

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 07 03 46 Historic – Wood Siding.
- .2 Section 08 03 12 Historic – Doors.
- .3 Section 08 03 52.71 Historic – Wood Window Rehabilitation.
- .4 Section 08 03 80 Historic – Glazing.

1.02 REFERENCES

- .1 Definitions:
 - .1 Demolition: rapid destruction of building following removal of hazardous materials.
 - .2 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well-being or environment if handled improperly.
- .2 Reference Standards:
 - .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .2 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Site Meetings.
 - .1 Convene pre-demolition meeting one week prior to beginning work of this Section in accordance with Section 01 32 16.06 - Construction Progress Schedule - Critical Path Method (CPM) to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
 - .2 Arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work, prior to start of Work.
 - .3 Ensure site supervisor project manager subcontractor representatives attend.
 - .4 Departmental Representative will provide written notification of change of meeting schedule established upon contract award 24 hours prior to scheduled meeting.
- .2 Scheduling: meet project time lines without compromising specified minimum rates of material diversion.
 - .1 Notify Departmental Representative in writing when unforeseen delays occur.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning, where required by authorities having jurisdiction.
- .3 Hazardous Materials:
 - .1 Provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.
- .4 Waste Reduction Workplan:
 - .1 Prior to beginning of Work on site submit detailed Waste Reduction Workplan in accordance with Section 01 00 10 - General Instructions
- .5 Certificates:
 - .1 Submit copies of certified weigh bills receipts from authorized disposal sites and reuse and recycling facilities for material removed from site upon request of Departmental Representative.
- .6 Photographic Documentation:
 - .1 Submit within three (3) working days after of Notice to Proceed, minimum one hundred (100) photographs prior to commencing work.
 - .1 Where work is performed in groups, submit with the advancement of each group of work.
 - .2 Photographs, showing existing conditions of work areas and materials, taken from both the interior and exterior to include:
 - .1 General views of work areas.
 - .2 Detailed images for each door or window unit showing condition and appearance of all facets, and any unique conditions.
 - .3 Detailed images for each historic woodwork unit showing condition and appearance of all facets, and any unique conditions.
 - .4 Detailed images for historic clapboard and shingle showing typical conditions and any unique conditions.
 - .5 Detailed images of existing conditions exposed by demolition work.
 - .6 Clearly identify unit number and date of exposure on each photo. Use of an erasable portable whiteboards is recommended.
 - .3 Submit printed and digital format sample to Departmental Representative for review, prior to commencing work.
 - .1 Submit 227 x 184 mm printed photographs in archival mountings, assembled into a binder.

1.05 QUALITY ASSURANCE

- .1 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial regulations.
- .2 Qualifications: provide adequate workforce training through meetings and demonstrations. Have someone on site with deconstruction experience throughout project for consultation and supervision purposes.

1.06 DELIVERY, STORAGE AND HANDLING

- .1 Store and manage hazardous materials in accordance with Section 02 82 00. 01 – Asbestos Abatement – Minimum Precautions and Section 02 83 20 – Lead Abatement.
- .2 Storage and Protection.
 - .1 Store materials salvaged for reuse in locations as directed by Departmental Representative.
 - .2 Maximum permitted duration of material storage on site determined in consultation with Departmental Representative.
 - .3 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Departmental Representative and at no cost to Departmental Representative.
 - .4 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.
 - .5 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping. Provide bracing shoring underpinning as required. Repair damage caused by deconstruction as directed by Departmental Representative.
 - .6 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems.
- .3 Packaging Waste Management: remove for reuse and return of pallets, crates, padding, and packaging materials in accordance with Section 01 00 10 – General Instructions, Waste Management and applicable regulations.

1.07 SITE CONDITIONS

- .1 Site Environmental Requirements.
 - .1 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .2 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .1 Ensure proper disposal procedures are maintained throughout the project.
 - .3 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.

- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities as directed by Departmental Representative.
- .5 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .2 Existing Conditions.
 - .1 Remove contaminated or hazardous materials as defined by authorities having jurisdiction as directed by Departmental Representative from site, prior to start of demolition Work, and dispose of at designated disposal facilities in safe manner in accordance with applicable regulatory requirements, Section 02 82 00. 01 – Asbestos Abatement – Minimum Precautions and Section 02 83 20 – Lead Abatement.
 - .2 List of hazardous materials:
 - .1 Asbestos.
 - .2 Lead.

