

PART 1 – GENERAL

1.1 REFERENCES

1. Federal Legislation
 1. Canada Labour Code, Part II, section 124 and 125. Canada Occupational Health and Safety Regulations (SOR/86-304).
 2. Transportation of Dangerous Goods Act, 1992 (TDGA)
 3. Canada Consumer Product Safety Act
 1. Surface Coating Materials Regulations SOR/2005-109.
 4. Canadian Environmental Protection Act, 1999 (CEPA)
 1. PCB Regulations (SOR/2008-273)
 2. Federal Halocarbon Regulations, 2003 (SOR/2003-289)
2. Provincial Legislation
 1. Ontario Occupational Health and Safety Act, R.S.O. 1990, 2010 edition.
 1. Ontario Regulation 490/09 – Designated Substances (O.Reg. 490/09).
 2. Ontario Regulation 278/05 – Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations, (O.Reg. 278/05).
 3. Ontario Regulation 213/91 for Construction Projects (O.Reg. 213/91)
 2. Ontario Environmental Protection Act, R.R.O. 1990,
 1. Ontario Regulation 347/09, General – Waste Management (O.Reg. 347/09).
 2. Ontario Regulation 362/90 – Waste Management, PCBs (O.Reg. 362/90)
 3. Ontario Regulation 463/10, Ozone Depleting Substances and Other Halocarbons (O.Reg. 463/10).
3. Canadian General Standards Board (CGSB).
4. Canadian Standards Association (CSA International). CAN/CSA-Z94.4-11 Respiratory Protection
5. Underwriters' Laboratories of Canada (ULC).
6. American Conference of Governmental and Industrial Hygienist's Threshold Limit Values (TLV's) and Biological Exposure Indices (BEIs) 2013

1.2 DEFINITIONS

Asbestos-Containing Materials (ACMs): means material that contains 0.5 per cent or more asbestos by dry weight as per Ontario Regulation 278/05.

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.

HEPA vacuum: High Efficiency Particulate Arrestor 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.

Lead-Containing Materials (LCMs): means material that contains 90 parts per million or more of lead.

Time-weighted average exposure limit (TWAEEL): the time-weighted average airborne concentration of a biological or chemical agent to which a worker may be exposed in a work day or work week as prescribed by O.Reg. 490/09 Designated Substances, as amended.

1.3 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. Measure disposal of mercury containing light tubes in units
5. Measure disposal of PCB containing Ballasts in units
6. Abatement work will be paid based on the actual quantities measured on site and the unit prices stated in the Bid and Acceptance Form.

1.4 RELATED SECTIONS

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
4. Section 02 83 20 – Lead Precautionary Measures
5. Section 02 84 00 – PCB Remediation
6. Section 02 87 00 – Mercury Precautionary Measures
7. Section 02 89 00 – Silica Precautionary Measures

1.5 DESIGNATED SUBSTANCES

Confirm with the Departmental Representative that no additional designated substances have been brought to the project area prior to beginning work.

Additional designated substances and hazardous materials may exist outside the accessible survey area but are beyond the scope of this project.

Should any additional material, suspected to be a designated substance, be encountered within the project area, any disturbance of such material must be stopped, precautionary measures taken, and the Departmental Representative must be notified immediately. Do not proceed until written instructions have been received.

1. ACRYLONITRILE: Not Identified
2. ARSENIC: Not Identified
3. ASBESTOS: Identified

1. Various Asbestos-Containing Materials (ACMs) have been confirmed present. A summary of these materials is outlined within the following documents:
 - a. Supplemental Designated Substances and Hazardous Materials Survey, West Memorial Building Asset Integrity Project [R.066170.001], 344 Wellington Street, Ottawa, Ontario. Prepared by DST Consulting Engineers Inc. Dated January 20, 2017. Details of ACMs are outlined within the associated Updated Room-by-Room ACM Database.
 - b. Designated Substances Report for the West Memorial Rehabilitation Project, West Memorial Building, 344 Wellington Street, Ottawa, Ontario, Summary Report (PNs: R.011705.061 and R.067947.001). Prepared by DST Consulting Engineers Inc. Dated May 21, 2014.
2. The following non-exhaustive list of friable Asbestos-Containing Materials have been identified and/or are assumed in the project area:
 - a. ACM debris.
 - b. Parging cement associated with pipe fittings.
 - c. Parging cement beneath canvas and lagging on mechanical ducting.
 - d. Parging cement on the outside of Air Handling Units and associated ducting.
 - e. Pipe insulation
 - f. Light heat shields
 - g. Fire door interior linings.
 - h. Safe door linings.
 - i. Lay-in ceiling tiles with pinhole pattern.
 - j.
3. The following non-exhaustive list of non-friable Asbestos-Containing Materials have been identified and/or are assumed in the project area:
 - a. Various vinyl floor tiles.
 - b. Transite ceiling tiles with pinholes.
 - c. Transite piping.
 - d. Transite wall panels.
 - e. Internal gaskets.
 - f. Wall tar.
 - g. Window caulking.
 - h. Exterior caulking.
 - i. Concrete expansion joint mastic.
4. BENZENE: Not Identified
5. COKE OVEN EMISSIONS: Not identified

