

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 01 35 29.06 - Health and Safety Requirements.
- .2 Section 01 74 21 - Construction / Demolition Waste Management and Disposal.

**1.2 REFERENCES**

- .1 Canadian Standards Association (CSA International).
  - .1 CSA S350-M1980(R2003). Code of Practice for Safety in Demolition of Structures.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to beginning of Work on site, submit detailed Waste Reduction Workplan in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
- .3 Submit pre-demolition audit and deconstruction / disassembly plan prior to starting work.
- .4 Before proceeding with demolition of load bearing walls or other walls and where required by authority having jurisdiction, submit for review by Departmental Representative shoring and underpinning drawings prepared by Qualified Professional Engineer registered or licensed in the Province of Ontario, showing proposed method.

**1.4 QUALITY ASSURANCE**

- .1 Ensure Work is performed in compliance with CSA S350 and applicable provincial regulations.
- .2 Prior to start of Work arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work.
- .3 Meetings:
  - .1 Hold project meetings every week.
  - .2 Ensure key personnel including site supervisor, project manager, subcontractor representatives and WMC attend.
  - .3 WMC must provide written report on status of waste diversion activity at each meeting.
- .4 Departmental Representative will provide written notification of change to meeting schedule established upon award 24 hours prior to scheduled meeting.

**DEMOLITION FOR MINOR WORKS****1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Prior to beginning any On-Site work, submit detailed Waste Reduction Workplan in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal. Indicate:
  - .1 Descriptions of and anticipated quantities in percentages of materials to be salvaged reused, recycled and landfilled.
  - .2 Schedule of selective demolition.
  - .3 Number and location of dumpsters.
  - .4 Anticipated frequency of tippage.
  - .5 Name and address of haulers, waste facilities and waste receiving organizations.
- .2 The Waste Management Co-ordinator is responsible for fulfilment of reporting requirements.
- .3 Submit pre-demolition audit and deconstruction / disassembly plan prior to starting work.
- .4 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
- .5 Divert excess materials from landfill to site approved by Departmental Representative.

**1.6 EXISTING CONDITIONS**

- .1 Review "Designated Substance Report" and take precautions to protect environment.
- .2 Should materials resembling spray or trowel applied asbestos, PCB's, Mould or other designated substance listed as hazardous be encountered in course of deconstruction, stop work, take preventative measures, and notify Departmental Representative immediately. Do not proceed until written instructions have been received. Refer to Section 01 35 29.06 - Health and Safety Requirements.
- .3 Structures to be demolished to be based on their condition at time of examination prior to tendering.
- .4 Remove, protect and store salvaged items as approved by Departmental Representative. Salvage items as identified by Departmental Representative. Deliver to Departmental Representative as approved.

**Part 2 Products****2.1 EQUIPMENT**

- .1 Demonstrate that tools are being used in manner which allows for salvage of materials in best condition possible.

**DEMOLITION FOR MINOR WORKS****Part 3 Execution****3.1 PREPARATION**

- .1 Do Work in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .2 Inspect building with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .3 Investigate site and structure to determine dismantling, processing and storage logistics required prior to beginning of Work.
- .4 Develop strategy for deconstruction to facilitate optimum salvage of reusable and recyclable materials.
- .5 Obtain necessary permits and approvals. Provide copies to Departmental Representative prior to start of Work on site and within 24 hours of written request.
- .6 Post signs in visible locations and appropriate languages which indicates to workers, subcontractors, haulers, the location of processing and stockpiling of each material, bin location and use e.g. ("CLEAN WOOD ONLY").
- .7 Locate and protect utilities inside and outside the building. Do not disrupt active or energized utilities traversing premises or designated to remain undisturbed. Notify and obtain approval of utility companies before starting demolition.
- .8 Locate and protect existing building services to remain.
- .9 Disconnect and re-route all electrical, telephone and communication service lines passing through area to be deconstructed. Post warning signs on electrical lines and equipment which must remain energized to serve other products during period of demolition.
- .10 Disconnect, cap, plug or divert, as required, existing utilities within the building where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.
  - .1 Natural gas supply lines: protect and /or relocate in accordance with utility company requirements or as approved by Departmental Representative.
- .11 Immediately notify Departmental Representative in case of damage to any utility or service, designated to remain in place.
- .12 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

**DEMOLITION FOR MINOR WORKS****3.2 PROTECTION**

- .1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, landscaping and adjacent grades and parts of building to remain. Provide bracing shoring and underpinning as required. Repair damage caused by deconstruction as approved by Departmental Representative.
- .2 Support affected structures and, if safety of structure being deconstructed or adjacent structures or services appears to be endangered, take preventative measures. Cease operations and immediately notify Departmental Representative.
- .3 Protect building systems, services and equipment.
- .4 Provide temporary construction dust screens, covers, railings, supports and other protection as required.
- .5 Prior to commencing deconstruction, cover all HVAC return airs and supply airs within the deconstruction zone with high quality micro filters and turn off air flows.
- .6 Prevent debris from blocking streets, and restricting normal access and egress from the building.

**3.3 AIRTIGHT DUST PARTITIONS**

- .1 Prior to undertaking any demolition work, provide airtight partitions to define the area of work to approval of Departmental Representative. Relocate dust enclosure to suit progress of the work and phasing. Do not damage or fasten to adjacent existing surfaces to remain.
- .2 Construct temporary airtight construction partitions as noted in Section 01 00 10 - General Instructions.
- .3 At completion of work on floor, vacuum clean and carefully remove temporary dust partitions. Reinstate all surfaces to approval of Departmental Representative.

**3.4 SALVAGE**

- .1 Salvage materials identified for re-use or handover to Departmental Representative. Remove and store materials to be salvaged, in manner to prevent damage.
  - .1 Store and protect in accordance with requirements for maximum preservation of material.
  - .2 Handle salvaged materials as new materials.
- .2 Remove, protect and store salvaged items as approved by Departmental Representative. Salvage items as identified by Departmental Representative. Deliver to location as approved by Departmental Representative.
- .3 Label and package component parts of mechanical and electrical material specified for salvage in accordance with Departmental Representative's instructions or as specified to prevent damage or loss.
- .4 Remove items to be reused, store as approved by Departmental Representative and re-install under appropriate section of specifications.

**DEMOLITION FOR MINOR WORKS****3.5 REMOVAL OF HAZARDOUS WASTES**

- .1 Refer to Section 01 14 25 - Designated Substance Report for materials identified as Hazardous.

**3.6 DISASSEMBLY**

- .1 Materials removed from designated structures are property of Contractor.
- .2 Throughout course of deconstruction pay close attention to connections and material assemblies. Employ workmanship procedures which minimize damage to materials and equipment.
- .3 Ensure workers and subcontractors are trained to carry out work in accordance with appropriate deconstruction techniques.
- .4 Project supervisor with previous deconstruction experience must be present on site throughout project.
- .5 Deconstruct in accordance with CSA S350 and other applicable safety standards.
- .6 Workers must utilize adequate fall protection including certified harness and belay systems as required by applicable Health & Safety regulations.

**3.7 DEMOLITION**

- .1 Refer to Section 01 00 10 - General Instruction, Scheduling, for day and time of day restrictions on noise producing work. Demolition noise is not permitted to impact occupants in adjacent buildings.
- .2 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
- .3 At end of each work shift, leave Work in safe and stable condition. Protect interiors of parts not to be demolished from exterior elements at all times.
- .4 Demolish to minimize dusting. Keep materials wetted as approved by Departmental Representative.
- .5 Contain fibrous materials (e.g. Insulation) to minimize release of airborne fibres while being transported within facility.
- .6 Coordinate removal of existing carpet for disposal through carpet reclamation program.
- .7 Use natural lighting to do Work where possible. Shut off lighting except those required for security purposes at end of each day.
- .8 Systematically remove finishes, furnishings, and mechanical and electrical equipment as indicated and as approved by Departmental Representative.
- .9 Carefully remove interior windows and doors from structure.

**DEMOLITION FOR MINOR WORKS**

- .10 Disassemble non-loadbearing interior partitions and remove materials from structure.
- .11 Separate from waste stream, material designated for alternate disposal or in condition suitable for reuse and/or recycling.
- .12 Source separate for recycling materials that cannot be salvaged for reuse including wood, metal, concrete and asphalt.

**3.8 FLOOR SURFACE PREPARATION**

- .1 Prepare all floor surfaces as follows:
  - .1 Completely remove, down to bare concrete: all existing coatings, laitance, paints, oils, grease, dirt, stains and any unsound concrete from existing concrete floors using a combination of commercial degreasers, alkaline wash, water blasting, hand grinding, shot blasting or wet sand blasting as required to suit site conditions.
  - .2 Remove all remaining residue, dust, dirt, and other debris by vacuuming, wiping with dry, clean cloths.
  - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

**3.9 PROCESSING**

- .1 Refer also to Section 01 74 21 - Construction / Demolition Waste Management and Disposal for other processing requirements.
- .2 Designate location for processing of materials which eliminates double handling and provides adequate space to maintain efficient material flow.
- .3 Separate, materials to ensure best possible condition of salvaged materials.
- .4 Keep processing area clean and free of excess debris.
- .5 Supply separate, marked disposal bins for categories of waste material. Do not remove bins from site until inspected and approved by Departmental Representative. Notify Departmental Representative prior to removal of bins from site.
- .6 Separate processed materials into organized piles for stockpiling. Provide collection area for materials processed or designated for alternate disposal. Pile materials on pallets to facilitate transport off-site or to storage areas.

**3.10 STOCKPILING**

- .1 Refer to Section 01 74 21 - Construction / Demolition Waste Management and Disposal for other processing requirements.
- .2 Label stockpiles, indicating material type and quantity.
- .3 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

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- .4 Locate stockpiled materials convenient for use in new construction. Eliminate double handling wherever possible.
- .5 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.
- .6 Separate from general waste stream each of following materials. Stockpile materials in neat and orderly fashion in location and as approved by Departmental Representative for alternate disposal. Stockpile materials in accordance with applicable fire and safety regulations.
  - .1 Glass fibre ceiling tiles.
  - .2 Wood fibre ceiling tiles.
  - .3 Power source poles deemed unfit for reuse by Departmental Representative.
  - .4 Wiring and conduit.
  - .5 Outlets/switches.
  - .6 Floor receptacles.
  - .7 Metal duct work, baffles, HVAC equipment.
  - .8 Demountable partitions.
  - .9 Drapes.
  - .10 Tracks and blinds.
  - .11 Insulation batts.
  - .12 Miscellaneous metals.
  - .13 Carpet.
  - .14 Brick
  - .15 Terracotta block
  - .16 Concrete block

**3.11 REMOVAL FROM SITE**

- .1 At end of each work shift, remove all processed materials. No storage of salvaged materials on site is permitted. Remove stockpiled material from site as approved by Departmental Representative when it interferes with operations of project construction. Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.
- .2 Transport material designated for alternate disposal to approved facilities, or receiving organizations listed in waste reduction workplan and in accordance with applicable regulations. Do not deviate from facilities or receiving organizations listed in waste reduction workplan without prior written authorization from Departmental Representative.
- .3 Dispose of materials not designated for alternate disposal in accordance with applicable regulations. Disposal facilities must be approved of and listed in waste reduction workplan. Do not deviate from disposal facilities listed in waste reduction workplan without prior written authorization from Departmental Representative.

**DEMOLITION FOR MINOR WORKS**

- .4 Provide written submittals throughout construction documenting waste management removals and overall summaries at the end of construction as required in Section 01 74 21 - Construction / Demolition Waste Management and Disposal.