PART 2 PRODUCTS

2.01 EQUIPMENT

- .1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.
- .2 Demonstrate that tools are being used in manner which allows for salvage of materials in best condition possible.

PART 3 EXECUTION

3.01 SITE VERIFICATION OF CONDITIONS

- .1 Employ necessary means to assess site conditions and structures to determine quantity and locations of hazardous materials.
- .2 Investigate site and structures to determine dismantling, processing and storage logistics required prior to beginning of Work.
- .3 Develop strategy for deconstruction to facilitate optimum salvage of reusable and recyclable materials.

3.02 PREPARATION

- .1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.

3.03 REMOVAL OF HAZARDOUS WASTES

- .1 Remove contaminated or dangerous materials defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

3.04 REMOVAL OPERATIONS

- .1 Remove items as indicated.
- .2 Dismantle woodwork as per Section 07 03 46 – Historic – Wood Siding.
- .3 Dismantle door or windows elements as per Section 08 03 52.71 – Historic – Wood Window Rehabilitation.
- .4 Do not disturb items designated to remain in place.
 - .1 Items to be left in place for in situ restoration or refinishing:
 - .1 Verandah including posts, flooring, soffit, skirting, banding, stairs, handrail.
 - .2 Fascia and racking soffits at dormers;
 - .3 Racking soffits at gables.
 - .4 Door and window frames.
- .5 Salvage:
 - .1 Items to be salvaged for reuse:
 - .1 Middle band mouldings 75% reuse: salvaged elements are generally located on East and North elevations.
 - .2 Corner boards at junction of East and North elevation where protected by the verandah.
 - .3 Hoods, brackets and associated mouldings of East and West elevation.
 - .4 Gable ends.
 - .5 Dormer gable ends.
 - .6 Door and window casings unless otherwise indicated on the door and window schedules or drawings.
 - .7 Window sashes, storms and screens unless otherwise indicated on the window schedule.
 - .8 Window glazing unless otherwise indicated on the window schedule.
 - .9 Door and window hardware unless otherwise indicated on the door and window schedules.
 - .10 25% of roof sheathing intended for repair of wall sheathing.
 - .2 Dismantle items containing materials for salvage and stockpile salvaged materials at locations as indicated.
- .6 Disposal of Material:
 - .1 Dispose of materials not designated for salvage or reuse on site as instructed by Departmental Representative at authorized facilities.

3.05 DISASSEMBLY

- .1 Materials removed from designated structures for disposal and salvage are property respectively of Contractor and Departmental Representative.
- .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 Workers must utilize adequate fall protection where necessary.
- .6 Source separate for recycling materials that cannot be salvaged for reuse including wood and metal.
- .7 Remove materials that cannot be salvaged for reuse or recycling and dispose of in accordance with applicable codes at licensed facilities.
- .8 Where existing materials are to be re-used in Work, use special care in removal, handling, storage and re-installation to assure proper function in completed work.

3.06 PROCESSING

- .1 Designate location for processing of materials which eliminates double handling and provides adequate space to maintain efficient material flow.
- .2 Separate materials to ensure best possible condition of salvaged materials.
- .3 Keep processing area clean and free of excess debris.
- .4 Separate processed materials into organized piles for stockpiling. Provide collection area for materials processed. Pile materials on pallets to facilitate transport off-site or to storage areas.

3.07 STOCKPILING

- .1 Label stockpiles, indicating material type and quantity.
- .2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.
- .3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.
- .4 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.

3.08 REMOVAL FROM SITE

- .1 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project.
- .2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

- .3 Transport material designated for alternate disposal using approved haulers facilities receiving organizations and in accordance with applicable regulations.
- .4 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.09 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of Work.
- .2 Restore lawn and paving damaged due to use and storage of lifting devices and other equipment used for work.
- .3 Use treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.10 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 –Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Remove debris, trim surfaces and leave work site clean, upon completion of Work
 - .3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

3.11 PROTECTION

- .1 Repair damage to adjacent materials or property caused by selective site demolition.

