PART 1 GENERAL

1.1 General and Related Work

.1 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the removal and disposal or decontamination of all ACM included in work of this section and all materials which have been contaminated by ACM either during or prior to work of this section.

1.2 Site Conditions

.1 Plaster, containing actinolite/tremolite asbestos in the finish/base coat, is present on the ceilings, walls and as overspray on the steel decking above throughout the abatement area.

.2 Parging cement, containing chrysotile asbestos, is present on pipe fittings throughout the abatement area.

.3 Aircell insulation, containing chrysotile asbestos, is present on straight sections of piping throughout the abatement area.

.4 Black tar mastic containing chrysotile asbestos is present on ducting and piping throughout the abatement area.

1.3 Outline of Work

.1 Refer to drawing No.1 for the extent of the Asbestos Work Area.

.2 Install Hoarding Walls between Asbestos Work Area boundaries as shown on drawing No.1

.3 Install upper perimeter seals between Asbestos Work Area boundaries as shown on drawing No. 1.

.4 Using Type 3 procedures of this section, remove the following:

.1 Asbestos-containing plaster ceilings and over spray from the steel decking.

.2 Asbestos-containing plaster walls behind drywall walls and behind wall radiators. Radiator covers are to be removed on both ends of the radiators, cleaned and stored for reuse.

.3 Asbestos-containing pipe insulation.

.4 Asbestos-containing black tar mastic.

.5 All carpeting and miscellaneous content to be removed and disposed of as asbestos waste.

.5 Without disturbing asbestos-containing materials, remove and dispose of the following materials as clean waste prior to asbestos removal work:

.1 All non-asbestos acoustic ceiling tiles and ceiling tile grids.

.2 All non-asbestos interior drywall and drywall joint compound walls scheduled for removal.

.6 The following items are to remain and be protected throughout the scheduled abatement:

.1 All speakers which are part of the fire alarm system.

.2 Existing newer walls are to remain in place (refer to attached drawing).

.3 New q-decking with new spray applied fireproofing.

1.4 Definitions

.1 Asbestos: Any of the fibrous silicates, including actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.

.2 Asbestos Abatement Consultant: The City of Winnipeg's Representative providing inspection and air monitoring.

.3 Asbestos Abatement Contractor: Contractor or sub-contractor performing work of this section.

.4 Asbestos-Containing Material(s) (ACM): Material(s) identified under Site Conditions including debris, fallen material and settled dust.

.5 Asbestos Work Area: Area where work takes place which will, or may, disturb ACM.

.6 Authorized Visitors: Prime Contractor, City of Winnipeg or Representatives, Asbestos Abatement Consultant, and persons representing regulatory agencies.

.7 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with Regulation 217/2006 and the Health and Safety Act, and has knowledge of the potential or actual danger to health and safety in the work.

.8 DOP Testing (or HEPA Integrity Test): Testing performed on HEPA Filtered Negative Pressure Machines and HEPA vacuums using DOP or equivalent. Testing shall ensure that total penetration from the unit does not exceed 0.03%, or 99.97% efficient of airborne particulate removal. DOP Testing must be in compliance with ASME N510-1989 (1995) and must be performed using a Temporary Mixing Chamber with installed baffles to allow uniform mixing of challenge aerosol.

.9 Fitting: Section of pipe other than straight uninterrupted sections including elbows, valves, tees, hangers, nipples, union or ends.

.10 Friable Material: means a material when dry can be crumbled, pulverized or powdered by hand pressure or is crumbled, pulverized or powdered.

.11 HEPA Filter: High Efficiency Particulate Arresting filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.

.12 PCM: Phase Contrast Microscopy.

.13 Polyethylene: Either polyethylene sheeting or rip-proof polyethylene sheeting (as specified) with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from damage, and to prevent escape of asbestos fibres through sheeting into Occupied Areas.

.14 Personnel: All contractors' employees, sub-contractors employees, supervisors.

.15 Occupied Area: Any area of the building outside the Asbestos Work Area.

.16 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to the City of Winnipeg).

1.5 Regulations

.1 Comply with Federal, provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed.

1.6 Supervision

.1 Provide on site, a supervisor, with authority to oversee all aspects of the work, including but not limited to, health and safety, methods, scheduling, labour and equipment requirements.

.2 The supervisor must be on site at all times during work at risk of disturbing ACM. Failure to comply with this requirement may result in a stoppage of work, at no cost to the City of Winnipeg.

.3 Provide a minimum of one supervisor for every 10 workers.

.4 Replace supervisory personnel, with approved replacements, within 3 working days of a written request from the Asbestos Abatement Consultant. Asbestos Abatement Consultant reserves the right to request replacement of supervisory personnel without explanation.

.5 Do not replace supervisory personnel without written approval from the Asbestos Abatement Consultant.

1.7 Quality Assurance

.1 Ensure the removal and handling of ACM or asbestos contaminated materials is performed by persons experienced in the methods, procedures and industry practices of asbestos abatement.

.2 Complete work so that at no time airborne asbestos, visible solid residue, or water runoff contaminates areas outside Asbestos Work Area. Asbestos Abatement Consultant is empowered to order a shutdown of work when a leak has occurred or is likely to occur. Cost of additional work by Asbestos Abatement Contractor and/or Asbestos Abatement Consultant to rectify unsatisfactory conditions shall be charged to the Asbestos Abatement Contractor.