**3.12 CLEANING AND RESTORATION**

- .1 Keep site clean and organized throughout deconstruction.
- .2 Upon completion of project, remove debris, trim surfaces and leave work site clean.
- .3 Upon completion of project, reinstate areas, landscaping, parking surfaces, walkways, light standards, affected by Work to condition which existed prior to beginning of Work and to same condition of adjacent, undisturbed areas.

**END OF SECTION**



**Part 1 General****1.1 SUMMARY**

- .1 Comply with requirements of this Section when performing following work:
  - .1 Removal of non-friable asbestos-containing material, referred to in Item 1.8 - Existing Conditions, if the material is removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
  - .2 Removal of non-friable asbestos-containing materials, referred to in Item 1.8 – Existing Conditions if the material is removed by breaking, cutting, drilling, abrading, grinding or vibrating if the material is wetted to control the spread of dust and fibres and the work is only done by non-powered hand-held tools.
  - .3 Removal or disturbance of less than one square metre of drywall in which the joint filling compounds are asbestos-containing.
- .2 Refer to the Specification Section 01 14 25 – Designated Substance Report, for details on asbestos-containing materials.

**1.2 MEASUREMENT AND PAYMENT**

- 1. Measurement Procedures.
  - .1 Measure abatement of asbestos-containing surfacing materials, Duct insulations and floor coverings in square metres.
  - .2 Measure abatement of asbestos-containing pipe insulations in linear metres.
  - .3 Measure abatement of asbestos-containing pipe fittings in units.
  - .4 Abatement work will be paid based on the actual quantities measured on site and the unit prices stated in the Bid and Acceptance Form.

**1.3 RELATED SECTIONS**

- .1 Section 01 14 25 – Designated Substance Report
- .2 Section 02 82 00.02 – Asbestos Abatement: Intermediate Precautions.
- .3 Section 02 82 00.03 – Asbestos Abatement: Maximum precautions.

**1.4 REFERENCES**

- .1 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-1.205-94, Sealer for Application of Asbestos-Fibre Releasing Materials.
- .2 Department of Justice Canada (Jus).
  - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .4 Transport Canada (TC).
  - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .5 Ontario Environmental Protection Act, R.R.O 1990,
  - .1 General – Waste Management, O. Reg 347/90, as amended.

- .6 Underwriters' Laboratories of Canada (ULC).
- .7 Ontario Ministry of Labour (MoL).
  - .1 Occupational Health and Safety Act, R.S.O 1990, c. O1 (OSHA)
    - .1 O.Reg. 278/05 – Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations, as amended
    - .2 Ontario Occupational Health and Safety Act, R.S.O. 1990, Regulation 490/09 “Designated Substances”, as amended.
    - .3 O.Reg 213/91 - “Construction Projects”, as amended.

## 1.5 DEFINITIONS

- .1 HEPA vacuum: DOP tested High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Amended Water: water with non-ionic surfactant wetting agent added to reduce surface tension of water to allow thorough wetting of fibres.
- .3 Asbestos-Containing Materials (ACMs): materials that contain 0.5 percent or more asbestos by dry weight, identified under Existing Conditions including fallen materials and settled dust.
- .4 Asbestos Work Area: area where work takes place which will, or may, disturb ACMs.
- .5 Authorized Visitors: Departmental Representative, and representative(s) of regulatory agencies.
- .6 Competent worker: in relation to specific work, means a worker who:
  - .1 Is qualified because of knowledge, training and experience to perform the work.
  - .2 Is familiar with the provincial laws and with the provisions of the regulations that apply to the work.
  - .3 Has knowledge of all potential or actual danger to health or safety in the work.
- .7 DOP Test: testing method used to determine integrity of unit using Dispersed Oil Particulate (DOP) HEPA-filter leak test.
- .8 Friable material: means material that:
  - .1 When dry, can be crumbled, pulverized or powdered by hand pressure, or
  - .2 is crumbled, pulverized or powdered.
- .9 Hazardous Material Workplan: A brief report identifying the location and quantities of hazardous materials and the methods that will be used to remove, store, transport and dispose of them.
- .10 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .11 Occupied Area: any area of the building or work site that is outside Asbestos Work Area.
- .12 Polyethylene: rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.
- .13 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Sprayer must have appropriate capacity for work.

**1.6 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit proof satisfactory to the Departmental Representative that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of authority having jurisdiction.
- .2 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.
- .3 Submit proof of Contractor's Asbestos Liability Insurance.
- .4 Submit to the Departmental Representative necessary permits for transportation and disposal of asbestos-containing waste and proof that asbestos-containing waste has been received and properly disposed.
- .5 Submit proof that all asbestos workers and/or supervisor have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene and work practices while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing.
- .6 Submit proof satisfactory to Departmental Representative that employees have appropriate respirator fitting and testing (fit test certificates). Workers must be fit-tested (qualitative as a minimum) with respirator that is personally issued.
- .7 Asbestos abatement section within Hazardous Material Work Plan.

**1.7 QUALITY ASSURANCE**

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time Work is performed.
- .2 Health and Safety:

Safety Requirements: worker protection.

- .1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:
  - .1 As a minimum, air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. 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. The employer 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. A worker 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.

- .2 Disposable-type protective clothing (high-density polyethylene protective clothing (Tyvek or similar, as approved by Departmental Representative) that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing shall 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 to include suitable footwear, and to be repaired or replaced if torn.
- .2 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.
- .3 Before leaving Asbestos Work Area, the worker can decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for asbestos waste, impervious to asbestos, identified as asbestos waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.
- .4 Facilities for washing hands and face shall be provided within or close to the Asbestos Work Area.
- .5 Ensure workers wash hands and face when leaving Asbestos Work Area.
- .6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

## **1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .3 Separate for reuse, and recycling and place in designated containers steel, metal, plastic waste in accordance with Waste Management Plan.
- .4 Place materials defined as hazardous or toxic in designated containers. Location and transportation of all on-site waste containers must be approved by Departmental Representative in writing prior to work.
- .5 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .6 Fold up metal banding, flatten and place in designated area for recycling.
- .7 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 0.15 mm thick bags or leak proof drums. Label containers with appropriate warning labels.
- .8 Provide waste manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial. All waste landfill manifests are to be provided to the Client/Client Representative at the end of the project.

**1.9 EXISTING CONDITIONS**

- .1 It is anticipated that Type 1, Minimum Asbestos Abatement Precautions will be required for removal or disturbance of the following asbestos-containing materials:
  - .1 Building 5
    - .1 12"x12" Vinyl Floor Tiles (VFT), Beige with White Streaks
    - .2 12"x12" Vinyl Floor Tiles (VFT), Beige with Reddish Brown Streaks
    - .3 9"x9" Vinyl Floor Tiles (VFT), Black & Rainbow
    - .4 9"x9" Vinyl Floor Tiles (VFT), Beige
    - .5 12"x12" Vinyl Floor Tiles (VFT), Beige
  - .2 Building 3
    - .1 Tar associated with piping and fitting insulation
  - .3 Building 2
    - .1 12"x12" Vinyl Floor Tiles (VFT), Light Grey
    - .2 12"x12" Vinyl Floor Tiles (VFT), Black
- .2 Refer to the Specification Section 01 14 25 – Designated Substance Report, which is bound to this Specification and forms part of the tender documents package, for details on materials containing Chrysotile asbestos to be handled, removed, or otherwise disturbed and disposed of during this Project.
- .3 Quantities of asbestos-containing materials and site conditions are the responsibility of the bidding contractor. Contractors are to verify all site conditions themselves and base their abatement bids upon their own observations and quantity take-offs. Bidding contractors are to draw their own conclusions with respect to site conditions and/or factors that may affect their work.
- .4 Notify Departmental Representative of asbestos-containing material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from Departmental Representative.

**1.10 SCHEDULING**

- .1 Hours of Work: perform work involving asbestos abatement located at the Building during hours specified by Departmental Representative. **The work schedule must be approved in writing by the Departmental Representative in advance of work.** Contractor shall be available to work continuously from beginning to end of project.

**1.11 PERSONNEL TRAINING**

- .1 Before beginning Work, provide Departmental Representative with satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.
- .2 Instruction and training related to respirators includes, following minimum requirements:
  - .1 Fitting of equipment.
  - .2 Inspection and maintenance of equipment.
  - .3 Disinfecting of equipment.
  - .4 Limitations of equipment.
- .3 Instruction and training must be provided by a competent, qualified person.

**Part 2 Products****2.1 MATERIALS**

- .1 Drop Sheets:
  - .1 Polyethylene: 0.15 mm thick.
  - .2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.
- .2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of asbestos-containing material.
- .3 Waste Containers: contain waste in two separate containers.
  - .1 Inner container: 0.15 mm thick sealable polyethylene waste bag.
  - .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 thick sealable polyethylene bag.
  - .3 Labelling requirements: affix preprinted cautionary asbestos warning in both official languages that is visible when ready for removal to disposal site.

**Part 3 Execution****3.1 SUPERVISION**

- .1 Minimum of one Supervisor for every ten workers is required inside the asbestos work areas at all times.
- .2 Approved Supervisor must remain within Asbestos Work Area during disturbance, removal, or other handling of asbestos-containing materials.

**3.2 PROCEDURES**

- .1 Before beginning Work, isolate Asbestos Work Area using, at a minimum, preprinted cautionary asbestos warning signs in both official languages that are visible at access routes to Asbestos Work Area.
  - .1 Remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work.
  - .2 Use HEPA vacuum, or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate.
  - .3 Do not use compressed air to clean up or remove dust from any surface.
- .2 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.
  - .1 Use FR polyethylene drop sheets over flooring such as carpeting that absorbs dust and over flooring in Asbestos Work Area where dust and contamination cannot otherwise be safely contained.
- .3 Wet materials containing asbestos to be cut, ground, abraded, scraped, drilled, or otherwise disturbed unless wetting creates hazard or causes damage.
  - .1 Use garden reservoir type low - velocity fine - mist sprayer.
  - .2 Perform Work to reduce dust creation to lowest levels practicable.

- .3 Work will be subject to visual inspection.
- .4 Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.
- .4 Cutting, shaping, grinding, drilling, abrading or otherwise disturbing non-friable asbestos-containing materials shall be executed using non-powered hand-tools only.
- .5 Clean-Up:
  - .1 Frequently during Work and immediately after completion of Work, clean up dust and asbestos-containing waste using HEPA vacuum or by damp mopping.
  - .2 Place dust and asbestos-containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste; wet and fold these items to contain dust, then place in plastic bags.
  - .3 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum and place in second clean waste bag immediately prior to removal from Asbestos Work Area.
  - .4 Seal waste bags and remove from site. Dispose of in accordance with requirements of Provincial and Federal Authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that guidelines and regulations for asbestos disposal are followed.
  - .5 Perform final thorough clean-up of Work areas and adjacent areas affected by Work using HEPA vacuum.

### **3.3 INSPECTION**

- .1 Perform inspection of Asbestos Work Area to confirm compliance with specification and governing authority requirements. Deviation(s) from these requirements that have not been approved in writing by Departmental Representative may result in Work stoppage, at no cost to Owner.
- .2 Departmental Representative may inspect Work at any time during the project for:
  - .1 Adherence to specific procedures and materials.
  - .2 Final cleanliness and completion.
  - .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.
- .3 When asbestos leakage from Asbestos Work Area has occurred or is likely to occur Departmental Representative may order Work shutdown.
- .4 No additional costs will be allowed by the Contractor for additional labour or materials required to provide specified performance level.