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 (window putty/window caulking), if the material is removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
 - .2 Removal of non-friable asbestos-containing materials (window putty/window caulking) 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.
- .2 Refer to the Specification Section 01 14 25 – Designated Substance Report for details on asbestos-containing materials.

1.2 RELATED REQUIREMENTS

- .1 Section 01 14 25 – Designated Substance Report
- .2 Section 02 83 20 – Lead Abatement

1.3 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.

1.4 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 Work Plan: 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.

1.5 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.

1.6 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, 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 must 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.

1.7 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.

1.8 EXISTING CONDITIONS

- .1 Refer to the Specification Section 01 14 25 – Designated Substance Report for details on asbestos-containing materials.
- .2 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.

1.9 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.

1.10 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 include the 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.
 - .4 Ensure debris does not fall from one work area to another.
- .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 or ground that absorbs dust and over flooring in asbestos work area where dust and contamination cannot

otherwise be safely contained. Do not allow asbestos to fall freely from one work level to another.

- .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 the 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, the 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.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Lead procedures for the removal/disturbance/repair of lead-containing surface coating materials on various building components, and other lead containing materials or materials suspected or assumed of containing lead if required to accommodate the project scope of work.
- .2 Refer to the Specification Section 01 14 25 – Designated Substance Report for details on lead-containing materials.

1.2 RELATED SECTIONS

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

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
 - .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 materials: Materials that are assumed to contain varying levels of lead from their historic composition (e.g. lead sheeting)
- .7 Lead-containing equipment: Equipment suspected of containing lead through historic application, or identified as lead containing through labels/tags.
- .8 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.
- .2 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.
 - .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 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/removal work.
- .3 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.
 - .4 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.
 - .5 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 lead, 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:
 - .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 Based on Toxicity Characteristic Leaching Procedure (TCLP) sampling in accordance with O. Reg 347/90, as amended, sample results have identified loose and delaminating paints as hazardous for disposal with respect to lead. As such, loose and delaminating paints (including dust and debris) shall be disposed of as hazardous lead waste, in accordance with O. Reg 347/90, as amended, unless proven otherwise by additional leachate sampling and laboratory analysis. However, painted wood substrate materials for which the paint is firmly adhered can be considered non-hazardous for disposal with respect to lead.
- .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 and waste receipts describing and listing waste created and that disposal has been completed in accordance with provincial and federal requirements to Department Representative. Transport containers by approved means to licensed facility for disposal.

1.8 EXISTING CONDITIONS

- .1 Refer to Specification Section 01 14 25 – Designated Substance report for details on lead-containing materials.
- .2 Notify Departmental Representative of lead-containing materials discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from Departmental Representative.

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 All exterior lead-abatement work that requires workers to wear disposal type protective clothing and respirators shall be obstructed from public view through the use of visual barriers.
- .2 Scaffolding
 - .1 Scaffolding in accordance with CAN/CSA-S269.2 and O.Reg 213/91, as amended.

3.2 ABATEMENT WORK AREA PREPERATION

- .1 Implement lead precautionary measures appropriate to the work to be completed in accordance with MOL Guideline: Lead on Construction Projects, September 2004 as amended. All work procedures shall and must be approved in writing by Departmental Representative prior to work.

- .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.
 - .3 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.
 - .4 Partial Enclosures:
 - .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.
- .5 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.
- .5 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 re-worn 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.
- .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.
- .7 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 (e.g. window putty/caulking) 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 Before removing lead-containing paint, 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 and interior lead-containing paint and surface coating removal:
 - .1 Prohibited methods of exterior lead-containing paint and surface coating 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 and surface coating 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 At completion of lead-containing paint, surface coatings, 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 the Departmental Representative.
- .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^3 , 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^3 .
 - .2 If air monitoring results show airborne lead levels in excess of 0.005 mg/m^3 , 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^3 .
- .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 has been performed to accommodate the project scope of work:
 - .2 Visibly free of paint(s), primer(s), surface coating, and/or associated dust.
 - .3 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.

3.7 FINAL CLEANUP

- .1 Following cleaning specified above, and when the Lead Work Area has met the air monitoring and residual lead dust levels specified above as well as inspection criteria specified above, 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