.3 Perform all work involving other trades such as electrical, mechanical, carpentry, glazing etc. using licensed persons experienced and qualified for the work required.

.4 The Asbestos Abatement Consultant will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs required for the Work in accordance with the applicable construction safety legislation, other regulations or general construction practice. The Asbestos Abatement Consultant will not be responsible for or have control or charge over the acts or omissions of the Asbestos Abatement Contractor, his Subcontractors or their agents, employees or other persons performing any of the Work.

1.8 Notification

.1 Notify Sanitary Landfill site as per local requirements.

.2 Inform all sub trades of the presence of ACM identified in the contract documents.

.3 Notify the City of Winnipeg or City of Winnipeg's Representative and Manitoba Workplace Safety and Health five days prior to starting abatement. If friable materials not identified in the contract documents are discovered during the course of the work. Stop work in these areas immediately.

1.9 Personal Protection

.1 Protect all personnel at all times when possibility of disturbance of ACM exists.

.2 Provide the following respiratory protection to all personnel:

.1 Full Face Powered Air Purifying Respirators with P100 high efficiency (HEPA) cartridge filters during projects when performing wet abatement of non-surfacing asbestos-containing material specified in this section.

.2 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters for dismantling of Type 3 enclosures, using Type 2 Procedures.

.3 Respirators shall be:

.1 Certified by the National Institute of Occupational Safety and Health (NIOSH).

.2 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter an Asbestos Work Area has facial hair which affects the seal between respirator and face.

.3 Assigned to a worker for their exclusive use.

.4 Maintained in accordance with manufacturer's specifications.

.5 Cleaned, disinfected and inspected by a competent person after use on each shift, or more often if required.

.6 Repaired or have damaged or deteriorated parts replaced.

.7 Stored in a clean and sanitary location.

.8 Provided with new filters as necessary, according to manufacturer's instructions.

.1 Replace cartridge filters for negative pressure respirator every 16 hours of wear unless tested on site.

.2 Replace PAPR cartridge filters every 8 hours of wear unless tested on site.

.3 Mark filters for rotation and regular replacement.

.9 Worn by personnel who have been fit checked by qualitative or quantitative fit-testing. Instruction must be provided by a competent person as defined by the Occupational Health and Safety Act.

.4 Provide protective clothing, to all personnel which:

.1 Is made of a material that does not readily retain nor permit penetration of asbestos fibres.

.2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.

.3 Is replaced or repaired if torn or ripped.

.4 Is disposed of as ACM.

.5 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

.6 Provide site specific instruction to workers before allowing entry to Asbestos Work Area. Instruction shall include training on entry and exit from Asbestos Work Areas. Instruction must be provided by a competent person as defined by the Occupational Health and Safety Act.

.7 Provide soap, shampoo and towels for use by all personnel when leaving the Asbestos Work Area.

.8 Prohibit smoking, eating, drinking, chewing in the Asbestos Work Area and Decontamination Facilities.

1.10 Asbestos Abatement Work Area Entry Procedures

.1 Use the following procedure to enter contaminated Asbestos Work Area:

.1 Remove street clothes in Clean Change Room.

.2 Put on respirator with new or tested filters, and protective clothing in Clean Change Room or clean side of Shower Room.

.3 Store all street clothes, uncontaminated footwear, towels, etc. in the Clean Change Room.

1.11 Asbestos Abatement Work Area Exit Procedures

.1 Use the following procedure to exit contaminated Asbestos Work Area:

.1 Remove gross contamination from protective clothing using HEPA vacuum or by wet wiping.

.2 Proceed to Equipment and Access Room and remove all contaminated clothing and equipment except respirator.

.3 Store contaminated footwear, hard hats, etc. in Equipment and Access Room.

.4 Proceed naked to shower while still wearing respirator.

.5 Shower, cleaning outside of respirator with soap and water. Thoroughly wet body, head and hair, remove respirator and wash body, head and hair. Wet clean inside of respirator face piece.

.6 Remove filters for testing or dispose of in container provided for this purpose. Remove after leaving the Shower but prior to entering the Clean Change Room.

.7 Proceed to the Clean Change Room, dry off and dress in street clothing.

.8 Maintain and disinfect respirator.

1.12 Authorized Visitor Protection

.1 Provide clean protective clothing and equipment, and approved respirators to Authorized Visitors.

.2 Ensure Authorized Visitors have received required training prior to granting entry into Asbestos Work Area.

1.13 Air Monitoring

.1 Air monitoring will be performed following the National Institute for Occupational Safety and Health method 7400, Asbestos and other fibres by PCM (Phase Contrast Microscopy).

.2 Co-operate with the Asbestos Abatement Consultant in collection of air samples, including providing workers to wear sampling pumps for up to full-shift periods. Asbestos Abatement Contractor to exercise care with Asbestos Abatement Consultant's equipment. The City of Winnipeg reserves the right to back-charge the Asbestos Abatement Contractor for further collection of samples damaged by tampering or abuse. In addition, the Asbestos Abatement Contractor will be responsible for the cost of testing equipment repairs resulting from the actions of the Asbestos Abatement Contractor's forces.