### **3.4 AIR MONITORING**

- .1 From beginning of Work until completion of cleaning operations, the Departmental representative may collect air samples on a daily basis outside of Asbestos Work Area enclosures.
- .2 If air monitoring shows that areas outside work area enclosures are contaminated, enclose, maintain, and clean these areas in same manner as that applicable to Asbestos Work Areas
  - .1 Stop work and clean areas outside of Asbestos Work Areas when Phased Contrast Microscopy measurements exceed 0.05 fibres per cubic centimetre (f/cc) and correct procedures.

- .2 All required cleaning, re-cleaning, additional air testing and/or inspections will be performed at no extra charge to the Client.
- .3 Ensure that respiratory safety factors for Workers are not exceeded.
- .4 The Departmental Representative may collect clearance air samples following a final visual inspection of the Asbestos Work Area by the Departmental Representative. Samples will be analyzed and compared to applicable regulations.
  - .1 Final air monitoring results must show fibre levels of less than 0.05 fibres per cubic centimetre (f/cc).
  - .2 If air monitoring shows that areas inside the Asbestos Work Area enclosures are contaminated; enclose, maintain and clean these areas in same manner as that applicable to Asbestos Work Area at no additional cost to the client.
  - .3 Repeat as necessary until fibre levels are less than 0.05 f/cc
  - .4 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

**END OF SECTION**



**Part 1 General****1.1 SUMMARY**

- .1 Comply with requirements of this Section when performing following Work:
  - .1 The removal or disturbance removal of one square metre or less of friable asbestos-containing material during the repair, alteration, maintenance or demolition of a building or any machinery or equipment located at site.
  - .2 The removal or disturbance removal of one square metre or less of asbestos-containing plaster and/or cementitious parging during the repair, alteration, maintenance of building, provided the materials are wetted and only hand powered tools are used or a power tool with an effective HEPA dust collection system
  - .3 Removal or disturbance of one square metre or more of drywall in which the joint filling compounds are asbestos-containing.
  - .4 Removing non-friable asbestos containing materials (excluding plaster, textured plaster or exterior stucco) by breaking, cutting, drilling, abrading, grounding, sanding or vibrating if:
    - .1 The material is not wetted to control the spread of dust or fibres, and
    - .2 The work is done only by means of non-powered hand-held tools.
  - .5 Removing non-friable asbestos containing materials by breaking, cutting, drilling, abrading, grounding, sanding or vibrating if the work is done by means of power tools that are attached to dust-collecting devices equipped with HEPA filters.
- .2 Refer to the Specification Section 01 14 25 – Designated Substance Report dated April, 2014 for details on asbestos-containing materials.

**1.2 MEASUREMENT AND PAYMENT**

- .1 Measurement Procedures.
  - .1 Measure abatement of asbestos-containing surfacing materials, Duct insulations and floor coverings in square metres.
  - .2 Measure abatement of asbestos-containing pipe insulations in linear metres.
  - .3 Measure abatement of asbestos-containing pipe fittings in units.
  - .4 Abatement work will be paid based on the actual quantities measured on site and the unit prices stated in the Bid and Acceptance Form.

**1.3 RELATED SECTIONS**

- .1 Section 01 14 25 – Designated Substance Report
- .2 Section 02 82 00.01 – Asbestos Abatement: Minimum Precautions.
- .3 Section 02 82 00.03 – Asbestos Abatement: Maximum precautions.

**1.4 REFERENCES**

- .1 Canadian General Standards Board (CGSB).

- .1 CAN/CGSB-1.205-94, Sealer for Application of Asbestos-Fibre Releasing Materials.
- .2 Department of Justice Canada (Jus).
  - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .4 Transport Canada (TC).
  - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .5 Ontario Environmental Protection Act, R.R.O 1990,
  - .1 General – Waste Management, O. Reg. 347/90, as amended.
- .6 Underwriters' Laboratories of Canada (ULC).
- .7 Ontario Ministry of Labour (MoL).
  - .1 Occupational Health and Safety Act, R.S.O 1990, c. O1 (OSHA)
    - .1 O.Reg. 278/05 – Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations, as amended
    - .2 Ontario Occupational Health and Safety Act, R.S.O. 1990, Regulation 490/09 “Designated Substances”, as amended.
    - .3 O.Reg. 213/91 - “Construction Projects”, as amended.

## **1.5 DEFINITIONS**

- .1 Amended Water: water with non-ionic surfactant wetting agent added to reduce surface tension of water to allow wetting of fibres.
- .2 Asbestos-Containing Materials (ACMs): materials that contain 0.5 percent or more asbestos by dry weight, identified under Existing Conditions Article, including fallen materials and settled dust.
- .3 Asbestos Work Area: area where work takes place which will, or may disturb ACMs.
- .4 Authorized Visitors: Departmental Representative, and representative(s) of regulatory agencies.
- .5 Competent worker: in relation to specific work, means a worker who:
  - .1 Is qualified because of knowledge, training and experience to perform the work.
  - .2 Is familiar with the provincial laws and with the provisions of the regulations that apply to the work.
  - .3 Has knowledge of all potential or actual danger to health or safety in the work.
- .6 Curtained doorway: arrangement of closures to allow ingress or 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 metres on each side.
  - .7 DOP Test: testing method used to determine integrity of Negative Pressure unit using Dispersed Oil Particulate (DOP) HEPA-filter leak test.
  - .8 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.
  - .9 Hazardous Material Workplan: A brief report identifying the location and quantities of hazardous materials and the methods that will be used to remove, store, transport and dispose of them.
  - .10 HEPA vacuum: DOP tested, High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any dimension at 99.97% efficiency.
  - .11 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
  - .12 Polyethylene: polyethylene sheeting or rip proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.
  - .13 Occupied Area: any area of building or work site that is outside Asbestos Work Area.
  - .14 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for scope of work.

## **1.6 ACTION AND INFORMATION SUBMITTALS**

- .1 Submit proof satisfactory to the Departmental Representative that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of authority having jurisdiction.
- .2 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.
- .3 Submit proof of Contractor's Asbestos Liability Insurance.
- .4 Submit to the Departmental Representative necessary permits for transportation and disposal of asbestos-containing waste and proof that asbestos-containing waste has been received and properly disposed.
- .5 Submit proof that all asbestos workers and/or supervisor have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene and work practices while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing.
- .6 Submit proof that supervisory personnel have attended asbestos abatement course, of not less than two days duration, approved by Departmental Representative. Minimum of one supervisor for every ten workers.
- .7 Submit Worker's Compensation Board status and transcription of insurance.

- .8 Submit documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including:
  - .1 encapsulants;
  - .2 amended water;
  - .3 slow-drying sealer.
- .9 Submit proof satisfactory to Departmental Representative that employees have appropriate respirator fitting and testing (fit test certificates). Workers must be fit tested (qualitative as a minimum for Half-face respirator, quantitative for Full-face respirator) with respirator that is personally issued.
- .10 Asbestos abatement section within Hazardous Material Work Plan.

## **1.7 QUALITY ASSURANCE**

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at the time work is performed.
- .2 Health and Safety:
  - .1 Safety Requirements: worker and visitor protection.
    - .1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:
      - .1 As a minimum, air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. 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. The employer 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. A worker 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.
      - .2 Full-face respirator required for work described in Part 1, Section 1.1.1.4 when material is not wetted.
      - .3 Disposable-type protective clothing (high-density polyethylene protective clothing (Tyvek or similar, as approved by Client/Client Representative) that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn

by every worker who enters the work area, and the protective clothing shall 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 to include suitable footwear, and to be repaired or replaced if torn.

- .3 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.
- .4 Before leaving Asbestos Work Area, the worker can decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for asbestos waste, impervious to asbestos, identified as asbestos waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.
- .5 Ensure workers wash hands and face when leaving Asbestos Work Area. Facilities for washing hands and face shall be provided within or close to the Asbestos Work Area.
- .6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.
- .7 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.

## **1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .3 Separate for reuse, and recycling and place in designated containers steel, metal, plastic waste in accordance with Waste Management Plan.
- .4 Place materials defined as hazardous or toxic in designated containers.
- .5 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .6 Fold up metal banding, flatten and place in designated area for recycling.
- .7 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 0.15 mm thick bags or leak proof drums. Label containers with appropriate warning labels.
- .8 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

**1.9 EXISTING CONDITIONS**

- .1 The following materials have been identified as asbestos containing and may be removed under Type 2, Intermediate Asbestos Abatement Precautions depending on the quantity of materials removed from any given area and/or removal methods used:
  - .1 Building 5
    - .1 Parging cement associated with pipe fittings (including, but not limited to, pipe elbows, hangers, tees, end-caps and reducers)
    - .2 Pipe insulations, including Aircell pipe insulation
    - .3 Spray-applied Fireproofing
    - .4 Parging cement around sensors on the outside of Air Handling Units
    - .5 Plaster ceiling finishes
    - .6 Cementitious parging cement (on basement level deck)
  - .2 Building 3
    - .1 Parging cement associated with pipe fittings (including, but not limited to, pipe elbows, hangers, tees, end-caps and reducers)
    - .2 Pipe insulations, including Aircell pipe insulation
    - .3 Plaster wall and column finishes
    - .4 Cementitious wall surfacing
  - .3 Building 2
    - .1 Parging cement associated with pipe fittings (including, but not limited to, pipe elbows, hangers, tees, end-caps and reducers)
    - .2 Pipe insulations
    - .3 Duct Insulation

Refer to the Specification Section 01 14 25 – Designated Substance Report, which is bound to this Specification and forms part of the tender documents package, for details on materials containing Chrysotile asbestos to be handled, removed, or otherwise disturbed and disposed of during this Project.

- .2 **Quantities of asbestos-containing materials and site conditions are the responsibility of the bidding contractor. Contractors are to verify all site conditions themselves and base their abatement bids upon their own observations and quantity take-offs. Bidding contractors are to draw their own conclusions with respect to site conditions and/or factors that may affect their work.**
- .3 Notify Departmental Representative of asbestos-containing material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from Departmental Representative.

**1.10 SCHEDULING**

- .1 Hours of Work: perform work involving asbestos abatement located at the Building during hours specified by Departmental Representative. **The work schedule must be approved in writing by the Departmental Representative in advance of work.** Contractor shall be available to work continuously from beginning to end of project.

**1.11 PERSONNEL TRAINING**

- .1 Before beginning Work, provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.
- .2 Instruction and training related to respirators includes, at minimum:
  - .1 Fitting of equipment.
  - .2 Inspection and maintenance of equipment.
  - .3 Disinfecting of equipment.
  - .4 Limitations of equipment.
- .3 Instruction and training must be provided by competent, qualified person.

**Part 2 Products****2.1 MATERIALS**

- .1 Drop and Enclosure Sheets.
  - .1 Polyethylene: 0.15 mm thick.
  - .2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.
- .2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in concentration to provide thorough wetting of asbestos-containing material.
- .3 Waste Containers: contain waste in two separate containers.
  - .1 Inner container: 0.15 mm thick sealable polyethylene bag
  - .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 thick sealable polyethylene bag.
  - .3 Labelling requirements: affix preprinted cautionary asbestos warning, in both official languages, that is visible when ready for removal to disposal site.
- .4 Tape: tape suitable for sealing polyethylene to surfaces under both dry and wet conditions using amended water.
- .5 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.
  - .1 Sealer: flame spread and smoke developed rating less than 50 and be compatible with new fireproofing.
- .6 Encapsulant: penetrating type conforming to CAN/CGSB-1.205.

**Part 3 Execution****3.1 SUPERVISION**

- .1 Minimum of one Supervisor for every ten workers is required.

- .2 Approved Supervisor must remain within Asbestos Work Area during disturbance, removal, or other handling of asbestos-containing materials.