6. ETHYLENE OXIDE: Not Identified

7. ISOCYANATES: Not Identified

8. LEAD: Identified

1. Various Lead-Containing Materials have been confirmed present. A summary of these materials is outlined within the following documents:
 - a. Supplemental Designated Substances and Hazardous Materials Survey, West Memorial Building Asset Integrity Project [R.066170.001], 344 Wellington Street, Ottawa, Ontario. Prepared by DST Consulting Engineers Inc. Dated January 20, 2017.
 - b. Designated Substances Report for the West Memorial Rehabilitation Project, West Memorial Building, 344 Wellington Street, Ottawa, Ontario, Summary Report (PNs: R.011705.061 and R.067947.001). Prepared by DST Consulting Engineers Inc. Dated May 21, 2014.
2. The following building materials are either confirmed or assumed to be Lead-Containing Materials:
 - a. All interior and exterior paints as well as surface coatings, including coatings on structural steel elements steel stairs and railings, etc.
 - b. Copper pipe solder.
 - c. Soldered edges of copper roofing.
 - d. Joints of terrazzo flooring.
 - e. Bell and spigot joint packings of cast iron water leaders
 - f. Metallic waterproofing on inside of elevator pits and pump pit walls and floors.
 - g. Armored finish with metallic hardener of the Ground floor loading dock
 - h. Dried cement floor finish sealers.
 - i. Cast bronze building materials.
 - j. Ceramic tile glazing.
 - k. Emergency light batteries.

9. MERCURY: Identified

1. Fluorescent light tubes are present that contain mercury in a vapour form and in the phosphor coating on the lamp tube.
 - a. A summary of fluorescent light tubes is provided within the following report: *Designated Substances Report for the West Memorial Rehabilitation Project, West Memorial Building, 344 Wellington Street, Ottawa, Ontario, Summary Report (PNs: R.011705.061 and R.067947.001)*. Prepared by DST Consulting Engineers Inc. Dated May 21, 2014.

10. SILICA: Identified

1. Free crystalline silica is assumed present in building materials such as concrete, brick, exterior stone, terracotta, mortars, terrazzo, marble, ceiling tiles, ceramic tiles, plaster, and drywall.

11. VINYL CHLORIDE MONOMER: Not Identified

12. POLYCHLORINATED BIPHENYLS (PCBS): Identified

1. PCB-containing fluorescent light ballasts are present in the project area.
 - a. A summary of PCB-containing fluorescent light ballasts is provided within the following report: *Designated Substances Report for the West Memorial Rehabilitation Project, West Memorial Building, 344 Wellington Street, Ottawa, Ontario, Summary Report (PNs: R.011705.061 and R.067947.001)*. Prepared by DST Consulting Engineers Inc. Dated May 21, 2014.
 - b. 40% of the PCB-containing light ballasts have leaked PCB-containing oil onto the metal casing below.

13. OZONE DEPLETING SUBSTANCES (ODS): Identified

1. Halocarbon-containing equipment is present in the project area.
 - a. A summary of halocarbon-containing equipment is provided within the following report: *Designated Substances Report for the West Memorial Rehabilitation Project, West Memorial Building, 344 Wellington Street, Ottawa, Ontario, Summary Report (PNs: R.011705.061 and R.067947.001)*. Prepared by DST Consulting Engineers Inc. Dated May 21, 2014.

14. OTHER HAZARDOUS MATERIALS: Not Identified

1.6 ABATEMENT REQUIREMENTS

1. ASBESTOS

1. All work must be done in accordance with O.Reg 278/05 (as amended).
 1. Identified friable ACMs as outlined in Item 1.5.3.2 require a minimum of Type 2 abatement procedures when disturbing, removing or repairing one (1) square metre or less of the material, provided that it is wetted and non-powered hand tools are used. Renovation or disturbance of more than one (1) square metre of friable ACM requires Type 3 abatement procedures. Asbestos-

containing pipe insulation and pipe fitting insulation can be removed using Type 2 glovebag procedures, provided the materials is in good condition, and the glovebag seal can be maintained throughout the removal process.

2. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable ACMs as outlined in Items 1.5.3.3 can be conducted using Type 1 asbestos precautionary measures, provided the material is wetted to control the spread of dust or fibres, and the work is done only by means of non-powered hand- held tools. If these conditions cannot be met, then more stringent (Type 2 or Type 3) work procedures are required.
2. Disposal of asbestos waste must be done in accordance with “General – Waste Management” O.Reg 347/90 (as amended) under the Ontario Environmental Protection Act and the federal Transportation of Dangerous Goods Act. The waste must be disposed at a licensed waste disposal site. Proper notification must be issued to the Departmental Representative prior to transportation of waste.