.3 Results of air monitoring of 0.05 fibres per millilitre of air (fibre/mL) or greater, outside of Asbestos Work Area, will indicate asbestos contamination of these areas and result in the following actions:

.1 Suspend Work within the adjoining Asbestos Work Area until written authorization to resume Work has been received from the Asbestos Abatement Consultant.

.2 Isolate and clean area in the same manner applicable to the Asbestos Work Area.

.3 Maintain Work area isolation, and repeat clean-up operations until visual inspection and air monitoring results are at a level equal to that specified.

.4 Install additional negative air units at locations specified in response to elevated fibre levels being detected in the Clean Change Room or Occupied Areas at the discretion of the Asbestos Abatement Consultant.

.4 Perform the following where results of air monitoring within the Asbestos Work Area show airborne fibre levels have exceeded the respirator protection factor:

.1 Immediately stop Work within the Asbestos Work Area.

.2 Instruct workers to exit the Asbestos Work Area via the Worker Decontamination Facility while observing specified personal decontamination procedures.

.3 Contractor's forces shall not re-enter the Asbestos Work Area until authorized by the Asbestos Abatement Consultant.

.4 Upon re-entry to the Asbestos Work Area, mist any fallen debris or exposed surfaces with amended water using an airless sprayer.

.5 If PCM monitoring shows repeated failure, change respiratory protection to suitable alternative and change unsatisfactory methods used.

.5 PCM samples will be collected from within the Asbestos Work Area, after the site has passed a visual inspection and an acceptable coat of post removal sealant has been applied. These airborne fibre levels must not exceed 0.01 fibre/mL, after forced air monitoring and PCM analysis (Air Monitoring Clearance Inspection). If these results show fibre levels in excess of 0.01 fibre/mL:

.1 Maintain Asbestos Work Area isolation.

.2 Re-clean entire Asbestos Work Area.

.3 Apply another acceptable coat of post removal sealant to exposed surfaces throughout the Work area.

.4 Repeat above measures until visually inspected and air monitoring results are at a level equal to that specified.

.5 Alternate to items 2-4 above, the Asbestos Abatement Contractor can pay for analysis of samples by Transmission Electron Microscopy (TEM). Laboratory performing TEM analysis is to be NVLAP accredited.

.6 Cost of additional inspection and sampling performed as a result of elevated fibre levels may be charged to the Asbestos Abatement Contractor at the City of Winnipeg's discretion.

1.14 Inspection

.1 From commencement of work until completion of clean-up operations, the Asbestos Abatement Consultant will be present periodically on site both inside and outside the Asbestos Work Area.

.2 The following Milestone Inspections will take place, at the City of Winnipeg's cost:

.1 Milestone Inspection A - Clean Site Preparation

.1 Inspection of preparations and set-up prior to contaminated work in the Asbestos Work Area.

.2 Milestone Inspection B – Contaminated Perimeter Preparation

.1 Inspection of upper perimeter seals prior to full abatement.

.3 Milestone Inspection C - Visual Clearance

.1 Inspection of Asbestos Work Area after removal of all asbestos, but prior to application of lock-down agent.

.4 Milestone Inspection D - Air Monitoring Clearance

.1 Inspection and air monitoring after the application of lock-down agent, but prior to removal of Polyethylene from within the Asbestos Work Area.

.3 Do not proceed with next phase of Work until written approval of each milestone is received from the Asbestos Abatement Consultant.

.4 In addition to the Milestone Inspections, inspection of the Asbestos Work Area may be performed to confirm the Asbestos Abatement Contractor's compliance with the requirements of the contract documents and governing authorities. Any deviations from these requirements that have not been approved in writing may result in a stoppage of work, at no additional cost to the City of Winnipeg.

.5 The Asbestos Abatement Consultant is empowered by the City of Winnipeg to inspect for final cleanliness at completion. Additional labour or materials expended by the Asbestos Abatement Contractor to provide satisfactory performance to the level specified shall be at no additional cost.

.6 Inspection and air monitoring performed as a result of Asbestos Abatement Contractor's failure to perform satisfactorily regarding quality, safety, or schedule may be charged to the Asbestos Abatement Contractor at the City of Winnipeg's discretion.

1.15 Differential Pressure Monitoring

.1 Install differential pressure monitor at a location chosen by the Asbestos Abatement Consultant.

.2 Replace damaged or non-functional equipment at the request of the Asbestos Abatement Consultant.

.3 Co-operate with the Asbestos Abatement Consultant in collection of pressure monitoring data.

.4 Maintain specified differential pressure at monitoring location. Negative air pressure is to be -0.02 inches of water, relative to the area outside the enclosed area

.5 Record data at start and end of shift and maintain records on file.

.6 Stop contaminated work and take corrective action if pressure differential drops below the specified level. Notify Asbestos Abatement Consultant immediately.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

.1 All materials and equipment brought to work site must be in good condition and free of asbestos, asbestos debris, and fibrous materials.

.2 Airless Sprayer: AC powered pressure washer that allows wetting agent to mix with water, uses no air or compressed air, and has a nozzle to regulate power and pressure.

.3 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of ACM.