### **3.2 PROCEDURES**

- .1 Before beginning Work, at each access to Asbestos Work Area, install warning signs in both official languages in upper case 'Helvetica Medium' letters reading as follows, where number in parentheses indicates font size to be used: 'CAUTION ASBESTOS HAZARD AREA (25 mm) / NO UNAUTHORIZED ENTRY (19 mm) / WEAR ASSIGNED PROTECTIVE EQUIPMENT (19 mm) / BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM (7 mm)'.
- .2 Before beginning Work remove visible dust from surfaces in work area where dust is likely to be disturbed during course of work.
  - .1 Use HEPA vacuum, or damp cloths where damp cleaning does not create hazard and is otherwise appropriate.
  - .2 Do not use compressed air to clean up or remove dust from any surface.
- .3 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.
  - .1 Use FR polyethylene drop sheets over flooring such as carpeting that absorbs dust and over flooring in work areas where dust or contamination cannot otherwise be safely contained.
  - .2 Erect enclosure of polyethylene sheeting around indoor Type 2 work areas, shut off mechanical ventilation system serving work area, and seal ventilation ducts to and from work area. Exterior abatement work areas shall be separated from other areas using visual barriers that prevent members of the public from viewing abatement work operations.
- .4 Remove loose material by HEPA vacuum; thoroughly wet friable material containing asbestos to be removed or disturbed before and during Work unless wetting creates hazard or causes damage.
  - .1 Use garden reservoir type low - velocity sprayer or airless spray equipment capable of producing mist or fine spray.
  - .2 Perform Work in a manner to reduce dust creation to lowest levels practicable.
- .5 Work is subject to visual inspection and air monitoring. Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas at no additional costs to owners.
- .6 Clean-up:
  - .1 Frequently during Work and immediately after completion of work, clean up dust and asbestos-containing waste using HEPA vacuum or by damp mopping.
  - .2 Place dust and asbestos-containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste and wet and fold to contain dust and then place in waste bags.
  - .3 Immediately before their removal from Asbestos Work Area and disposal, clean each filled waste bag using damp cloths or HEPA vacuum and place in second clean waste bag.



- .4 Seal and remove double-bagged waste from site. Dispose of in accordance with requirements of Provincial/Territorial and Federal authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that guidelines and regulations for asbestos disposal are followed.
- .5 Perform final thorough clean-up of Asbestos Work Areas and adjacent areas affected by Work using HEPA vacuum.

### **3.3 AIR MONITORING**

- .1 From beginning of Work until completion of cleaning operations, the Departmental representative may collect air samples on a daily basis outside of Asbestos Work Area enclosures.
- .2 If air monitoring shows that areas outside work area enclosures are contaminated, enclose, maintain, and clean these areas in same manner as that applicable to Asbestos Work Areas
  - .1 Stop work and clean areas outside of Asbestos Work Areas when Phased Contrast Microscopy measurements exceed 0.05 fibres per cubic centimetre (f/cc) and correct procedures.
  - .2 All required cleaning, re-cleaning, additional air testing and/or inspections will be performed at no extra charge to the Client.
- .3 Ensure that respiratory safety factors for Workers are not exceeded.
- .4 The Departmental Representative may collect clearance air samples following a final visual inspection of the Asbestos Work Area by the Departmental Representative. Samples will be analyzed and compared to applicable regulations.
  - .1 Final air monitoring results must show fibre levels of less than 0.05 fibres per cubic centimetre (f/cc).
  - .2 If air monitoring shows that areas inside the Asbestos Work Area enclosures are contaminated; enclose, maintain and clean these areas in same manner as that applicable to Asbestos Work Area at no additional cost to the client.
  - .3 Repeat as necessary until fibre levels are less than 0.05 f/cc
  - .4 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

**END OF SECTION**

**Part 1 General****1.1 SECTION INCLUDES**

- .1 Comply with requirements of this Section when performing following work:
  - .1 Removal or disturbance of more than one square metre of friable asbestos-containing materials.
  - .2 Removal or disturbance of one square metre or more of asbestos-containing plaster or cementitious parging if the materials are not wetted or power tools are used without an effective HEPA dust collection system.
  - .3 Breaking, cutting, drilling, abrading, grinding, sanding or vibrating of asbestos containing materials, if the work is done by means of power tools that are not attached to dust-collecting devices equipped with HEPA filters.
- .2 Refer to the Specification Section 01 14 25 – Designated Substance Report for details on asbestos-containing materials.

**1.2 MEASUREMENT AND PAYMENT**

- .1 Measurement Procedures.
  - .1 Measure abatement of asbestos-containing surfacing materials, Duct insulations and floor coverings in square metres.
  - .2 Measure abatement of asbestos-containing pipe insulations in linear metres.
  - .3 Measure abatement of asbestos-containing pipe fittings in units.
  - .4 Abatement work will be paid based on the actual quantities measured on site and the unit prices stated in the Bid and Acceptance Form.

**1.3 RELATED SECTIONS**

- .1 Section 01 14 25 – Designated Substance Report
- .2 Section 02 82 00.01 – Asbestos Abatement: Minimum Precautions.
- .3 Section 02 82 00.02 – Asbestos Abatement: Intermediate precautions.
- .4 Section 02 83 20 – Lead Products Removal: Precautionary Measures
- .5 Section 02 89 00 – Silica Precautionary Measures

**1.4 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.205-03, Sealer for Application to Asbestos-Fibre-Releasing Materials.
- .2 Canadian Standards Association (CSA International).
- .3 Department of Justice Canada.
  - .1 Canadian Environmental Protection Act (CEPA), 1999.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .5 Transport Canada (TC).

- .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .6 Ontario Environmental Protection Act, R.R.O 1990,
  - .1 General – Waste Management, O. Reg 347/90, as amended.
- .7 Underwriters' Laboratories of Canada (ULC).
- .8 Ontario Ministry of Labour (MoL).
  - .1 Occupational Health and Safety Act, R.S.O 1990, c. O1 (OSHA)
    - .1 O.Reg. 278/05 – Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations, as amended.
    - .2 O.Reg. 490/09 – Designated Substances
    - .3 O.Reg. 213/91 - “Construction Projects”, as amended

## **1.5 DEFINITIONS**

- .1 Airlock: system for permitting ingress or egress without permitting air movement between contaminated area and uncontaminated area, typically consisting of two curtained doorways at least 2 m apart.
- .2 Amended Water: water with a non-ionic surfactant wetting agent added to reduce surface tension of water to allow wetting of fibres.
- .3 Asbestos-Containing Materials (ACMs): materials that contain 0.5 percent or more asbestos by dry weight, identified under Existing Conditions Article, including fallen materials and settled dust.
- .4 Asbestos Work Area: Area where actual removal and sealing and enclosure of spray or trowel-applied asbestos-containing materials takes place.
- .5 Authorized Visitors: Departmental Representative, and representative(s) of regulatory agencies.
- .6 Competent worker: in relation to specific work, means a worker who:
  - .1 Is qualified because of knowledge, training and experience to perform the work.
  - .2 Is familiar with the provincial laws and with the provisions of the regulations that apply to the work.
  - .3 Has knowledge of all potential or actual danger to health or safety in the work.
- .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: testing method used to determine integrity of 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.
- .10 Glove Bag: prefabricated glove bag as follows:
  - .1 Minimum thickness 0.25 mm (10 mil) polyvinyl-chloride bag.
  - .2 Integral 0.25 mm (10 mil) thick polyvinyl-chloride gloves and elastic ports.
  - .3 Equipped with reversible, double-pull, double throw zipper on top and at approximately mid-section of the bag.
  - .4 Straps for sealing ends around pipe.
- .11 Hazardous Material Workplan: A brief report identifying the location and quantities of hazardous materials and the methods that will be used to remove, store, transport and dispose of them.
- .12 HEPA vacuum: DOP tested, High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .13 Negative pressure: DOP tested system that extracts air directly from work area, filters such extracted air through High Efficiency Particulate Air filtering system, and discharges this air directly outside work area to exterior of building.
  - .1 System to maintain minimum pressure differential of 5 Pa relative to adjacent areas outside of work areas, be equipped with alarm to warn of system breakdown, and be equipped with instrument to continuously monitor and automatically record pressure differences.
- .14 Non-Friable Materials: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .15 Occupied Area: any area of building or work site that is outside Asbestos Work Area.
- .16 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.
- .17 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.

## **1.6 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Before beginning work:
  - .1 Obtain from appropriate agency and submit to Departmental Representative necessary permits for transportation and disposal of asbestos waste. Ensure that dump operator is fully aware of hazardous nature of material being dumped, and proper methods of disposal. Submit proof satisfactory to Departmental Representative that suitable

arrangements have been made to receive and properly dispose of asbestos waste.

- .2 Submit proof satisfactory to Departmental Representative that every worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Worker Training Program approved by the Ministry of Training, Colleges and Universities and every supervisor of a worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Supervisor Training Program approved by the Ministry of Training, Colleges and Universities as outlined in O. Reg. 278/05, s. 20 (1). Submit proof of attendance in form of certificate.
- .3 Ensure supervisory personnel have attended asbestos abatement course, of not less than two days duration, approved by Departmental Representative. Submit proof of attendance in form of certificate. Minimum of one Supervisor for every ten workers.
- .4 Submit layout of proposed enclosures and decontamination facilities to Departmental Representative for review.
- .5 SPEC NOTE: Delete the following paragraph if sealing does not apply.
- .6 Submit documentation including test results for sealer proposed for use.
- .7 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.
- .8 Submit proof of Contractor's Asbestos Liability Insurance.
- .9 Submit proof satisfactory to Departmental Representative that employees have appropriate respirator fitting and testing. Workers must be fit-tested (quantitative) with respirator that is personally issued.
- .10 Submit Worker's Compensation Board status and transcription of insurance.
- .11 Submit documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including but not limited to following:
  - .1 amended water;
  - .2 slow-drying sealer.
- .12 Asbestos abatement section within Hazardous Material Work Plan.

## **1.7 QUALITY ASSURANCE**

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to asbestos, provided that in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
  - .1 Safety Requirements: worker and visitor protection.
    - .1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area includes:
      - .1 As a minimum, full-face respirator equipped with HEPA P-100 filter cartridges, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator to be fitted so that there is an

effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. 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. The employer 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. A worker 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.

- .2 Disposable-type protective clothing (high-density polyethylene protective clothing (Tyvek or similar, as approved by Client/Client Representative) that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing shall 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 to include suitable footwear, and to be repaired or replaced if torn

.2 Requirements for each worker:

- .1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters that have been tested as satisfactory, clean coveralls and head covers before entering Equipment and Access Rooms or Asbestos Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.
- .2 Remove gross contamination from clothing before leaving work area then proceed to Equipment and Access Room and remove clothing except respirators. Place contaminated worksuits in receptacles for disposal with other asbestos - contaminated materials. Leave reusable items except respirator in Equipment and Access Room. Still wearing the respirator proceed naked to showers. Using soap and water wash body and hair thoroughly. Clean outside of respirator with soap and water while showering; remove respirator; remove filters and wet them and dispose of filters in container provided for purpose; and wash and rinse inside of respirator. When not in use in work area, store work footwear in Equipment and Access Room. Upon completion of asbestos abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out

- using soap and water before removing from work area or from Equipment and Access Room.
- .3 After showering and drying off, proceed to clean change room and dress in street clothes at end of each day's work, or in clean coveralls before eating, smoking, or drinking. If re-entering work area, follow procedures outlined in paragraphs above.
  - .4 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers must not use this system as means to leave or enter work area.
  - .3 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.
  - .4 Ensure workers are fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual asbestos abatement.
  - .5 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this Section, in both official languages.
  - .6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.
  - .7 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.

