1.0 General

1.1 SUMMARY

- .1 This specification outlines the basic requirements for the handling and/or disposal of suspect asbestos-containing materials (ACMS), namely vermiculite insulation in concrete block, as part of a duct installation project at 552 Plinguet Street in Winnipeg, Manitoba (the site).
- .2 Generally Type 2 or moderate risk asbestos abatement specifications shall apply to the removal or disturbance of less than 1 m² of friable asbestos containing materials located outside a Type 3.
- .3 These specifications and supplementary document(s) 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.
- .4 The Contractor is to abide by all Federal, Provincial and Municipal regulations and is to complete the work to the satisfaction of the Contract Administrator and all authorities having jurisdiction.
- .5 The Abatement Consultant is AMEC Environment & Infrastructure (hereby referred to as the Abatement Consultant).

1.2 RELATED REQUIREMENTS

.1 All drawings and all sections of the specifications shall apply to and form an integral part of this section.

1.3 **REFERENCES**

- .1 The most current edition of the following:
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.205, Sealer for Application to Asbestos-Fibre-Releasing Materials.
- .3 Canadian Standards Association (CSA International).
- .4 Department of Justice Canada.
 - .1 Canadian Environmental Protection Act (CEPA).
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .6 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act (TDGA).
- .7 Underwriters' Laboratories of Canada (ULC)
- .8 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention (CDC)/National Institute for Occupational Safety and Health (NIOSH)
 - .1 NIOSH 94-113, NIOSH Manual of Analytical Methods (NMAM).
- .9 Manitoba Labour Workplace Safety & Health Division, Guidelines for Working with Asbestos.

1.4 SITE CONDITIONS

- .1 The site conditions identify the known conditions at the site with respect to asbestos. This information is provided for reference purposes only and each contractor must confirm existing conditions within the work area(s) as a part of this contract.
- .2 Asbestos containing materials (ACMs) have been identified (visually or through testing) at the site.
 - .1 Asbestos-containing vermiculate insulation is known to be present in the concrete block walls at the site.
 - .2 All materials which may contain asbestos shall be considered as asbestos containing and handled as such unless proven otherwise by laboratory analysis.
 - .3 Additional information of ACMs present at the site may be available. Based on limited survey information, and project expectations, only the above materials are expected to be disturbed. Do not disturb other materials unless conferring with the Abatement Consultant.
- .3 Examine local conditions affecting work under this contract. No allowance will be made for necessary changes, unless notification of interferences have been brought to the Contract Administrator's attention, in writing, prior to bid closing.
- .4 Where material is encountered by Trades or Contractors that is suspected of containing asbestos fibres not identified in this Section or other hazardous substances, the Trade or Contractor is to immediately stop work in the area and notify the Contract Administrator. Do not resume work in the area until further follow-up has been completed and authorization granted by the Contract Administrator.

1.5 OUTLINE OF WORK

- .1 In order to accommodate the installation of mechanical ducts along upper portion of the walls at the ceiling level, the abatement contractor is required to conduct the following:
 - .1 Confirm the location of and dimension of required openings in the concrete block walls. The abatement contractor shall work with other contractors and the Contract Administrator to determine location(s) and extent of work.
 - .2 The abatement contractor shall set-up a negative pressure, Type 2, containment and conduct all work within the containment. It is anticipated that the containment will be constructed on scaffolding or a mobile lift.
 - .3 Within the containment, the abatement contractor shall make the required opening in the block wall and abate all exposed vermiculate insulation which cannot be effectively sealed into the wall cavity.
 - .4 The edges of the wall cavity are to be effectively sealed to prevent leakage or possible exposure to residual vermiculate insulation. The method of wall penetration sealing shall be reviewed by the Contract Administrator.
 - .5 The abatement contractor shall ensure the work area is effectively cleaned prior to removal of the containment. Refer to Part 7 of this Section for inspection and air sampling requirements.
- .2 Refer to other Sections of this specification for a specific outline of work.
- .3 Do not remove any materials not specifically identified by the Contract Administrator. Any removal of unauthorized materials shall be at the cost of the Contractor including the cost of repairs or re-insulation subject to the satisfaction of the Contract Administrator.

