2 Respirators shall be acceptable to the Workplace Safety and Health Branch of Manitoba Labour and Immigration.

.3 Provide instruction to workers and visitors in use of respirators including qualitative fit testing.
.4 No supervisor, worker or authorized visitor shall wear facial hair which may affect the seal between the respirator and face.

.5 Maintain respiratory protection equipment in proper functioning and clean condition.

1.4.3 **Protective Clothing:** Provide workers and visitors with new full body coveralls with integral hoods. Once coveralls are worn in the asbestos work area, treat and dispose of as asbestos contaminated waste. Workers and visitors shall also wear other protective apparel required by Manitoba Labour and Immigration construction regulations. Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped.

1.4.4 At no time shall the Abatement Contractor use existing furnishings or mechanical equipment (including piping) to support personal.

1.4.5 Before entering asbestos work area(s), don appropriate respirator with new or tested filters, new disposable coveralls with integrated hoods, and all other appropriate personal protective equipment.

1.4.6 To leave the asbestos work area(s), all persons shall:

.1 HEPA vacuum or wet wipe clothing and respirator prior to leaving the asbestos work area.

.2 Remove contaminated coveralls and place in receptacles for disposal with other asbestos-contaminated materials prior to leaving the asbestos work area.

.3 Still wearing appropriate respirator, proceed out of the established asbestos work area to the decontamination facility.

.4 Using soap and warm water wash and remove respirator then thoroughly wash hands and face.

1.4.7 Do not eat, drink, smoke or chew gum or tobacco in asbestos work area.

1.4.8 Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.

1.4.9 A copy of the procedures described under Para. 1.4: Worker and Visitor Protection shall be posted at access points to the asbestos work area.
2.0 PREPARATION

2.1 Site Preparation

2.1.1 Complete isolation measures between the asbestos work area and occupied areas using tape barriers, saw-horses, or other barriers, or by closing any door, windows, etc. at the perimeter of the Asbestos Work area.

2.1.2 Install worker decontamination facilities at locations approved by the Owner and/or Owner’s Consultant.

2.1.3 Set-up clear warning signs at each entry point to the work area and at a distance from the work area if required. Signs shall read:

   CAUTION (25 mm high)
   Asbestos Hazard Area (19 mm high)
   Unauthorized Entry Prohibited (19 mm high)
   Wear Assigned Protective Equipment (19 mm high)
   Breathing Asbestos Dust May Cause Serious Bodily Harm (19 mm high)

2.1.4 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from the asbestos work area. Ensure air-handling systems remain shut off for duration of work.

2.1.5 Clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.

2.1.6 Cover with polyethylene sheeting any furnishings or equipment that will remain in the asbestos work area. Clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.

2.1.7 Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.

2.1.8 Lay polyethylene sheeting directly underneath piping from which insulation is to be removed.

2.1.9 Locate required tools, equipment, and waste receptors within the asbestos work area.

2.1.10 Provide fire extinguisher at the asbestos work area. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of the Owner.
2.2 Workers' Decontamination Facilities

2.2.1 Set-up an isolated worker decontamination area adjacent to the asbestos work area consisting of a HEPA filtered vacuum, bucket of warm water, soap, rags, and disposal container for asbestos contaminated disposable coveralls.

3.0 EXECUTION

3.1 Do Not Commence Asbestos Removal Work Until:

3.1.1 Arrangements have been made for disposal of waste.

3.1.2 Asbestos work areas and decontamination facilities are effectively segregated.

3.1.3 Tools, equipment and waste materials receptors are on hand.

3.1.4 Signs are displayed in areas where access to asbestos work area is possible.

3.1.5 The Owner and/or Owner’s Consultant has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

3.2 Asbestos-Containing Material Removal

3.2.1 Before removing asbestos, prepare site as described previously.

3.2.2 All individuals involved with any portions of the removal process shall be equipped with appropriate respirators and protective equipment while working within the asbestos work area.

3.2.3 Pre-clean surface of pipe or fitting to remove fallen or damaged insulation by HEPA vacuuming or damp wiping.

3.2.4 Before beginning work, wet all insulation to be removed with amended water.

3.2.5 Wet areas of damaged jacketing with amended water and tape over damage, or wrap with polyethylene sheeting, to provide temporary repair.

3.2.6 If insulation is not jacketed, wet surface with amended water and wrap entire length of fitting and/or piping with 0.15 mm (6 mil) polyethylene sheeting taped in place.

3.2.7 Place tools necessary to remove insulation in tool pouch. Zip glovebag onto pipe and/or fitting and seal all openings to fitting with cloth securing straps. For valve bags seal valve cover with wire tie or equivalent.

3.2.8 Insert nozzle of sprayer into bag through valve and thoroughly wet insulation and interior of glovebag.
3.2.9 Place hands into gloves and use necessary tools to remove insulation. Roll jacketing carefully to minimize possibility of ripping or puncturing bags. Preformed insulation block should be cut at joints to minimize fibre release.