## **1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .3 Separate for reuse, and recycling and place in designated containers steel, metal, plastic waste in accordance with Waste Management Plan.
- .4 Place materials defined as hazardous or toxic in designated containers.
- .5 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .6 Fold up metal banding, flatten and place in designated area for recycling.
- .7 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of asbestos

waste in sealed double thickness 6 ml bags or leak proof drums. Label containers with appropriate warning labels.

- .8 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

## **1.9 EXISTING CONDITIONS**

- .1 The following materials have been identified as asbestos containing and are to be removed under Type 3, Maximum Asbestos Abatement Precautions provided more than one square metre of the below identified materials are removed or disturbed to accommodate the project:
  - .1 Building 5
    - .1 Parging cement associated with pipe fittings (including, but not limited to, pipe elbows, hangers, tees, end-caps and reducers)
    - .2 Pipe insulations, including Aircell pipe insulation
    - .3 Spray-applied Fireproofing
    - .4 Parging cement around sensors on the outside of Air Handling Units
    - .5 Plaster ceiling finishes
    - .6 Cementitious parging cement (on basement level deck)
  - .2 Building 3
    - .1 Parging cement associated with pipe fittings (including, but not limited to, pipe elbows, hangers, tees, end-caps and reducers)
    - .2 Pipe insulations, including Aircell pipe insulation
    - .3 Plaster wall and column finishes
    - .4 Cementitious wall surfacing
  - .3 Building 2
    - .1 Parging cement associated with pipe fittings (including, but not limited to, pipe elbows, hangers, tees, end-caps and reducers)
    - .2 Pipe insulations
    - .3 Duct Insulation
- .2 Refer to the Specification Section 01 14 25 – Designated Substance Report, which is bound to this Specification and forms part of the tender documents package, for details on materials containing Chrysotile asbestos to be handled, removed, or otherwise disturbed and disposed of during this Project.
- .3 Contractors are responsible for all leachate hazardous material testing using toxicity characteristic leaching procedures (TCLP) prior to disposal of materials as well as costs associated with disposal of hazardous materials (where applicable), in accordance with O.Reg 347/90, as amended. Include in contract sum costs due to this requirement.
- .4 **Quantities of asbestos-containing materials and site conditions are the responsibility of the bidding contractor. Contractors are to verify all site conditions themselves and base their abatement bids upon their own observations and quantity take-offs. Bidding contractors are to draw their own conclusions with respect to site conditions and/or factors that may affect their work.**



- .5 Notify Departmental Representative of friable or any otherwise suspect asbestos-containing material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

#### **1.10 SCHEDULING**

- .1 Not later than ten (10) days before beginning Work on this Project notify following in writing:
  - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
  - .2 Regional Office of Labour Canada.
  - .3 Provincial/Territorial, Department of Labour.
  - .4 Disposal Authority.
- .2 Inform sub-trades of presence of asbestos-containing materials identified in the Specification Section 01 14 25 – Designated Substance Report.
- .3 Submit to Departmental Representative copy of notifications prior to start of Work.
- .4 Hours of Work: perform work involving asbestos abatement located at the Building during hours specified by Departmental Representative. **The work schedule must be approved in writing by the Departmental Representative in advance of work.** Contractor shall be available to work continuously from beginning to end of project.

#### **1.11 PERSONNEL TRAINING**

- .1 Before beginning Work, provide to Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene including dress and showers, in entry and exit from Asbestos Work Area, in aspects of work procedures, and in use, cleaning, and disposal of respirators and protective clothing.
- .2 Instruction and training related to respirators includes, at minimum:
  - .1 Proper fitting of equipment.
  - .2 Inspection and maintenance of equipment.
  - .3 Cleaning and Disinfecting of equipment.
  - .4 Limitations of equipment.
- .3 Instruction and training must be provided by competent, qualified person.
- .4 Every worker involved in a Type 3 operation must have successfully completed the Asbestos Abatement Worker Training Program approved by the Ministry of Training, Colleges and Universities.
- .5 Every supervisor of a worker involved in a Type 3 operation must have successfully completed the Asbestos Abatement Supervisor Training Program approved by the Ministry of Training, Colleges and Universities.

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**Part 2 Products****2.1 MATERIALS**

- .1 Polyethylene: minimum 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.
- .2 FR polyethylene: minimum 0.15 mm thick, woven fibre reinforced fabric bonded both sides with polyethylene.
- .3 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions using amended water.
- .4 Wetting agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether, or other material approved by Departmental Representative mixed with water in concentration to provide adequate penetration and wetting of asbestos-containing material.
- .5 Asbestos waste containers: Metal or fibre - type acceptable to dump operator with tightly fitting covers and 0.15 mm minimum thickness sealable polyethylene liners.
  - .1 Inner container: 0.15 mm thick sealable polyethylene waste bag.
  - .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 thick sealable polyethylene bag.
  - .3 Label containers in accordance with applicable Regulations. Label in both official languages.
- .6 Tape: tape suitable for sealing polyethylene to surfaces under both dry and wet conditions using amended water.
- .7 Scaffolding: Of appropriate size and strength to accommodate project in accordance with O.Reg 213/91, with specifications and set-up to be approved and stamped by professional engineer. Include in contract sum costs due to this requirement.
- .8 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.
- .9 Sealer: flame spread and smoke developed rating less than 50 and be compatible with new fireproofing.
- .10 Encapsulant: penetrating type conforming to CAN/CGSB-1.205.

**Part 3 Execution****3.1 PREPARATION**

- .1 Work Areas:
  - .1 Shut off and isolate air handling and ventilation systems to prevent fibre dispersal to other building areas during work phase. Conduct smoke tests to ensure that duct work is airtight. Seal and caulk joints and seams of active return air ducts within Asbestos Work Area.

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- .2 Pre-clean moveable furniture and carpeting within proposed work area using HEPA vacuum and remove from work area to an appropriate temporary location.
  - .3 Pre-clean fixed casework, plant, and equipment within proposed work area(s), using HEPA vacuum and cover with polyethylene sheeting sealed with tape.
  - .4 Clean proposed work area(s) using, where practicable, HEPA vacuum cleaning equipment. If not practicable, use wet cleaning method. Do not use methods that raise dust, such as dry sweeping, or vacuuming using other than HEPA vacuum equipment.
  - .5 The spread of dust from the work area to be prevented by:
    - .1 Using enclosures of polyethylene or other suitable material that is impervious to asbestos (including, if the enclosure material is opaque, one or more transparent window areas to allow observation of the entire work area from outside the enclosure), if the work area is not enclosed by walls.
    - .2 Using curtains of polyethylene sheeting or other suitable material that is impervious to asbestos, fitted on each side of each entrance or exit from the work area.
  - .6 DOP test negative pressure units within one (1) month prior to work operations. Provide documentation to Client Representative. Put negative pressure system in operation and operate continuously from time first polyethylene is installed to seal openings until final completion of work including final cleanup. Provide continuous monitoring of pressure difference using automatic recording instrument. The system to maintain a negative air pressure of 0.02 inches [5 Pa] of water, relative to the area outside the enclosed area. 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. Vent negative air units to the outdoors.
  - .7 Seal off openings such as corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.
  - .8 Cover floor and wall surfaces with polyethylene sheeting sealed with tape. Use one layer of FR polyethylene on floors. Cover floors first so that polyethylene extends at least 300 mm up walls then cover walls to overlap floor sheeting.
  - .9 Build airlocks at entrances to and exits from work area(s) so that work area(s) are always closed off by one curtained doorway when workers enter or exit.
  - .10 At each access to work areas install warning signs in both official languages in upper case "Helvetica Medium" letters reading as follows where number in parentheses indicates font size to be used: "CAUTION ASBESTOS HAZARD AREA (25 mm) NO UNAUTHORIZED ENTRY (19 mm) WEAR ASSIGNED PROTECTIVE EQUIPMENT (19 mm) BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM (7 mm)".
  - .11 After work area isolation, remove heating, ventilating, and air conditioning filters, pack in sealed plastic bags 0.15 mm minimum thick and treat as contaminated asbestos waste. Remove ceiling - mounted objects such as

lights, partitions, other fixtures not previously sealed off, and other objects that interfere with asbestos removal, as directed by Departmental Representative. Use localized water spraying during fixture removal to reduce fibre dispersal.

- .12 Maintain emergency and fire exits from work area(s), or establish alternative exits satisfactory to Fire Commissioner of Canada.
- .13 Where application of water is required for wetting asbestos-containing materials, shut off electrical power, provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical lines and equipment.
- .2 Worker Decontamination Enclosure System:
  - .1 Worker Decontamination Enclosure System includes Equipment and Access Room, Shower Room, and Clean Room, as follows:
    - .1 Equipment and Access Room: build Equipment and Access Room between Shower Room and work area(s), with two curtained doorways, one to Shower Room and one to work area(s). Install portable toilet, waste receptor, and storage facilities for workers' shoes and protective clothing to be reworn in work area(s). Build Equipment and Access Room large enough to accommodate specified facilities, other equipment needed, and at least one worker allowing him /her sufficient space to undress comfortably.
    - .2 Shower Room: build Shower Room between Clean Room and Equipment and Access Room, with two curtained doorways, one to Clean Room and one to Equipment and Access Room. Provide one shower for every five workers. Provide hot and cold water or water of a constant temperature that is not less than 40°C or more than 50°C. Provide individual controls inside the room to regulate water flow, and individual controls inside room to regulate temperature. Provide piping and connect to water sources and drains. Pump waste water through 5 micrometre filter system acceptable to Client Representative before directing into drains. Provide soap, clean towels, and appropriate containers for disposal of used respirator filters.
    - .3 Clean Room: build Clean Room between Shower Room and clean areas outside of enclosures, with two curtained doorways, one to outside of enclosures and one to Shower Room. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.
    - .4 Contractor shall provide adequate facilities to meet the requirements of Section 3.1.2. for all exterior Type 3 work.
- .3 Container and Equipment Decontamination Enclosure System:
  - .1 Container and Equipment Decontamination Enclosure System consists of Staging Area within work area, Washroom, Holding Room, and Unloading Room. Purpose of system is to provide means to decontaminate waste containers, scaffolding, waste and material containers, vacuum and spray

equipment, and other tools and equipment for which Worker Decontamination Enclosure System is not suitable.

- .1 Staging Area: designate Staging Area in work area for gross removal of dust and debris from waste containers and equipment, labelling and sealing of waste containers, and temporary storage pending removal to Washroom. Equip Staging Area with curtained doorway to Washroom.
  - .2 Washroom: build Washroom between Staging Area and Holding Room with two curtained doorways, one to Staging Area and one to Holding Room. Provide high - pressure low - volume sprays for washing of waste containers and equipment. Pump waste water through 5 micrometre filter system before directing into drains. Provide piping and connect to water sources and drains.
  - .3 Holding Room: build Holding Room between Washroom and Unloading Room, with two curtained doorways, one to Washroom and one to Unloading Room. Build Holding Room sized to accommodate at least two waste containers and largest item of equipment used.
  - .4 Unloading Room: build Unloading Room between Holding Room and outside, with two curtained doorways, one to Holding Room and one to outside.
- .4 Construction of Decontamination Enclosures:
- .1 Build suitable framing for enclosures or use existing rooms where convenient, and line with polyethylene sheeting sealed with tape. Use one layer of FR polyethylene on floors, as applicable.
  - .2 Build curtained doorways between enclosures so that when people move through or when waste containers and equipment are moved through doorway, one of two closures comprising doorway always remains closed.
- .5 Separation of Work Areas from Occupied Areas:
- .1 Separate parts of building required to remain in use from parts of building or exterior used for asbestos abatement by means of airtight barrier system constructed as follows:
    - .1 Build suitable floor to ceiling lumber or metal stud framing, cover with polyethylene sheeting sealed with tape, and apply 9 mm minimum thick plywood. Seal joints between plywood sheets and between plywood and adjacent materials with surface film forming type sealer, to create airtight barrier.
    - .2 Cover plywood barrier with polyethylene sealed with tape, as specified for work areas.
- .6 Maintenance of Enclosures:
- .1 Maintain enclosures in tidy condition.
  - .2 Ensure that barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.
  - .3 Visually inspect enclosures at beginning of each working period.