1.6 SITE EXAMINATION

- .1 Prior to commencing actual work, check field conditions, obtain and confirm actual site dimensions, examine surface conditions, site restrictions, etc., as required, to ensure correct execution of work. Notify the Contract Administrator in writing of all matters which could prejudice proper execution of work.
- .2 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 Contractor.
- .3 Commencement of construction or any part thereof constitutes acceptance of existing conditions and means all dimensions and the scope of work has been considered, verified and is acceptable.

1.7 SCHEDULE

- .1 Work is to be carried out during agreed upon hours with the Contract Administrator. It is expected that normal working hours will be maintained.
- .2 The Contractor is to assume that all work is to be performed when the area is unoccupied as determined by the Contract Administrator. Removal of designated substances must not delay the performance of other trades.
- .3 Prior to any on-site activities, the Contractor shall submit a proposed schedule showing phasing and proposed workforce related to each work area enclosure or repair operation.
- .4 Modifications to the project schedule would only be granted on acceptance by the Contract Administrator.

1.8 GENERAL REQUIREMENTS

- .1 Supply all labour, material, and equipment necessary to safely execute and complete all work specified, required, or implied under this section.
- .2 Prepare and isolate the specified work area(s) from adjoining occupied and unoccupied areas.
- .3 Shut down and/or isolate any air moving equipment that could contribute to the dispersal of contaminants, including asbestos, from the work area.
- .4 Under no circumstances shall existing service or utility lines be disconnected, shut off, or otherwise removed from service without prior consent of the Contract Administrator.
- .5 Construct worker and waste decontamination facilities at the perimeter of the work area as further specified in the sections listed in Article 1.2 of this section.
- .6 As required, allow for access to security and other alarm panels at all times.
- .7 Securing the work site is the responsibility of the Contractor. Any damage to the work site or unauthorized access during or after normal working hours resulting from contractor negligence will be the responsibility of the Contractor to make right.
- .8 After preparation and acceptance of the work areas and decontamination facilities, remove and dispose of all required materials.
- .9 The Contractor will be responsible for the general upkeep of the site. Where available, workers and trades will use designated washrooms <u>only</u>. Designated washrooms must be kept clean at all times. All other facilities will be off limits.
- .10 All work will be subject to review inside and outside work area by the Contract Administrator and/or the Abatement Consultant as further specified.
- .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 Contract Administrator.

- .12 When directed by the Abatement Consultant, decommission the work area and decontamination facilities.
- .13 Exercise care and caution in operations relative to the site. Any unnecessary destruction or damage of the site will not be permitted and shall be repaired to the Consultants' satisfaction, by the Contractor, at the Contractor's expense.
- .14 All designated substances removed shall be transported and disposed as further specified.

1.9 **DEFINITIONS**

- .1 **Airlock:** System for permitting ingress or egress without permitting air movement between contaminated area and uncontaminated areas, typically consisting of two (2) curtained doorways spaced minimum of 2 m (6') apart.
- .2 **Amended Water:** Water with a non-ionic wetting agent added to reduce water tension to allow wetting of fibres.
- .3 **Asbestos-Containing Material (ACM):** Materials identified under Article 1.4 of this Section, Site Conditions including fallen materials and settled dust. ACM includes all non-fibreglass pipe and pipe fitting insulation associated with the steam heating system.
- .4 **Asbestos-Contaminated Waste:** Materials identified under Article 1.4 of this Section, Site Conditions that have been removed as specified including fallen materials, debris, rubble, and settled dust, and materials and/or equipment deemed to be contaminated under this specification and/or by the Abatement Consultant.
- .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.
- .6 **Authorized Visitor(s):** Abatement Consultant or person(s) representing regulatory agencies, and person(s) authorized by them.
- .7 **Curtained doorway**: arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed as follows:
 - .1 Place two overlapping sheets of polyethylene over existing or temporarily framed doorway, secure each along top of doorway, secure vertical edge of one sheet along one vertical side of doorway, and secure vertical edge of other sheet along opposite vertical side of doorway.
 - .2 Reinforce free edges of polyethylene with duct tape and weight bottom edge to ensure proper closing.
 - .3 Overlap each polyethylene sheet at openings not less than 1.5 m on each side.
- .8 **DOP Test:** A testing method used to determine the integrity of the negative pressure unit using dioctyl phthalate (DOP) HEPA filter leak test.
- .9 **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 during removal.
- .10 **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 by licensed technician and meet applicable CSA standards.
- .11 HEPA Filter: High Efficiency Particulate Aerosol filter at least 99.97 percent efficient in