.4 Asbestos Waste Container: An impermeable container acceptable to disposal site comprised of one of the following:

.1 A 6 mil (0.15 mm) labelled yellow sealed polyethylene bag, inside a clear 6 mil (0.15 mm) sealed polyethylene bag.

.2 A 6 mil (0.15 mm) sealed polyethylene bag, positioned inside or outside a rigid sealed container of sufficient strength to prevent perforation of the container during filling, transportation and disposal.

.5 Differential Pressure Monitor: a high precision instrument for measuring and controlling pressure differences in the low range, between the Asbestos Work Area and occupied area. Acceptable Product: Magnehelic gauge (Cat. No. 2000-00) manufactured by Dwyer Instruments Inc. or equivalent. Calibrate regularly to manufacturer's instructions.

.6 Discharge Ducting: Polyethylene Tubing. Reinforced with wire. Diameter equal to negative pressure machine discharge. Not to be longer than required, or so long that negative pressure is compromised.

.7 Ground Fault Panel: Electrical panel as follows:

.1 Ground fault circuit interrupters of sufficient capacity to power temporary electrical equipment and lights in Asbestos Work Area.

.2 Interrupters to have a 5 mA ground fault protection.

.3 Necessary accessories including main switch disconnect, ground fault interrupter lights, test switch to ensure unit is working, and reset switch.

.4 Openings sealed to prevent moisture or dust penetration.

.5 Inspected by the Electrical Safety Authority.

.6 Panel uses CSA approved parts and been constructed, inspected and installed by a licensed electrician.

.8 HEPA Filtered Negative Pressure Machine: Portable air handling system which extracts air directly from the Asbestos Work Area and discharges the air to the exterior of the building. Equipped as follows:

.1 Prefilter and HEPA filter. Air must pass HEPA filter before discharge.

.2 Pressure differential gauge to monitor filter loading.

.3 Auto shut off and warning system for HEPA filter failure.

.4 Separate hold down clamps to retain HEPA filter in place during change of prefilter.

.9 HEPA Vacuum: High Efficiency Particulate Arresting (HEPA) filtered vacuum equipment with a filter system capable of collecting and retaining spherical particles greater than 0.3 microns at 99.97% efficiency.

.10 Hose: Leak-proof, minimum busting strength of 200 PSI or greater if required, abrasion resistant covering, reinforcing, and machined-brass couplings. Maintained and tested. Hose to be temperature resistant if it is to carry domestic hot water.

.11 OSB: Oriented Strand Board.

.12 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified in sheet size to minimize joints. New materials only.

.13 Post Removal Sealant (or Lockdown): Sealant that when applied to surfaces serves the function of trapping residual asbestos fibres or other dust. Product must have flame spread and smoke development ratings both less than 50. Product shall leave no stain when dry. Post Removal Sealant shall be compatible with replacement insulation or fireproofing where required and capable of withstanding service temperature of substrate. Apply to manufacturer's instructions.

.14 Protective Clothing: Disposable full body coveralls complete with hoods manufactured of a material which does not permit penetration of asbestos fibres. Coveralls to fit snugly at ankles, wrists and neck. Acceptable materials: Dupont Tyvek or Kimberly Clark Kleenguard.

.15 Rip-Proof Polyethylene Sheeting: Minimum requirements 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and 2 layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps. New materials only.

.16 Shower Hose: Water lines for supply of hot & cold water to shower facilities to be rated for use at 200 PSI (1380 kPa) or twice the working pressure whichever is greater. Supply lines to be continuous and free of fittings, joints or couplings.

.17 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.

.18 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.

.19 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

2.2 Hoarding Walls

.1 Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of rip-proof polyethylene sheeting on each side of wall.

2.3 Decontamination Facilities

.1 Workers' Decontamination Facility: A decontamination facility comprised of three linked rooms, Contaminated Change Room, a Shower Room, and a Clean Change Room.

.1 Rooms, Occupied Areas and Asbestos Work Areas, shall be separated by curtained doorways at each door.

.2 Contaminated Change Room: Room between Shower Room and Asbestos Work Area.

.1 Locate on contaminated side of Shower Room.

.2 Install asbestos waste container for asbestos contaminated protective clothing.

.3 Install storage facilities for any personal protective equipment to be reused in Asbestos Work Area including boots, hard hats, etc., but excluding respirators.

.4 Install hooks and shelves as required for personal protective equipment.

.5 Minimum size of generally 2 m x 2 m. Increase size accordingly to accommodate number of workers.

.3 Shower Room: Room between Clean Change Room and Contaminated Change Room.

.1 Install one walk through shower unit for every six workers.

.2 Install constant supply of hot and cold water, controllable at each shower. Water supply must be sufficient to provide water at a minimum temperature of 40 degrees Celsius (maximum 50 degrees) in a volume required for all workers to properly decontaminate.

.1 Install individual hot and cold shut-off valves on water supply located on clean side of Shower Room. Connect shower to these valves.

.2 Install individual controls inside the shower to regulate water flow and temperature.

.3 Install rigid piping or Shower Hose with watertight connections for supply and drains.

.4 Install a sealed drip pan under and around the showers, 150 mm deep.

.5 Install sump pumps, sufficient for volume of waste shower water from showers and drip pan. Direct waste shower water to sanitary drains.

.6 Install ground fault protected power switch on clean side of shower for sump pumps, or timed for shut off.