- .4 Use smoke methods to test effectiveness of barriers when directed by Departmental Representative.
- .7 Do not begin Asbestos Abatement work until:
  - .1 Arrangements have been made for disposal of waste.
  - .2 For wet stripping techniques, arrangements have been made for containing, filtering, and disposal of waste water.
  - .3 Work area(s) and decontamination enclosures and parts of building required to remain in use are effectively segregated.
  - .4 Tools, equipment, and materials waste containers are on hand.
  - .5 Arrangements have been made for building security.
  - .6 Warning signs are displayed where access to contaminated areas is possible.
  - .7 Notifications have been completed and other preparatory steps have been taken.
  - .8 Work area enclosure has been inspected and approved by the Departmental Representative.
  - .9 Locations for waste bins as designated by the Departmental Representative have been established. Keep bins covered and enclosed while at the site. Bin loading area shall be kept clean at all times.

### **3.2 SUPERVISION**

- .1 Minimum of one Supervisor for every ten workers is required.
- .2 Approved Supervisor must remain within Asbestos Work Area during disturbance, removal, or other handling of asbestos-containing materials.

### **3.3 ASBESTOS REMOVAL**

- .1 Before removing asbestos:
  - .1 Prepare site.
  - .2 Spray asbestos material with water containing specified wetting agent, using airless spray equipment capable of providing "mist" application to prevent release of fibres. Saturate asbestos material sufficiently to wet it to substrate without causing excess dripping. Spray asbestos material repeatedly during work process to maintain saturation and to minimize asbestos fibre dispersion.
- .2 Remove saturated asbestos material in small sections. Do not allow saturated asbestos to dry out. As it is being removed pack material in sealable plastic bags 0.15 mm minimum thick and place in labelled containers for transport.
- .3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to Staging Area. Clean external surfaces thoroughly again by wet sponging before moving containers to decontamination Washroom. Wash containers thoroughly in decontamination Washroom, and store in Holding Room pending removal to Unloading Room and outside. Ensure that containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.

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- .4 After completion of stripping work, wire brushed and wet-sponged surfaces from which asbestos has been removed to remove visible material. During this work keep surfaces wet.
  - .5 Where Departmental Representative decides complete removal of asbestos containing material is impossible due to obstructions such as structural members or major service elements, or because asbestos containing material was originally applied to asphaltic coating, and provides written direction, encapsulate material as follows:
    - .1 Apply surface film forming type sealer to provide 0.635 mm minimum dry film thickness over asbestos surfaces. Apply using airless spray equipment to avoid blowing off fibres. Apply penetrating type sealer to penetrate existing sprayed asbestos surfaces to uniform depth of 25 mm minimum. Apply penetrating type sealer to penetrate existing asbestos surfaces uniformly to substrate.
  - .6 After wire brushing and wet sponging to remove visible asbestos and after encapsulating asbestos containing material impossible to remove, wet clean entire work area including Equipment and Access Room, and equipment used in process. After 24 hour period to allow for dust settling, wet clean these areas and objects again. During this settling period no entry, activity, or ventilation will be permitted. After second 24 hour period under same conditions, clean these areas and objects again using HEPA vacuum followed by wet cleaning. After inspection by Departmental Representative or designate, apply continuous coat of slow drying sealer to surfaces of work area. Allow at least 16 hours with no entry, activity, ventilation, or disturbance other than operation of negative pressure units during this period.
  - .7 Work is subject to visual inspection and air monitoring by Departmental Representative. Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.
  - .8 Cleanup:
    - .1 Frequently during Work and immediately after completion of work, clean up dust and asbestos containing waste using HEPA vacuum or by damp mopping.
    - .2 Place dust and asbestos containing waste in sealed dust tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste and wet and fold to contain dust and then place in waste bags.
    - .3 Immediately before their removal from Asbestos Work Area and disposal, clean each filled waste bag using damp cloths or HEPA vacuum and place in second clean waste bag.
    - .4 Seal and remove double bagged waste from site. Dispose of in accordance with requirements of Provincial/Territorial and Federal authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that guidelines and regulations for asbestos disposal are followed.
    - .5 Perform final thorough clean-up of Asbestos Work Areas and adjacent areas affected by Work using HEPA vacuum.

**3.4 INSPECTION**

- .1 Perform inspection of Asbestos Work Area to confirm compliance with specification and governing authority requirements. Deviation(s) from these requirements that have not been approved in writing by the Departmental Representative may result in Work stoppage, at no cost to the Owner.
- .2 Departmental Representative will inspect Work for:
  - .1 Adherence to specific procedures and materials.
  - .2 Final cleanliness and completion.
  - .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.
- .3 When asbestos leakage from Asbestos Work Area has occurred or is likely to occur, Departmental Representative may order Work shutdown.
- .4 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

**3.5 AIR MONITORING**

- .1 From beginning of Work until completion of cleaning operations, Departmental Representative will collect air samples on daily basis outside of work area enclosure(s) in accordance with industry standard practice.
  - .1 Contractor shall be responsible for monitoring inside in accordance with applicable Provincial/Territorial Occupational Health and Safety Regulations.
  - .2 Contractor shall ensure that respiratory safety factors for Workers are not exceeded.
- .2 If air monitoring shows that areas outside work area are contaminated, enclose, maintain and clean these areas in same manner as that applicable to Asbestos Work Areas.
  - .1 Stop work and clean areas outside of Asbestos Work Areas when Phase Contrast Microscopy measurements exceed 0.05 fibres per cubic centimetre (f/cc) and correct procedures.
  - .2 All required cleaning, re-cleaning, additional air testing and/or inspections will be at no extra charge to Departmental Representative.
- .3 Final air monitoring to be conducted as follows: After Asbestos Work Area has passed visual inspection by Departmental Representative, and acceptable coat of lock-down agent has been applied to surfaces within enclosure, and appropriate setting period has passed, Departmental Representative will perform aggressive air monitoring within Asbestos Work Area.
  - .1 Final air monitoring results must show fibre levels of less than 0.01 f/cc.
  - .2 If air monitoring results show fibre levels in excess of 0.01 f/cc, re-clean work area and apply another acceptable coat of lock-down agent to surfaces.
  - .3 Repeat as necessary until fibre levels are less than 0.01 f/cc.
  - .4 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.



**3.6 FINAL CLEANUP**

- .1 Following cleaning and air sampling by Departmental Representative shows that asbestos levels inside work area enclosure(s) do not exceed 0.01 fibres/cc, proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible asbestos-containing particles observed during cleanup, immediately, using HEPA vacuum equipment.
- .3 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Include in clean-up Work areas, Equipment and Access Room, Washroom, Shower Room, and other contaminated enclosures.
- .5 Include in clean-up sealed waste containers and equipment used in Work and remove from work areas, via Container and Equipment Decontamination Enclosure System, at appropriate time in cleaning sequence.
- .6 Conduct final check to ensure that no dust or debris remains on surfaces as result of dismantling operations.
- .7 As work progresses, and to prevent exceeding available storage capacity on site, remove sealed and labelled containers containing asbestos waste and dispose of at authorized disposal area in accordance with requirements of disposal authority. Ensure that each shipment of containers transported to dump is accompanied by Contractor's representative to ensure that dumping is done in accordance with governing regulations.

**END OF SECTION**

**Part 1 General****1.1 SECTION INCLUDES**

- .1 Lead abatement procedures for the removal/disturbance/repair of lead-containing surface coating materials on various building components, including structural steel, and other lead containing materials or materials suspected of containing lead, if required to accommodate the project scope of work.
- .2 Refer to Section 1.7 Existing Conditions.

**1.2 RELATED SECTIONS**

- .1 Section 01 14 25 – Designated Substance Report
- .2 Section 02 82 00.01 – Asbestos Abatement: Minimum Precautions.
- .3 Section 02 82 00.02 – Asbestos Abatement: Intermediate Precautions.
- .4 Section 02 82 00.03 – Asbestos Abatement: Maximum Precautions.
- .5 Section 02 89 00 – Silica Precautionary Measures.

**1.3 REFERENCES**

- .1 Department of Justice Canada.
- .1 Canadian Environmental Protection Act (CEPA), 1999.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
- .1 Material Safety Data Sheets (MSDS).
- .3 Transport Canada (TC).
- .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .4 Ontario Ministry of Environment (MoE).
- .1 R.R.O. 1990, Reg. 347, General – Waste Management, as amended.
- .5 Ontario Ministry of Labour (MoL).
- .1 Occupational Health and Safety Act, R.S.O. 1990, c. O.1 (OHSA).
  - .1 O.Reg. 213/91, Construction Projects.
  - .2 R.R.O. 1990, Regulation 490/09, “Designated Substances”.
- .2 Guideline: Lead on Construction Projects, September 2004, as revised.
- .6 Canada Consumer Product Safety Act *Surface Coating Materials Regulations* SOR/2005-109, as amended.

**1.4 DEFINITIONS**

- .1 Airlock: system for permitting ingress or egress without permitting air movement between contaminated area and uncontaminated area, typically consisting of two curtained doorways at least 2 m apart unless Site Conditions dictate otherwise.
- .2 Authorized Visitors: Departmental Representatives or designated representatives, and representatives of regulatory agencies.

- .3 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed by placing 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. Reinforce free edges of polyethylene with duct tape and weight bottom edge to ensure proper closing. Overlap each polyethylene sheet at openings not less than 1.5 m on each side unless Site Conditions dictate otherwise.
- .4 Hazardous Material Workplan: A brief report identifying the location and quantities of hazardous materials and the methods that will be used to remove, store, transport and dispose of them.
- .5 Lead-Containing Paint: Paint that contains lead in measurable concentrations, that may result in elevated airborne lead exposure during operations that disturb the paint.
- .6 Lead-Containing Mortar: Mortar that contains lead in measurable concentrations, that may result in elevated airborne lead exposure during operations that disturb the mortar.
- .7 Lead-containing materials: Materials that are assumed to contain varying levels of lead from their historic composition.
- .8 Lead-containing equipment: Equipment suspected of containing lead through historic application, or identified as lead containing through labels/tags.
- .9 Occupied Area: any area of building or work site that is outside the Lead Work Area.

## **1.5**

### **ACTION AND INFORMATION SUBMITTALS**

- .1 One (1) week prior to the start of abatement work, submit proposed methodology for abatement procedures for review by Departmental Representative. The proposed methodology shall include:
  - .1 Products to be used complete with MSDS information.
  - .2 List of protective equipment to be used by workers.
  - .3 Plan identifying area(s) of work for abatement procedures.
  - .4 Requirements for engineering controls, ventilation, etc.
  - .5 Requirements for access to and egress from the Lead Work Area.
  - .6 A written Health and Safety Plan specific to work of this Section. As a minimum this document must include:
    - .1 Classification of all lead abatement work in accordance with the criteria used in the document Guideline: Lead on Construction Projects issued by the Ontario Ministry of Labour.
    - .2 The identity of the “competent person” who will, on behalf of the Contractor, perform regular inspections of the lead abatement activities to prevent dangerous, unhealthy or unsafe conditions. The “competent person” must be on site at all times while lead abatement activities are in progress.