2. LEAD

1. All work involving disturbance of lead-containing materials must be done in accordance with O O.Reg 490/09.
2. Follow recommendations provided in the Ontario Ministry of Labour (MoL) Guideline entitled “Guideline: Lead on Construction Projects”. This guideline classifies all lead disturbances as Type 1, Type 2a, Type 2b, Type 3a or Type 3b work, and assigns different levels of respiratory protection and work procedures for each classification.
 1. Work procedures and personal protective equipment must be used to ensure that workers are not exposed to airborne lead levels that exceed the TWAEL of 0.05 milligram per cubic metre (mg/m³) prescribed by O.Reg 490/09.
 2. The use of mechanically-powered tools or torches on lead-containing materials increases the concentration of airborne lead dust or fumes requiring more stringent respiratory protection and controlled work procedures.
3. Disposal of construction waste containing lead must be done in accordance with “General – Waste Management” O.Reg 347/90 (as amended) under the Ontario Environmental Protection Act and the federal Transportation of Dangerous Goods Act.

3. MERCURY

1. All work involving disturbance of mercury-containing equipment must be done in accordance with O.Reg 490/09.
2. Follow recommendations provided in the MoL Guideline entitled “The Safe Handling of Mercury: A Guide for the Construction Industry”. This document provides advice on how to reduce the risk of mercury exposure, and outlines clean-up methods for spills.

3. When removal of fluorescent light tubes is required, the tubes should be removed intact from the fixtures. Other sources of liquid mercury should be removed intact to prevent worker exposure.
 4. Disposal of waste containing mercury must be done in accordance with "General – Waste Management" O.Reg 347/90 (as amended) under the Ontario Environmental Protection Act and the federal Transportation of Dangerous Goods Act.
4. SILICA
1. Comply with Ontario Regulations O.Reg 490/09 when performing works that may disturb silica-containing materials.
 2. Follow recommendations provided in the MoL Guideline entitled "Guideline: Silica on Construction Projects". This document classifies all silica disturbances as Type 1, Type 2 or Type 3 work, and assigns different levels of respiratory protection and work procedures for each classification.
5. POLYCHLORINATED BIPHENYLS (PCBS)
1. Comply with PCB Regulations (SOR/2008-273) made pursuant to the Canadian Environmental Protection Act, 1999 (CEPA 1999).
 2. Follow recommendations provided in the Environment Canada guideline 'Identification of Lamp Ballasts Containing PCBs' to determine whether or not the fluorescent light fixture ballasts contain PCBs.
 3. Disposal of waste containing PCBs must be done in accordance with "General – Waste Management" O.Reg 347/90 (as amended) under the Ontario Environmental Protection Act and the federal Transportation of Dangerous Goods Act.
6. OZONE DEPLETING SUBSTANCES (ODS)
1. Halocarbon refrigerants must be captured and reclaimed by a licensed technician in any suspected halocarbon-containing equipment that is taken out of service. Appropriate records of equipment decommissioning must be maintained in accordance with requirements of the Federal Halocarbon Regulations, 2003.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 41 00 – Demolition and Preparation for New Work
- .2 Section 02 65 01 – Aboveground Storage Tank Removal
- .3 Section 02 81 01 – Hazardous Materials
- .4 Section 02 82 00.01 – Asbestos Abatement: Minimum Precautions
- .5 Section 02 82 00.02 – Asbestos Abatement: Intermediate Precautions
- .6 Section 02 83 20 – Lead Products Removal Precautionary Measures
- .7 Section 02 84 00 – Polychlorinated Biphenyl Remediation
- .8 Section 02 87 00 – Mercury - Precautionary Measures
- .9 Section 02 89 00 – Silica - Precautionary Measures

1.2 REFERENCES

- .1 Definitions:
 - .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.
 - .3 Integrated Pest Management Plan: is a pest control strategy which implements environmental health and safety approaches to minimize the use of toxic pesticides and minimize their exposure to humans and the environment.
- .2 Reference Standards:
 - .1 Comply with federal, provincial and local anti-pollution laws, ordinances, codes, and regulations when disposing of waste materials, debris, and rubbish including, but is not limited to:
 - .1 Canadian General Standards Board (CGSB).
 - .2 Transportation and Dangerous Goods Act.
 - .3 Water management policies, guidelines and Provincial Water Quality Objectives (MOE).
 - .4 General Waste Management Regulation under the Environmental Protection Act, O. Reg. 347/90, as amended, Province of Ontario.
 - .5 Ontario Regulation 102/94 as amended: Waste Audits and Waste Reduction Work plans for Industrial, Commercial and Institutional Sectors.
 - .6 Ontario Regulation 103/94 as amended: Industrial, Commercial and Institutional Source Separation Programs.