.7 Provide adequate quantity of soap, shampoo, clean towels

.8 Install an Asbestos Waste Container for disposal of used respirator filters, on the contaminated side of the Shower Room.

.4 Clean Change Room: A room between the Shower Room and Occupied Areas.

.1 Install hooks and shelves on clean side of shower in clean Change Room for storage of respirators.

.2 Install lockers or hangers for workers' street clothes and personal belongings.

.3 Install hose bib on domestic cold water pipe for connection on clean side of Asbestos Work Area.

.4 Install electric hot water heater/tank for showers in decontamination facility.

.5 Provide ground fault protected power supply to hot water tanks, sump pump, battery chargers.

.6 Install a fire extinguisher, mount to wall.

.7 Minimum size of generally 2 m x 2 m. Increase size accordingly to accommodate number of workers.

.5 Waste and Equipment Decontamination Facility: Waste and Equipment Decontamination Facility comprised of three linked rooms: a Container Cleaning Room, a Holding Room and a Transfer Room.

.1 Purpose of Waste and Equipment Decontamination Facility is to provide a means to decontaminate asbestos waste containers, scaffolding, vacuums, and other tools and equipment and materials required in the Asbestos Work Area.

.2 Rooms, Occupied Areas and Asbestos Work Areas, shall be separated by curtained doorways at each door.

.6 Container Cleaning Room: Room between Asbestos Work Area and Holding Room of sufficient size to allow proper washing of equipment and waste containers or double bagging of asbestos waste. All wash water shall be treated as asbestos contaminated waste.

.7 Holding Room: Room between Container Cleaning Room and Transfer Room, of sufficient size to accommodate at least two asbestos waste containers and two workers double bagging waste, or for largest item of equipment used.

.8 Transfer Room: Room between Holding Room and Occupied Area, acting as an air lock for the transfer of waste.

.9 Construction of Decontamination Facilities

.1 Install floor protection as follows:

.1 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting beneath entire decontamination facility.

.2 Turn 600 mm of polyethylene up the sides of the decontamination facility and overlap with the polyethylene sheeting covering the walls.

.2 Install walls as follows:

.1 Around all rooms, between all rooms, at entrance to Asbestos Work Area and at entrance to Occupied Area.

.2 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.

.3 Install one layer rip-proof polyethylene sheeting on walls of Decontamination Facility.

.3 Install roof as follows:

.1 Install joists. Size of joists is to be determined by clear span. For clear spans up to 2850 mm use SPF Select 38 x 140 mm wood joist at 400 mm o/c with continuous 38 x 140 mm wood headers, and install strapping beneath joists.

.2 At the Contaminated Change Room and where roof is exposed to the Asbestos Work Area, install 19 mm plywood or OSB over joists. Caulk and tape joints and install one layer rip-proof polyethylene sheeting over 2 layers of 6 mil polyethylene sheeting.

.3 Where roof is not exposed to the Asbestos Work Area, install one layer rip-proof polyethylene sheeting over joists.

.4 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.

.5 Minimum interior clear height 2 m to underside of joist.

.10 Curtained Doorways

.1 Construct as follows:

.1 Install two flap doors, full width and height of door opening at all doors between chambers, facilities and Asbestos Work Area.

.2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.

.3 Install weights attached to bottom edge of each door flap.

.4 Provide direction arrows on flaps to indicate opening.

2.4 Signage

.1 Work Area Signs: Post signs in both official languages at access points to the Asbestos Work Area and on hoarding walls as follows:

.1 CAUTION.

.2 Asbestos Dust Hazard Area.

.3 Unauthorized Entry Prohibited.

.4 Wear Assigned Protective Equipment.

.5 Breathing Asbestos Dust May Cause Serious Bodily Harm.

.2 Vehicles, Bins and Asbestos Waste Containers: Post signs on both sides of every vehicle used for the transportation of asbestos waste and on every asbestos waste container. Signs must display thereon in large, easily legible letters that contrast in colour with the background the word “CAUTION” in letters not less than ten centimetres in height and the words:

.1 CONTAINS ASBESTOS FIBRES

.2 Avoid Creating Dust and Spillage

.3 Asbestos May be Harmful to Your Health

.4 Wear Approved Protective Equipment.

.3 Place placards in accordance with Transportation of Dangerous Goods Act.

PART 3 EXECUTION

3.1 Clean Site Preparation

.1 Remove stored or non-fixed items from the Asbestos Work Area, including but not limited to equipment, furniture, waste etc. Store in area provided by the City of Winnipeg.

.2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.

.3 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping using Type 2 Procedures.

.4 Maintain emergency and fire exits from Asbestos Work Area, or establish alternative exits satisfactory to Provincial Fire Marshall and local authorities having jurisdiction. Maintain extra routes from occupied areas. Place emergency exit signs at locations to clearly mark exit route. Seal emergency exit doors so as not to impede use of door during emergency evacuation.

.5 Remove items specified to be reused or turned over to the City of Winnipeg.

.6 Install Hoarding Walls between Asbestos Work Area and Occupied Area.

.7 Install Worker Decontamination facility.

.1 Worker Decontamination Facility to be located within the Asbestos Work Area.

.8 Install Waste Decontamination facility.

.1 Waste Decontamination Facility to be located within the Asbestos Work Area.