**LEAD PRODUCTS REMOVAL  
PRECAUTIONARY MEASURES**

- .3 A description of the equipment and materials, controls, crew size, job responsibilities, and operations and maintenance procedures for each activity involved in the work of this Section.
- .4 A description of the specific control methods to be used in the lead-containing paint, surface coatings and mortar abatement processes.
- .5 A strategy to ensure that personnel are not exposed to airborne lead or other contaminants in concentrations that exceed the current Time Weighted Average Exposure Value (TWAEV).
- .6 A description of the medical surveillance program in place for lead abatement workers.
- .7 Names of products to be used in lead abatement work.
- .2 Before beginning work:
  - .1 Obtain from appropriate agency and submit to Departmental Representative all necessary permits for transportation and disposal of lead-containing waste. Ensure that dump operator is fully aware of hazardous nature of material being dumped, and proper methods of disposal.
  - .2 Submit proof satisfactory to Departmental Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, use of showers, entry and exit from work areas, and aspects of work procedures and protective measures.
  - .3 Submit proof in the form of a certificate that supervisory personnel have attended a lead-containing paint abatement course, of not less than 1-day duration.
  - .3 For each load of waste that leaves the site, submit landfill weigh scale receipts, shipping documents, and lead-containing waste manifests, as applicable based upon waste characterization.
  - .4 Lead abatement section within Hazardous Material Work Plan.

**1.6****QUALITY ASSURANCE**

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to asbestos, provided that in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
  - .1 Safety Requirements: worker and visitor protection.
    - .1 Eating, drinking, chewing, and smoking are not permitted in the Lead Work Area.
    - .2 Washing facilities consisting of a wash basin, water, soap and towels shall be provided by the Contractor. All workers shall use these washing facilities before eating, drinking, smoking or leaving the work site. Washing facility areas are to be designated by Departmental Representative
    - .3 Protective equipment and clothing to be worn by workers while in the Lead Work Area includes:

**LEAD PRODUCTS REMOVAL  
PRECAUTIONARY MEASURES**

- .1 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres, consisting of full-body covering including head covering with snug-fitting cuffs at wrists, ankles, and neck.
- .2 Respirator, personally issued to worker and marked as to efficiency and purpose, and acceptable to Authority having jurisdiction as suitable for level of lead exposure in the Lead Work Area. If disposable type filters are used, provide sufficient filters so that workers can install new filters following disposal of used filters and before re-entering contaminated areas.
- .4 Ensure that no person required to enter the Lead Work Area has facial hair that affects seal between respirator and face.
- .5 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 the Lead Work Area.

**1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Representative sampling of lead-containing materials that is representative of the applicable waste stream (i.e. sampling to include substrate material as applicable) shall be performed by a competent person retained by the Contractor prior to disposal of lead-containing materials. Lead-containing waste streams are to be classified for disposal purposes using the Toxicity Characteristic Leachate Procedure at a certified analytical laboratory. All sampling procedures and submissions shall be approved of by the Departmental Representative.
- .2 Place materials characterized as hazardous or toxic based upon leachate analysis in designated containers.
- .3 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .4 Disposal of lead waste, including wash and rinse water, generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Label containers with appropriate warning labels.
- .5 Provide manifests describing and listing waste created. Transport containers by approved means to licensed facility for disposal.

**1.8 EXISTING CONDITIONS**

- .1 Surface coatings within the project areas have been confirmed or are assumed to contain lead in concentrations that may result in a health risk during demolition activities. Other lead-containing materials and materials suspected of containing lead include the following:
  - solder on copper piping and copper shielding;

- ceramic tile glazing;
  - terrazzo floor joints;
  - emergency light, server room and other batteries; and,
  - cast iron joint caulking.
- .2 Refer to the following documentation for details on lead-containing materials:
- .1 Specification Section 01 14 25 – Designated Substance Report.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 All materials brought to project site must be in good condition and free of lead dust. Disposable items must be of new materials only.
- .2 Lead Waste Container: An impermeable container acceptable to disposal site and Ministry of Environment. Labelled as required. Comprised of one of the following:
- .1 A 0.15 mm sealed polyethylene bag, inside a second 0.15 mm sealed polyethylene bag.
- .2 A barrel suitable for lead wash water and/or sludge. Container must be acceptable to the waste hauler.
- .3 Lead Cleaning Agent: A cleaning agent suitable for lead dust. Acceptable products:
- .1 Detergents with a high phosphate content (containing at least 5% trisodium phosphate).
- .2 Phosphate-free lead dissolving agent.
- .4 FR polyethylene: minimum 0.15 mm thick, woven fibre reinforced fabric bonded both sides with polyethylene.
- .5 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions.

### **2.2 EQUIPMENT**

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Sprayer: Garden reservoir type, low velocity, capable of producing a mist or fine spray.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Scaffolding
- .1 Scaffolding in accordance with CAN/CSA-S269.2.

- .2 All exterior lead-abatement work that requires workers to wear disposable type protective clothing and respirators shall be obstructed from public view through the use of visual barriers.

### **3.2 ABATEMENT WORK AREA PREPERATION**

- .1 Implement lead precautionary measures appropriate to the work completed in accordance with MOL Guideline: Lead on Construction Projects, September 2004 as revised.
- .2 Type 1 Work Areas:
  - .1 Install polyethylene drop sheets below lead operations which produce or may produce dust, chips, or debris containing lead.
- .3 Type 2 Work Areas:
  - .1 Install polyethylene drop sheets below lead operations which produce or may produce dust, chips, or debris containing lead.
  - .2 Post signs in sufficient numbers to warn of the lead hazard. There shall be a sign, at least, at each entrance to the Lead Work Area. The signs shall display the following information in large, clearly visible letters using both official languages:
    - .1 Lead dust, fume or mist hazard.
    - .2 Access to the work area is restricted to authorized persons.
    - .3 Respirators must be worn in the work area.
  - .4 Type 3 Work Areas:
    - .1 Post signs in sufficient numbers to warn of the lead hazard. There shall be a sign, at least, at each entrance to the Lead Work Area. The signs shall display the following information in large, clearly visible letters using both official languages:
      - .1 Lead dust, fume or mist hazard.
      - .2 Access to the work area is restricted to authorized persons.
      - .3 Respirators must be worn in the work area.
    - .2 Barriers, Partial Enclosures and Full Enclosures: Barriers, partial enclosures, and full enclosures shall be constructed to separate the Lead Work Area from the rest of the project. Barriers shall only be used where full and partial enclosures are not practical.
      - .1 Barriers:
        - .1 Ropes or barriers do not prevent the release of contaminated dust or other contaminants into the environment. However, they can be used to restrict access of workers who are not adequately protected with proper PPE, and also prevent the entry of workers not directly involved in the operation. Ropes or barriers shall be placed at a distance far enough from the operation that allows the lead-containing dust to settle. If this is not achievable, warning signs should be posted at the distance where the lead-containing dust settles to warn that access is restricted to persons wearing PPE.
      - .2 Partial Enclosures:

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- .1 Partial enclosures allow some emissions to the atmosphere outside of the enclosure. Partial enclosures may consist of vertical tarps and floor tarps so long as the tarps are overlapped and securely fixed together at the seams. A partial enclosure is not a suitable containment system if significant dust is being generated.
- .3 Full Enclosures:
  - .1 Full enclosures are tight enclosures (with tarps that are generally impermeable and fully sealed joints and entryways). Full enclosures allow minimal or no fugitive emissions to reach the environment outside of the Lead Work Area. For full enclosures, the following requirements shall be met:
    - .1 The enclosure shall be constructed of windproof materials that are impermeable to dust.
    - .2 The enclosure shall be supported by a secure structure.
    - .3 All joints in the enclosure shall be fully sealed.
    - .4 Entrances to the enclosure shall be equipped with air locks.
    - .5 The escape of abrasive and debris from the enclosure shall be controlled, at air supply points, by the use of baffles, louvers, flap seals and filters.
- .3 Worker Decontamination Enclosure System: Worker Decontamination Enclosure System includes Equipment and Access Room, Shower Room, and Clean Room, as follows:
  - .1 Construct Worker Decontamination Enclosure System as close to the work area as possible in area specified by Departmental Representative. Submit layout of proposed enclosures and decontamination facilities including location to Departmental Representative for review.
  - .2 Equipment and Access Room: build an Equipment and Access Room between Shower Room and Lead Work Area, with two curtained doorways, one to Shower Room and one to Lead Work Area. Install a waste receptor and storage facilities for workers' shoes and protective clothing to be reworn in Lead Work Area. Build Equipment and Access Room large enough to accommodate specified facilities, other equipment needed, and at least one worker allowing him /her sufficient space to undress comfortably.
  - .3 Shower Room: build a Shower Room between Clean Room and Equipment and Access Room, with two curtained doorways, one to Clean Room and one to Equipment and Access Room. Provide one shower for every five or fewer workers. Provide constant supply of hot and cold, or warm (between 40°C and 50°C) potable water. Provide piping and connect to water sources and drains. Provide soap, clean towels, and appropriate containers for disposal of used respirator filters.
  - .4 Clean Room: build a Clean Room between Shower Room and clean areas outside of enclosures, with two curtained doorways, one to outside of enclosures and one to Shower Room. Provide



lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install a mirror to permit workers to fit respiratory equipment properly.

- .4 Maintenance of Enclosures:
  - .1 Maintain enclosures in tidy condition.
  - .2 Ensure that barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.
  - .3 Visually inspect enclosures at beginning of each working period.
- .5 Do not begin lead abatement work until:
  - .1 Arrangements have been made for disposal of lead-containing waste.
  - .2 Arrangements have been made for containing, filtering, testing and disposal of waste water.
  - .3 Work areas, decontamination enclosures and parts of project site required to remain in use are effectively segregated.
  - .4 Tools, equipment, and materials waste containers are on hand.
  - .5 Arrangements have been made for building security.
  - .6 Warning signs are displayed where access to contaminated areas is possible.
  - .7 Notifications have been completed and other preparatory steps have been taken.
  - .8 Departmental Representative has reviewed preparatory work and provided written approval for lead abatement work to proceed.

### **3.3 SUPERVISION**

- .1 Minimum of one Supervisor for every ten or fewer workers is required.
- .2 Approved Supervisor must remain within Lead Work Area during disturbance, removal, or other handling of lead-containing paint and other lead contaminated materials.