collecting 0.3 micrometer aerosol.

- .12 **HEPA Vacuum:** HEPA filtered vacuum with all necessary fittings, tools and attachments. Air must pass HEPA filter before discharge.
- .13 **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.
- .14 **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.
- .15 **Non-Friable Materials**: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .16 **Occupied Area:** Any area of the site building or work site that is outside the work area.
- .17 **Polyethylene sheeting sealed with tape:** polyethylene sheeting of type and thickness specified sealed with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of asbestos fibres through sheeting into clean area.
- .18 **Sprayer:** Garden reservoir type portable manual sprayer or airless spray equipment capable of producing mist or fine spray. Must be of appropriate capacity for scope of work.

1.10 REGULATIONS AND GUIDELINES

- .1 Comply with the most stringent requirements of Manitoba Building Code, National Building Code as well as Federal, Provincial, and local requirements, with specified standards and codes and this specification. Work shall be performed under regulations in effect at the time work is performed.
- .2 Provide necessary notices, obtain permits and pay all fees, in order that work specified may be carried out. Charges and alterations required by authorized inspector of any authority having jurisdiction, to be carried out.
- .3 Manitoba Workplace Safety and Health Act (C.C.S.M. c. W210), Workplace Safety and Health Regulation (MR217/2006).
- .4 Manitoba Environment Act, Chapter E125, Waste Disposal Grounds Regulation (MR 150/91) as it pertains to asbestos and other hazardous materials.
- .5 Provincial Guidelines or Safe Work Bulletins associated with MR217/2006. Such guidelines and bulletins are available on the Manitoba Workplace Safety and Health website at: http://www.gov.mb.ca/labour/safety/index.html.
- .6 The 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 City are complied with including site specific safety, health and environment requirements.
- .5 Notify sanitary landfill or waste disposal site as per Municipal and Provincial requirements.
- .7 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.

1.11 QUALITY ASSURANCE

- .1 Ensure work proceeds to schedule and meets all requirements of this section.
- .2 Perform work so airborne contaminants or wastewater run-off does not contaminate areas outside specified work areas.
- .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 The City. The Abatement Consultant shall be notified as soon as possible following such an occurrence and informed of the measures being implemented to correct the situation.
- .4 Pay cost to The City of inspection and air monitoring performed as result of failure to perform work satisfactorily.
- .5 Protect and maintain work until work has been completed and accepted. Protect work against damage during installation. Repair all damage to existing facilities without expense to The City.
- .6 Coordinate work with other sections to avoid conflict and ensure proper installation of all materials.
- .7 On completion of work, remove all tools, surplus and waste material and leave work in a clean condition.
- .8 Use only skilled and qualified workers for all trades required for this work.

1.12 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 Submittal Procedures.
- .2 The Contractor shall ensure that the following has been submitted to The City prior to commencing work:
 - .1 Contractor health & safety records are required to be provided to The City.
 - .2 Before commencing any work, Contractor shall submit, in writing, confirmation of good standing with Worker's Compensation Board of Manitoba.
- .3 The Contractor shall ensure that the following has been submitted to the Abatement Consultant at least seven (7) days prior to commencing work:
 - .1 Obtain and submit all necessary permits for transporting and disposal of waste materials.
 - .2 Names of supervisory personnel who will be responsible for the specified work area(s).
 - .3 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.
 - .4 Satisfactory proof that every worker has had instruction and training in the hazards of asbestos and other designated substances (as appropriate), in personal hygiene and work practices, and in the use, cleaning, and disposal of respirators

and protective clothing.