.9 Install signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

.10 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Asbestos Work Area that may be damaged. Items to remain include but are not limited to:

.1 Millwork.

.2 Doors.

.3 Electrical Equipment.

.4 Mechanical Equipment.

.5 Protect pneumatic control lines located in Asbestos Work Area. Notify Asbestos Abatement Consultant if lines are or become damaged.

.11 Seal openings in floor using tape, caulking, polyethylene, etc. Openings in floor are to be sealed independently prior to installation of polyethylene sheeting on floor. Include floors of duct and service shafts.

.1 Large openings in floor to be covered. Construction to comply with loading requirements of regional Building Code and secured in place. Surround with guard rails as per the Occupational Health and Safety Act. Install one layer of rip proof polyethylene over two layers of 6 mil polyethylene over cover. Mark as opening to below. No personnel are to walk or stand on covered opening unless constructed to support live and dead load.

.12 Seal openings in walls using polyethylene, tape, caulking, etc. including but not limited to windows, doors, vents, diffusers, etc.

.13 Seal openings in ceilings or slabs, using polyethylene, tape, caulking, etc. including diffusers, grills, etc.

.14 Establish negative pressure in Asbestos Work Areas as follows:

.1 Install HEPA Filtered Negative Pressure Machines sufficient to maintain pressure differential of -0.02 inches of water between contaminated Asbestos Work Area and Occupied Areas.

.2 Arrange HEPA Filtered Negative Pressure Machines to maximize differential pressure in Asbestos Work Area.

.3 Install weighted flaps in perimeter Hoarding Walls as necessary to provide make-up air.

.4 Operate HEPA Filtered Negative Pressure Machines continuously from first disturbance of ACM until completion of dismantling.

.5 Replace prefilters frequently to maintain specified flow rate.

.6 Replace HEPA filters as required to maintain flow rate and integrity of unit.

.7 Discharge HEPA filtered negative pressure machines as follows:

.1 To building exterior.

.1 Remove existing glazing where necessary and replace with a 19 mm plywood panel.

.2 Install panel securely on the exterior side of the window frame and make weather-tight with caulking.

.3 For each negative pressure unit, provide a 300 mm diameter, duct opening through panel.

.4 Cover duct opening with chicken wire.

.5 Direct discharge ducting out the window and up to the rooftop of the link.

.6 Reinstall glazing to match existing upon completion of work.

.2 Into Occupied Areas. Direct so that it does not discharge at building occupants.

.3 Install and make airtight all negative air discharge ducting.

.4 Discharge ducting is not to be longer than required, and to be straight, so that the length of the ducting does not reduce the flow from negative pressure machines.

.8 DOP test all HEPA Filtered Negative Pressure Machines where they discharge into Occupied Areas.

.9 DOP test all HEPA Filtered Negative Pressure Machines.

.15 Provide a Ground Fault Panel in the Asbestos Work Area.

.1 Ground Fault Interrupter Panel to use CSA approved equipment and be inspected by the Electrical Safety Authority.

.2 Ensure safe installation by licensed electricians.

.3 Connect to building power at electrical panel outside Asbestos Work Area.

.4 Cable to be completely jacketed with no defects. Tag/mark cable as Live.

.5 All electrical equipment used during work shall be supplied power from a Ground Fault Panel.

.16 Install temporary lighting in all work areas at levels that will provide for a safe and efficient use of the work area.

.17 Isolate, at panel, and disconnect existing power supply to Asbestos Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.

.1 Lock-out/tag-out power at electrical panels.

.2 Mark/tag any items within or passing through the Asbestos Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.

.18 Install hose bib on domestic cold water pipe for connection of hoses for wetting.

.1 Install hoses with watertight connections and airless sprayers to wet asbestos-containing materials.

.19 Shut down HVAC systems serving the Asbestos Work Area.

.20 Seal openings in dormant rigid ductwork with rip-proof poly. Cap openings in live ducts with equal gauge metal and duct sealant.

.21 Clean and protect electrical systems in the Asbestos Work Area with polyethylene and tape. Include all communication, coaxial, triaxial, fire and public address systems, wiring, conduit, speakers, heat and smoke detectors, alarms, exit lights, junction boxes, etc.

.22 For HVAC systems to remain active within the Asbestos Work Area, perform the following:

.1 Remove insulation from exterior of duct.

.2 Clean outside and seal duct or equipment with one layer of rip-proof polyethylene sheeting over one layer of 6 mil polyethylene sheeting so as to make air tight.

.3 Seal HVAC systems while deactivated.

.4 Seal seams of cap and duct with duct sealant, tape and polyethylene sheeting. Smoke test seal after system is reactivated. Reseal and retest as required.

.5 Include in this preparation all active ductwork and equipment presently insulated with asbestos-containing products.

.6 Smoke test seals regularly and maintain.

.23 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting, on floor surfaces in Asbestos Work Area.

.1 Extend floor protection a minimum of 300 mm up all vertical surfaces in the Asbestos Work Area.

.24 On walls within and forming the perimeter of the Asbestos Work Area install one layer of rip-proof polyethylene sheeting.

.1 At junction of floor and wall surface overlap floor polyethylene with wall polyethylene by a minimum of 300 mm at each layer.