### **3.4 LEAD REMOVAL**

- .1 The removal or disturbance of asbestos-containing materials coated with lead-containing coatings must also be performed using appropriate asbestos precautions as outlined in the relevant Section.
  - .1 Section 02 82 00.01 – Asbestos Abatement, Minimum Precautions.
  - .2 Section 02 82 00.02 – Asbestos Abatement, Intermediate Precautions.
  - .3 Section 02 82 00.03 – Asbestos Abatement, Maximum Precautions.
- .2 Before removing lead-containing paint, mortar or disturbing other lead containing or contaminated materials:
  - .1 Prepare site.
  - .2 Spray surfaces to be disturbed, that are finished with lead-containing paint, with water using airless spray equipment capable of providing a “mist” application to prevent the release of dust.
  - .3 Exterior lead-containing paint, surface coating and mortar removal:

**LEAD PRODUCTS REMOVAL  
PRECAUTIONARY MEASURES**

- 
- .1 Prohibited methods of exterior lead-containing paint, surface coating and mortar removals include:
    - .1 Open flame burning, torching, fossil fuel-powered heat plates, welding, cutting torches, and heat guns operating at temperatures greater than 590°C.
  - .2 Methods of lead-containing paint, surface coating and mortar removal that may be used, pending approval from the Departmental Representative, include:
    - .1 Powered tools equipped with HEPA dust collection systems.
    - .2 Other method(s) at the sole discretion of the Departmental Representative.
  - .4 Interior lead-containing paint, surface coating and mortar removal:
    - .1 Methods of lead-containing paint, surface coating and mortar removal that may be used, pending approval from the Departmental Representative, include:
      - .1 Dry, manual scraping.
      - .2 Powered tools equipped with HEPA dust collection systems.
      - .3 Other method(s) at the sole discretion of the Departmental Representative
  - .5 Lead-containing emergency light batteries and other miscellaneous equipment batteries must be disposed of appropriately and recycled where possible.
    - .1 Handle lead-containing batteries in such a manner so as to prohibit generation and/or ingestion of lead dust.
  - .6 Use appropriate lead precautions when handling lead-containing solder on piping and on the joints of exterior copper roofing.
    - .1 Handle lead-containing solder in such a manner so as to prohibit generation and/or ingestion of lead dust.
  - .7 Use appropriate lead precautions when handling glazing on ceramic tiles.
    - .1 Handle lead-containing ceramic tile glazing in such a manner so as to prohibit generation and/or ingestion of lead dust.
  - .8 At completion of lead-containing paint, surface coatings and mortar removals, perform the following clean-up:
    - .1 Wait at least 1-hour after active lead abatement work has ceased to allow airborne lead particles to settle.
    - .2 HEPA vacuum all surfaces within the Lead Work Area. Start vacuuming at the highest levels furthest from the Decontamination Facilities and work progressively downwards towards the Decontamination Facilities.
    - .3 Wash all surfaces with Lead Cleaning Agent and rinse with clean water. Start washing and rinsing at the highest levels furthest from the Decontamination Facilities and work progressively downwards towards the Decontamination Facilities.
    - .4 Repeat HEPA vacuuming, washing and rinsing as required to achieve clearance criteria.

**3.5 INSPECTION**

- .1 Perform inspections of Lead Work Area to confirm compliance with specification and requirements of authorities having jurisdiction. Deviation from these requirements that have not been approved in writing by the Departmental Representative may result in Work stoppage, at no cost to Owner.
- .2 Departmental Representative will inspect Work for:
  - .1 Adherence to specific procedures and materials.
  - .2 Final cleanliness and completion.
  - .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.
- .3 When a leakage of liquid, dust or fume from the Lead Work Area has occurred or is likely to occur the Departmental Representative Construction Manager may order Work shutdown.
- .1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

**3.6 AIR MONITORING AND SURFACE WIPE SAMPLING**

- .1 From beginning of Work until completion of cleaning operations, the Departmental Representative may be on site to collect air samples either inside or outside of the Lead Work Area in accordance with standard methods for workplace air sampling and analysis.
- .1 This air monitoring does not relieve the Contractor of any responsibility for air monitoring inside the Lead Work Area to verify that the respiratory protection in use provides a suitable protection factor.
- .2 Use results of air monitoring inside the Lead Work Area to establish type of respirators to be used. Workers may be required to wear sample pumps for up to full-shift periods.
- .1 If airborne lead concentrations are above the protection factor of respirators in use, the Contractor shall:
  - .1 Stop abatement.
  - .2 Introduce more stringent engineering controls.
  - .3 Use a higher protection factor in respiratory protection for persons inside the Lead Work Area.
- .2 If air monitoring shows that airborne lead concentrations outside the Lead Work Area exceed 0.025 mg/m<sup>3</sup>, the Contractor shall maintain and clean these areas, in same manner as applicable to the Lead Work Area, at no additional cost to the Departmental Representative.
- .3 Final clearance air monitoring will be performed at the sole discretion of the Departmental Representative.
- .1 Final air monitoring results must show airborne lead levels less than 0.005 mg/m<sup>3</sup>.
- .2 If air monitoring results show airborne lead levels in excess of 0.005 mg/m<sup>3</sup>, the Contractor shall re-clean the Lead Work Area at no additional cost to the Departmental Representative or owner.

- .3 Repeat as necessary until airborne lead levels are less than 0.005 mg/m<sup>3</sup>.
- .4 The following criteria shall be used to define an acceptable level of cleanliness after lead abatement activities:
  - .1 Where removal of paints, other surface coatings and mortars has been performed to accommodate the project scope of work:
    - .1 Visibly free of paint(s), primer(s), surface coating(s), mortars, and/or associated dust.
    - .2 Residual lead dust concentration less than:
      - .1 430 micrograms/square metre for interior floor surfaces
      - .2 2,691 micrograms/square metre for interior windowsills
      - .3 8,611 micrograms/square metre for exterior surfaces
      - .4 Repeat cleaning as necessary until lead concentrations are below specified levels, at no additional cost to the Departmental Representative or owner.

**3.7****FINAL CLEANUP**

- .1 Following cleaning specified in Item 3.4.8 above, and when the Lead Work Area has met the air monitoring and residual lead dust levels specified in Item 3.6 as well as inspection criteria specified in Item 3.5, proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it towards the centre of the Lead Work Area. Immediately vacuum any visible paint chips, particles, dust and debris observed during cleanup using HEPA vacuum equipment.
- .3 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in sealed labelled waste containers for transport.
- .4 Include in clean-up Work areas, Equipment and Access Room, Shower Room, and other contaminated enclosures.
- .5 Include in clean-up sealed waste containers and equipment used in Work and remove from work areas, at appropriate time in cleaning sequence.
- .6 A final check may be carried out to ensure that no lead dust or debris remains on surfaces as a result of dismantling operations.
- .7 As work progresses, and to prevent exceeding available storage capacity on site, remove sealed and labelled waste containers.
- .1 Dispose of lead-containing waste in accordance with R.R.O. 1990, Regulation 347, as amended. Ensure that waste hauler and receiver are fully aware of hazardous nature of material to be disposed of and that guidelines and regulations for lead-containing waste disposal are followed.
- .2 Ensure that materials removed during the Work of this Section are treated, packaged, transported and disposed of as lead-containing waste.
- .3 Clean up waste routes and loading area after each load. Use lead abatement procedures if appropriate or requested by Departmental Representative.
- .4 Drop garbage bins at designated locations. Keep bins covered and enclosed while at the site. Bin loading area shall be kept clean at all times.

- .5 Transport all waste to a landfill licensed by the Ontario Ministry of Environment (MOE).
- .6 Provide Departmental Representative with copies of shipping documents and lead-containing waste manifests for each load of waste. The Contractor is responsible to ensure that written documentation is submitted for each load of waste leaving the site.
- .7 Cooperate with MOE inspectors and immediately carry out instructions for remedial work at landfill to maintain environment, at no additional cost to the Departmental Representative.

**END OF SECTION**

**Part 1 General****1.1 SUMMARY**

- .1 This section specifies requirements and procedures for silica precautionary measures. This section conforms to the requirements of the Ontario Occupational Health and Safety Act, R.S.O. 1990, Regulation 490/09 "Designated Substances".
- .2 Comply with the requirements of this Section when performing the following work:
  - .1 Work at site which may involve contact with silica dust generated through such processes as sawing, cutting, grinding, blasting and/or breaking of the silica containing material.
- .3 Silica is present in concrete, drywall, stipple ceilings, marble, mortar, terrazzo, drywall, ceramic tiles, and ceiling tiles were within all of the project areas (Buildings 2, 3, 4, 5, and 6). Refer to the following documentation for details on silica-containing materials:
  - .1 Specification Section 01 14 25 – Designated Substance Report.

**1.2 RELATED SECTIONS**

- .1 Section 01 14 25 – Designated Substance Report
- .2 Section 02 82 00.01 – Asbestos Abatement: Minimum Precautions.
- .3 Section 02 82 00.02 – Asbestos Abatement: Intermediate Precautions.
- .4 Section 02 82 00.03 – Asbestos Abatement: Maximum Precautions.
- .5 Section 02 83 20 – Lead Products Removal: Precautionary Measures

**1.3 REFERENCES**

- .1 Comply with current Federal, Provincial, and local requirements pertaining to silica, provided that in case of conflict among these requirements or with these specifications the more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Federal Legislation
  - .1 Canada Labour Code and associated regulations.
- .3 Provincial legislation
  - .1 Ontario Occupational Health and Safety Act, R.S.O. 1990, Regulation 490/09 "Designated Substances".

**1.4 DEFINITIONS**

- .1 **Dangerous Goods:** product, substance, or organism that is specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 **Hazardous Material:** product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.

- .3 **Hazardous Material Workplan:** A brief report identifying the location and quantities of hazardous materials and the methods that will be used to remove, store, transport and dispose of them.
- .4 **Workplace Hazardous Materials Information System (WHMIS):** Canada-wide system designed to give employers and workers information about hazardous materials used in workplace. Under WHMIS, information on hazardous materials is provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by combination of federal and provincial laws.

## 1.5 SUBMITTALS

- .1 Silica abatement section within Hazardous Material Work Plan.

## 1.6 PRECAUTIONARY MEASURES AND PROCEDURES

- .1 Execute work by methods to minimize raising silica dust from demolition operations. Where practical, wet methods or a dust collection system should be used to reduce dust.
- .2 Adequate ventilation, including local exhaust ventilation, should be maintained to prevent the accumulation and recirculation of harmful concentrations of free crystalline silica in the work area.
- .3 As practical, processes that generate silica dust should be completed in enclosed areas wherever possible to prevent the spread of silica dust outside of the work area.
- .4 Implement and maintain silica dust control measures during work to ensure that silica levels do not exceed allowable limits.
- .5 Departmental Representative may stop work at any time when release of silica dust to adjacent area is suspected. Contractor must discuss procedures that Contractor proposes to resolve problem. Make all necessary changes to operations prior to resuming any demolition activities that may cause release of silica dust at no extra cost to the Departmental Representative.
- .6 Silica dust should be cleaned from machinery and work surfaces by wet sweeping, the use of sweeping compounds or vacuum cleaners fitted with a HEPA filter to prevent the recirculation of dusty air. Cleaning methods such as blowing with compressed air or dry sweeping should be avoided. Where exposure to free crystalline silica occurs, protective work clothing should be vacuumed before removal.
- .7 Store material containing silica dust in closed containers or use other appropriate means to prevent dust from becoming airborne.

## 1.7 PERSONAL PROTECTIVE EQUIPMENT

- .1 Anticipated minimum levels of personal protection based on work activity involving silica dust are listed below and are in addition to the personal protective equipment required for the completion of the demolition activities. Personal protection are dependent on the work practices and associated silica exposure risks.
  - .1 Air purifying half-mask respirator equipped with HEPA filter cartridges or supplied-air type, personally issued to the worker and marked as to efficiency and purpose, and acceptable to the Provincial Authority having

jurisdiction as suitable for silica and the level of silica exposure in the Work Area. If disposable type filters are used, provide sufficient filters so that workers can install new filters following disposal of used filters and before re-entering contaminated areas.

- .2 Eye Protection: Goggles, Safety glasses with side shields, or Face shield.
- .3 If requested by a worker,
  - .1 Hand Protection: Gloves
  - .2 Clothing: Full body protective clothing

## **1.8 AIR MONITORING**

- .1 If air monitoring shows that work areas contain crystalline silica above the specified action levels, these areas shall be cleaned by previously outlined methods at no additional cost to the Departmental Representative.

## **1.9 PERMITS**

- .1 Contractor is responsible to obtain all necessary permits, licenses and approvals to conduct the abatement (e.g. Ontario Ministry of the Environment (MOE) waste generating number, etc.).

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

## **Part 3 Execution**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**