- .5 A proposed schedule showing phasing and proposed workforce related to each work area enclosure or repair operation.
- .6 Negative air unit performance data and results of DOP test as required.
- .7 Recording manometer calibration data as required.
- .8 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.
- .9 Provide a written emergency access/egress plan for the work area for acceptance by The City.
- .10 Provide a written visitor entrance procedure for the work area for acceptance by The City.
- .11 If requested, submit copies of Contractor's authorized representative's work site health and safety inspection reports to The City on a weekly basis.
- .12 Submit copies of any reports or directions issued by Federal and Provincial health and safety inspectors.
- .13 Submit copies of incident and accident reports.

1.13 SUPERVISION

- .1 A minimum of one (1) supervisor is required for every ten (10) workers unless otherwise directed in writing by The City.
- .2 An accepted supervisor must remain within the designated work area at all times during the disturbance, removal, or other handling of designated substances.
- .3 Site supervision must only be replaced by accepted replacement on acceptance by The City. The City reserves the right to request the replacement of the supervisor without explanation.

1.14 WORKER AND VISITOR PROTECTION

- .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.
- .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 2 activities:
 - .1 Workers, supervisors, and authorized visitors shall wear, at a minimum, nonpowered half-face respirators with minimum P100 filter cartridges in accordance with NIOSH Part 84 requirements. Use of other types of respiratory protection can only be used on written direction by the Abatement Consultant.
 - .2 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.
 - .3 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.
 - .4 Respirators shall be acceptable to the Workplace Safety and Health Branch of

Manitoba Labour and Immigration.

- .5 Provide instruction to workers and visitors in use of respirators including qualitative fit testing.
- .6 A worker is not to be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
- .7 The employer is to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator.
- .8 No supervisor, worker or authorized visitor shall wear facial hair which may affect the seal between the respirator and face.
- .9 Maintain respiratory protection equipment in proper functioning and clean condition. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary. The respirator to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location.
- .3 **Protective Clothing:** Provide workers and visitors in asbestos work area with:
 - .1 New disposable type protective coveralls that do not readily retain or permit penetration of asbestos fibres. Coveralls to be provided by the employer and worn by every worker who enters the work area. Coveralls to consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing.
 - .2 Once coveralls are worn in the asbestos work area, treat and dispose of as asbestos contaminated waste.
 - .3 Workers and visitors shall also wear other protective apparel required by Manitoba Labour and Immigration construction regulations.
 - .4 Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped.
- .4 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.
- .5 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.
- .6 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.
- .7 Still wearing appropriate respirator, proceed to the Clean Room or designated area.
- .8 Using soap and warm water wash and remove respirator then thoroughly wash hands and face.
- .9 Do not eat, drink, smoke or chew gum or tobacco in Asbestos Work Area.
- .10 Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.
- .11 A copy of the procedures described under Article 1.14 Worker and Visitor Protection

shall be posted at access points to the asbestos work area. Procedures shall be in both official languages.

- .12 Maintain one visitor/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 authorized visitors.
- .13 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.
 - .2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Asbestos Work Area.

2.0 Products

2.1 MATERIALS

- .1 Materials and equipment specified and acceptable manufacturers are named in this specification for the purposes of establishing the standard of materials and workmanship to which the Contractor shall adhere. Bid price shall be based on the use of materials and equipment as specified.
- .2 Asbestos Waste Containers: contain waste in two separate containers.
 - .1 Inner container: 0.15 mm (6 mil) thick sealable polyethylene bag or where glove bag method is used, glove bag itself.
 - .2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 0.15 mm (6 mil) thick sealable polyethylene bag.
 - .3 Containers must be acceptable to disposal site selected and Manitoba Conservation.
 - .4 Labelling requirements: affix preprinted cautionary asbestos warning, that is visible when ready for removal to disposal site. Label in both official languages if required.
 - .5 Labelling shall be as per the following:

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

- .3 **Encapsulant:** Type 2 surface film forming or Type 1 penetrating type Class A water based conforming to CAN/CGSB-1.205 and approved by the Fire Commissioner of Canada. Encapsulant used to meet requirements for fire resistance, flame spread or acoustical characteristics as required. Accepted material and manufacturers include Bakor, Childers and Fosters.
- .4 **Flexible ducting:** Metal reinforced flexible ductwork, 300 mm (12") diameter minimum.
- .5 **Polyethylene Sheeting:** 0.15 mm (6 mil) minimum thickness unless otherwise specified. Sheet size shall be such to minimize joints.
- .6 **Protective Coveralls:** Disposable full body coveralls complete with elasticized hoods made of spun polyolefin material or non-woven material and must be rated for asbestos and lead abatement applications by the manufacturer.
- .7 **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.

- .8 **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 equal in accordance with Part B Bidding Procedures. For mechanical equipment, pipes, boilers, etc. use high temperature sealer only. Chil-Abate CP210, Childers Products Company, Mississauga, Ontario or equal in accordance with Part B Bidding Procedures.
- .9 **Tape:** Tape suitable for sealing polyethylene to surface encountered under both wet conditions using amended water, and dry conditions. Standard of acceptance, Nashaua 300 polyethylene coated cloth tape, Tyco Adhesives, or equal in accordance with Part B Bidding Procedures.
- .10 **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 equal in accordance with Part B Bidding Procedures.

3.0 Preparation

3.1 CLEAN SITE PREPARATION FOR FULL-ENCLOSUARE ASBESTOS WORK AREAS

- .1 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.
- .2 Pre-clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.
- .3 Erect appropriate worker and waste decontamination facilities at locations accepted by the Contract Administrator.
- .4 Complete isolation measures between the asbestos work area and occupied areas. Where required, erect hoarding walls and complete other isolation measures between asbestos work area and occupied areas.
 - .1 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.
- .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.
- .6 Seal off all openings including but not limited to doorways, hatch openings, windows, vents, service holes in walls and grilles to non-operating ducts with two (2) layers of ripproof polyethylene sheeting sealed with tape or with polyurethane foam as appropriate.
- .7 Seal joints and holes in HVAC ductwork through an asbestos work area, using tape and rip-proof polyethylene to make airtight.
- .8 Establish negative pressure in asbestos work area. 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.
- .9 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 accepted by the Abatement Consultant.

- .10 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.
- .11 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.
- .12 The system to be inspected and maintained by a competent person prior each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it to be replaced before the ventilation system is used.
- .13 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.
- .14 Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.
- .15 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. Ensure safe installation of electrical lines and equipment.
- .16 Provide temporary lighting in asbestos work area to levels that will permit work safely.
- .17 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.

3.2 DECONTAMINATION FOR ASBESTOS WORK AREAS

- .1 It is anticipated that a separate decontamination chamber shall not be required given work will proceed at a elevated location.
- .2 It is expected that all work will be conducted with a single containment and will proceed until completion (i.e. workers will not need to exit the containment until final cleaning completed).
- .3 **Staging Area:** The area within the Type 2 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.
- .4 As a separate clean room is not required by the Abatement 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.

3.3 MAINTENANCE OF ENCLOSURES

- .1 Maintain enclosures and work areas in tidy condition. Thoroughly clean decontamination facilities at the end of each work shift.
- .2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.
- .3 Visually inspect enclosures and work areas at beginning and end of each working period.
- .4 The negative air system to be inspected and maintained by a competent person prior each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it to be replaced before the ventilation system is used.
- .5 Use smoke methods to test the effectiveness of the isolation barriers when directed by the Abatement Consultantsbestos-contaminated waste unless such materials can be properly decontaminated and are specified to be re-used.