.25 Notify Asbestos Abatement Consultant at least 24 hours prior to the need for Milestone Inspection A (Clean Site Preparation). Obtain written approval for this Milestone Inspection before proceeding.

3.2 Contaminated Site Preparation

.1 Remove acoustic ceiling tiles.

.2 Cut and attached 2” x 4” wood studs with a foam gasket to the steel decking.

.3 Fill all open holes with fiberglass batting.

.4 Remove small sections of plaster ceiling to accommodate the upper perimeter seals.

.5 Attach upper perimeter seals to wood studs and into Asbestos work area and seal.

.6 Notify Asbestos Abatement Consultant at least 24 hours prior to the need for Milestone Inspection B (Contaminated Site Preparation). Obtain written approval for this Milestone Inspection before proceeding.

3.3 Maintenance of Contaminated Asbestos Work Area

.1 Inspect Asbestos Work Area at the beginning and end of each working period and once on each day work does not take place. Inspection must be performed by competent person.

.2 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.

.3 Perform Differential Pressure Monitoring on a frequent basis and record pressure at start and end of shift at a minimum.

.4 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.

.5 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Asbestos Work Area.

.6 Maintain Asbestos Work Area in tidy condition.

.7 Remove waste and debris frequently.

.8 Remove standing water on polyethylene/floor at the end of every shift.

.9 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Asbestos Work Area at end of shift.

.10 Turn off water supply to showers, at the end of every shift.

.11 Ensure shower pans are pumped out at the end of every use and shift.

3.4 Wet Removal

.1 Do not use compressed air to clean or remove dust or debris.

.2 Remove and dispose of remaining non-asbestos items before, during or after wet removal.

.3 ACM cannot be allowed to fall from one level to the next.

.4 Spray asbestos-containing materials with Amended Water using airless spray equipment.

.5 Remove pipe, duct and mechanical insulations specified to be removed and clean substrate. Maintain exposed surfaces of insulation or lagging in a wet condition.

.6 Remove obstructions as required to remove the ACM.

.1 Notify asbestos abatement consultant if item is not specified to be removed and inhibits removal of ACM.

.2 Do not demolish any existing walls etc. that form the perimeter of the Asbestos Work Area without prior written permission from Asbestos Abatement Consultant.

.7 All dislodged ACM shall be maintained in wet state until placed in asbestos waste containers for disposal.

.8 As work progresses, and at regular intervals, place waste in asbestos waste containers and remove from the Asbestos Work Area.

.9 After completion of gross asbestos removal work, perform the following:

.1 Wet clean surfaces from which ACM has been removed with stiff bristle brushes, vacuums, wet-sponges etc. to remove all visible residue and asbestos-containing materials.

.2 Wet clean surfaces which ACM has fallen on using stiff bristle brushes, vacuums, wet-sponges etc. to remove all visible residue and asbestos-containing materials

.3 Wet clean other surfaces in the Asbestos Work Area, including the decontamination facilities, scaffolding, equipment, polyethylene sheeting on floor and walls surfaces etc., ducts and similar items not covered with polyethylene sheeting.

.4 Remove wash water as contaminated waste.

.5 Remove waste.

.6 Level of cleanliness must be acceptable to Asbestos Abatement Consultant.

.7 Remove and dispose of the pre-filters from all negative air units as asbestos-contaminated waste.

.10 Notify Asbestos Abatement Consultant at least 24 hours prior to the need for Milestone Inspection C (Visual Clearance). Obtain written approval for this Milestone Inspection before proceeding.

3.5 Waste and Material Handling

.1 Waste bins must be placed on grade or in receiving.

.2 All bins must be covered and locked when waste transfer is not being performed.

.3 Ensure redundant non-ACM, rubble, debris, etc. which was not cleaned and which was removed during contaminated work are treated, packaged, transported and disposed of as asbestos waste.

.4 Fluorescent lamps contain mercury and are to be recycled. Do not dispose of fluorescent lamps.

.5 Clean, wash and apply Post Removal Sealant to metal waste prior to removal from Asbestos Work Area.

.1 Recycle metals or dispose of metals as clean waste.

.6 Clean, wash and apply Post Removal Sealant to non-porous materials prior to disposal as clean waste.

.1 Obtain prior written approval from the Asbestos Abatement Consultant for each individual type of material.

.7 Clean and wash equipment prior to removal from Asbestos Work Area if removed prior to completion.

.8 Place all equipment, tools and unused materials that cannot be cleaned in Asbestos Waste Containers.

.9 As work progresses, and at regular intervals, transport the sealed and labelled asbestos waste containers from the Asbestos Work Area to waste bin.

.10 Place items in bins according to waste classification. Place asbestos waste, metals, non-asbestos waste, etc. in separate bins.

.11 Removal of waste containers and decontaminated equipment and materials from the Asbestos Work Area shall be performed using the Waste and Equipment Decontamination Facility as follows:

.1 Prior to entering the Waste and Equipment Decontamination Facility Container Cleaning Room, the first worker (fully protected inside the Asbestos Work Area) shall remove any visible contamination from the surface of the item or waste container being removed from the Asbestos Work Area.