3.2.10 Arrange insulation to obtain full capacity of glovebag.

3.2.11 Wet freshly exposed insulation frequently during work.

3.2.12 After insulation has been removed, wash down fitting and/or exposed pipe and interior of glovebag thoroughly. Use one hand to aid washing process. Wet surface of insulation in lower section of glovebag and exposed end of asbestos insulation remaining on fitting by spraying with water prior to moving glovebag.

3.2.13 If glovebag is to be moved along fitting, evacuate air from bag using a HEPA vacuum through the valve opening, move glovebag along pipe and re-seal. Use double-pull zipper to pass hangers. Repeat insulation removal procedures specified above.

3.2.14 If glovebag is to be removed from cleaned pipe and/or fitting for use on new pipe and/or fitting, seal interior zip lock and evacuate air from glovebag using a HEPA vacuum through the valve opening. Re-install in new location before opening zip lock. Repeat insulation removal procedures specified above.

3.2.15 If glovebag is ripped, cut or opened in any way, cease work and repair with tape before continuing work. Immediately clean spilled material with HEPA vacuum or wet washing.

3.2.16 To remove glovebag once filled, wash top section and tools thoroughly. Place tools in one hand (glove), pull hand out inverted and twist to create a separate pouch. Tape in two locations to seal separate pouch from glovebag and cut between two tape locations to remove separated pouch. Place pouch with tools in next glove bag, or into a water bucket. Open the pouch underwater to remove and clean tools.

3.2.17 Pull waste disposal bag over glovebag before removing from pipe and/or fitting. Remove securing straps. Unfasten zipper.

3.2.18 After removal of glovebag, ensure newly exposed pipe and/or fitting is clean of residue by HEPA vacuuming or wet wiping surfaces. Ensure that surfaces are kept free of wet sludge.

3.2.19 Before completion of shift, apply sealer to all surfaces of freshly-exposed pipes and/or fittings.

3.2.20 Apply heavy coat of encapsulant to exposed ends of asbestos insulation to remain.

3.2.21 Dispose of removed glovebags as contaminated waste.
3.2.22 Remove drop sheet and dispose of as contaminated waste.

3.2.23 On completion of removal activities, clean asbestos work area with HEPA vacuum or by wet wiping or mopping and request inspection by Owner’s Consultant.

4.0 DECOMMISSIONING

4.1 Dismantling Of Protection

4.1.1 If air sampling by The Owner’s Consultant shows that levels in asbestos work area do not exceed the action level of 0.05 fibres/mL, as determined by NIOSH 7400 Analytical Method, A Counting Rules, and when approved in writing by the Owner or Owner’s Consultant, proceed with final dismantling of the asbestos work area.

4.1.2 As per Section 8 and Appendix X of the Owner’s AMP site inspections and air monitoring shall be conducted for all Type II asbestos work including a final review of the work area by the Owner and/or Owner’s Consultant to ensure that no dust or debris remains.

5.0 INSPECTION AND AIR MONITORING

5.1 Inspection

5.1.1 As per Section 8 and Appendix X of the Owner’s AMP, site inspections and air monitoring shall be conducted for all internal (by UofM employees) and external (outside Abatement Contractor) Type II asbestos work.

5.1.2 From commencement of work until completion of clean-up operations, the Owner’s Consultant is empowered by the Owner to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).

5.1.3 The Owner’s Representative or Owner’s Consultant will inspect both inside and outside the work area a minimum of once per 10 hour work shift during active abatement.

5.1.4 The Owner’s Consultant is empowered to shut-down all work activities when leakage of asbestos from the work area has occurred or is likely to occur.

5.1.5 The Abatement Contractor is to allow inspection by the Owner’s Consultant and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Owner.

5.1.6 If asbestos work area(s) or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Owner.
5.1.7 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

5.2 Air Monitoring

5.2.1 As per Section 8.2 of the Owner’s AMP, air sampling shall be performed a minimum of once per 10 hour work shift within and immediately adjacent to each active asbestos work area. Results obtained from all test monitoring shall be posted at the work site and provided to the UofM Project Coordinator, the UofM Environmental Health & Safety office and the Abatement Contractor.

5.2.2 All air samples must be collected in accordance with NIOSH Analytical Method 7400.

5.2.3 If air monitoring or visual inspection indicates that areas inside or outside the asbestos work area are contaminated above the action level of 0.05 fibres/mL, clean these areas in same manner as that applicable to asbestos work areas, at no cost to Owner.

5.2.4 If air sampling by Owner’s Consultant show that levels in asbestos work area do not exceed the action level of 0.05 fibres/mL, as determined by NIOSH 7400 Analytical Method (A Counting Rules), proceed with dismantling of asbestos work area.

5.2.5 The air clearance concentration shall not exceed the designated action level of 0.05 fibres/mL.

END OF SECTION