4.0 Execution

4.1 DO NOT COMMENCE ASBESTOS REMOVAL WORK UNTIL

- .1 Arrangements have been made for disposal of waste.
- .2 Asbestos work areas and decontamination enclosures are effectively segregated.
- .3 Negative pressure equipment is operating continuously (where required).
- .4 Tools, equipment and waste materials receptors are on hand.
- .5 Arrangements have been made with Contract Administrator for work area security.
- .6 Signs are displayed in areas where access to sealed asbestos work area is possible. Signs shall be in both official; languages and 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).

.7 The Contract Administrator has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

4.2 CONTAMINATED SITE PREPARATION

- .1 Before performing any contaminated work, prepare site as previously described.
- .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 Seal holes or penetrations to provide airtight enclosure around asbestos work area(s).
- .4 Protect electrical, communication, life safety and control systems to remain in place in asbestos work area with polyethylene and tape.

4.3 ASBESTOS-CONTAINING MATERIAL REMOVAL OR HANDLING

- .1 All individuals involved with any portions of the removal or handling process shall be equipped with appropriate respirators and protective equipment while working within the enclosure.
- .2 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 Spray asbestos-containing materials with amended water using airless spray equipment.

Dampen asbestos to prevent release of airborne fibres during removal or handling.

- .4 Where required, 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.
- .5 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.
- .6 Seal filled containers, clean external surfaces thoroughly, and remove from working area to staging area.
- .7 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.
- .8 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. Wash water shall be treated as asbestos-contaminated waste.
 - .2 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.
- .9 Apply accepted encapsulate to all exposed edges of the ACM, including around ceiling hangers and screw holes.
- .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.
- .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.

5.0 Decommissioning

5.1 DISMANTLING OF PROTECTION

- .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 Abatement Consultant.
- .2 A final review may be carried out by the Contract Administrator and/or the Abatement Consultant to ensure that no dust or debris remains and that the required work has been completed. Air monitoring may be considered as part of the final review at the discretion of the Contract Administrator and Abatement Consultant.
- .3 On written direction of the Abatement Consultant, the Contractor may proceed with final dismantling of enclosures affected by asbestos abatement as follows.
- .4 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.

- .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.
- .6 Remove hoardings, temporary lighting, equipment and facilities provided for asbestos work which are not to be used by other trades.
- .7 Complete final general cleaning of worksite and ensure no dust and debris remain.

6.0 Waste Transport and Disposal

6.1 GENERAL REQUIREMENTS AND PROCEDURES

- .1 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Provincial and Municipal regulations.
- .2 Check with local landfill operator or waste disposal site to determine type of waste containers acceptable.
- .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.
- .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.
- .5 All waste containing designated substances removed as part of this specification must be removed from the work area at the end of each work shift.
- .6 Each load requires completion of bill of loading showing type and weight of hazardous waste being transported. Provide proof (copies of all waste manifests or other required documentation) of proper disposal to the Contract Administrator on a weekly basis (at a minimum) and on completion of the project.
- .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 Contract Administrator.
- .8 Ensure landfill or waste facility operator is fully aware of substances being disposed of.
- .9 Ensure that containers used for disposal are locked and covered at all times.

7.0 Inspection and Air Monitoring

7.1 INSPECTION

- .1 From commencement of work until completion of clean-up operations, the Abatement Consultant is empowered 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).
- .2 The Abatement Consultant is empoered 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.
- .3 The Abatement Contractor is to allow inspection by the Abatement 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 City.
- .4 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 City.

- .5 The Abatement Contractor is to pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.
- .6 The Abatement Contractor is to provide a minimum of 24 hours written notice to the Abatement Consultant of any request for scheduling milestone inspections or transportation of waste through an occupied area.
- .7 Do not proceed with next phase of work until written acceptance of each inspection is received from the Abatement Consultant.

7.2 AIR MONITORING

- .1 Air sampling may be performed 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 Contract Administrator, the Contractor for the Project and the Abatement Subcontractor.
- .2 All air samples must be collected in accordance with NIOSH Analytical Method 7400.
- .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 The City.
- .4 If air sampling by Abatement 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 The air clearance concentration shall not exceed the designated action level of 0.05 fibres/mL.

END OF SECTION