.2 The first worker then carries the item into the Container Cleaning Room and wet sponges the item prior to passing the item through the curtained doorway to a second worker in the Holding Room. (The second worker shall be fully protected with respirator and disposable clothing and may only leave the decontamination facility via the Asbestos Work Area.)

.3 The second worker in the Holding Room double bags or wraps and seals the item. Without entering the Transfer Room, the second worker passes the item through the curtained doorway into the Transfer Room.

.4 A third worker enters the Transfer Room from the clean area. (The third worker must never enter the Holding Room.) The third worker removes the item from the Transfer Room and transports it to the disposal bin.

.12 Dispose of plaster debris, lath, hangers and other asbestos-contaminated waste that could tear a 6 mil (0.15 mm) polyethylene bag in sealed rigid Asbestos Waste Container.

.13 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with the City of Winnipeg. Use a closed, covered cart to transport through Occupied Areas.

.14 Limit transportation of waste and materials through Occupied Areas of the building to Quiet Hours.

.15 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled ACM in the case of a rupture of an Asbestos Waste Container.

.16 Bin loading area and waste routes shall be kept clean at all times. Use Type 2 asbestos abatement procedures if appropriate or requested by the City of Winnipeg's Representative.

.17 Pick-up and drop off of garbage bin shall be at pre-approved times, and must not interfere with the City of Winnipeg’s operations.

3.6 Application of Post Removal Sealant

.1 Obtain Asbestos Abatement Consultant's written permission to proceed.

.2 Apply one coat of Post Removal Sealant with an airless sprayer, in accordance with Manufacturer’s Instructions, to cover all surfaces on all items in the Asbestos Work Area, including but not limited to polyethylene, ACM substrate, structural steel, and surfaces scheduled for demolition.

.1 Do not apply post removal sealant to materials that will be damaged by its application.

.3 Notify Asbestos Abatement Consultant at least 24 hours prior to the need for Milestone Inspection D (Air Monitoring Clearance). Obtain written approval of this Milestone Inspection before proceeding.

3.7 Air Clearance Monitoring

.1 Site must be dry prior to Air Clearance Monitoring.

.2 The number of Air Clearance Monitoring samples will be as follows:

.1 2 samples for less than 10 square metres.

.2 3 samples for 10 to 500 square metres.

.3 5 samples for more than 500 square metres.

.3 Prior to air clearance monitoring, install clean 20-inch fans for air circulation during Air Clearance Monitoring.

.1 At least one fan per 10,000 cubic feet of space in Asbestos Work Area.

.2 Install in centre of Asbestos Work Area and space evenly.

.3 The fan exhaust shall be directed upwards or toward the ceiling.

.4 The fans shall be operated on the lowest speed setting.

.4 Restrict access to Asbestos Work Area and operate negative air units for a 12 hour period prior to Milestone Inspection D.

.5 The HEPA filtered negative pressure machines shall be in operation during clearance air monitoring.

.6 In the presence of the Asbestos Abatement Consultant, immediately prior to air clearance monitoring, use a leaf blower to dislodge loose fibre.

.1 Direct leaf blower against walls, ceilings, floors, and other surfaces.

.2 Perform this for at least five minutes per 1,000 sq. ft. of Asbestos Work Area.

.7 PCM samples will be collected as per Air Monitoring Section.

3.8 Asbestos Work Area Dismantling

.1 Use Type 2 worker precautions during dismantling.

.2 Operate negative air units during dismantling.

.3 Polyethylene, tape, cleaning material, etc. to be treated as asbestos waste.

.4 Wash remaining equipment and tools used in contaminated Asbestos Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Asbestos Work Area.

.5 Clean Asbestos Work Area, Equipment and Access area, washing/Showering Room.

.6 Remove polyethylene sheeting as follows:

.1 Remove asbestos contaminated Polyethylene by carefully rolling away from walls to centre of Asbestos Work Area.

.2 Remove visible fibres or residue found during removal of polyethylene using a HEPA vacuum.

.3 Remove polyethylene protection and hoarding walls.

.7 Remove remaining polyethylene sheeting, tape and seals.

.8 Remove water hoses and shut off at source.

.9 Remove Signs, Hoarding Walls, Decontamination Facilities, Equipment Enclosures, Tunnels, Platforms.

.10 Seal vacuum hoses and fittings, flexible ductwork and all tools used in contaminated work site in 6 mil polyethylene bags prior to removal from Work Area.

.11 Remove temporary lights.

.12 Remove negative air unit prefilters. Dispose of as asbestos contaminated waste.

.13 Remove HEPA filtered negative pressure machines and discharge ducting.

.14 Immediately upon shutting down negative air units, seal air inlet grill and exhaust vent with polyethylene and tape.

3.9 Re-Establishment of Items

.1 Upon completion of work:

.1 Move items that were removed from Asbestos Work Area prior to work, back into same location within Asbestos Work Area.

.2 Remove and disconnect Ground fault Panel, tags and locks from electrical panels and re-energize equipment and items.

.3 Remove hose bibs installed and repair pipe.

.4 Remove negative air discharge panel and reinstall glazing to match existing.

.5 Reinstall ducts removed to perform cleaning of ducts or to access ACM.

.6 Clean, mop and vacuum Asbestos Work Area and area beneath any tunnels, platform and Decontamination Facilities.

.7 Enable building air handling systems.

End of Section 02 82 12

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