- .7 Pesticides Act R.S.O. 1990, Chapter P11 and Ontario Regulation 63/09, Guide to Pesticide Licensing and Certification, April 2009.
- .8 Canadian Environmental Quality Guidelines 1999, updated 2007 Chapter 7: Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health.
- .9 Ontario Ministry of the Environment and Climate Change (MOECC), "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", April 2011.
- .10 Work to meet or exceed minimum requirements established by federal, provincial, and local laws and regulations which are applicable.
 - .1 Contractor is responsible for complying with amendments as they become effective.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Before commencing demolition activities or delivery of materials to site, submit Environmental Protection Plan 7 days prior to start of work on site, for review and approval by Departmental Representative. Environmental Protection Plan is to present comprehensive overview of known or potential environmental issues which must be addressed during demolition.
- .3 Contractor to submit a detailed Integrated Pest Management (IPM) Plan at least 5 days prior to the Work Start. IPM to be prepared by a Pest Control Professional and operated by a commercially licensed pest control operator in Ontario, as per Pesticides Act and O.Reg. 63/09.
 - .1 Contractor to submit name of pest control professional for review and approval by Departmental Representative.
- .4 Address topics at level of detail commensurate with environmental issue and required demolition tasks.
- .5 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Sediment Control measures identifying and describing the means, equipment, labour, etc. to address, at a minimum, the following concerns:
 - .1 Mud/debris tracking from construction sites onto adjacent municipal streets; contractor shall be prepared to clean impacted municipal streets due to mud/debris tracking from construction vehicles on a regular basis or specific request by Departmental Representative at no extra cost to Departmental Representative. All municipal streets shall be free from any mud/debris generated from project site.

- .2 Silt and debris being washed into the existing conveyance sewer system;
- .3 Silt and debris being carried into receiving watercourses by rain and surface flows and through the sewer system; and
- .4 Wind and blown dust during construction activities.
- .6 Drawings indicating locations of material storage areas, structures, and sanitary facilities, including methods to control runoff and to contain materials on site.
- .7 Traffic Control Plan.
 - .1 The Contractor will be responsible for traffic management in accordance with the Ontario Traffic Manual Book 7 and City of Ottawa Requirements, and notifying the proper stakeholders impacted by the construction program.
- .8 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .9 Non-Hazardous Solid Waste Reduction Plan per Section 01 74 21 - Construction/Demolition Waste Management and Disposal identifying methods and locations for solid waste disposal in accordance with applicable provincial and federal regulations.
- .10 Hazardous solid waste disposal plan identifying methods and locations for the solid waste disposal in accordance with applicable provincial and federal regulations.
- .11 Decontamination procedures for equipment and personnel exposed to identify hazards.
- .12 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.
- .13 Contaminant prevention plan that identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .14 Waste water management plan that identifies methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as clean-up water, dewatering of ground water.

1.4 FIRES

- .1 Fires and burning of rubbish on site is not permitted.

1.5 DRAINAGE

- .1 Provide erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan: include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

- .2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 POLLUTION CONTROL

- .1 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .2 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where directed by Departmental Representative.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.7 WATER CONTROL

1.8 Manage all surface water on site to prevent contamination of uncontaminated material or off-site migration in a manner not injurious to public health & safety, to property, or to any part of Work completed or under construction. NOT USED

1.9 PEST AND RODENT CONTROL MANAGEMENT PLAN

- 1. Pests and rodents on-site to be controlled by implementing an IPM Plan to achieve a short and long-term, environmental sound pest suppression and prevention through the use of technological and management practices before and during demolition activities until the site has been turned over to the owner. The IPM will include:
 - .1 Description of structural or operational changes that would facilitate the pest control effort: Using a building floor plan as a permanent record, the Contractor shall describe site specific solutions for eliminating pest access, food, water and harborage. The effort and costs associated with the specific measures and controls shall be at no extra cost to the owner.
 - .2 Proposed methods for monitoring: a description of the products and procedures used for identification of pest presence, access and harborage locations.
 - .3 List of proposed materials and equipment: current labels and Material Safety Data Sheets (MSDS) for all pesticide products to be used. In addition, brand names shall be provided for all application equipment, rodent bait boxes, monitoring and trapping devices, and any other control equipment that may be used.
 - .4 Service Schedule: that includes the weekly or quarterly frequency of Pest Operator visits. The IPM operator on Site to record the date and duration of each visit and log all services received.
 - .5 Commercial pesticide operator licenses: photocopies of the company pest control license and dated pesticide operator certificates for every employee who will be performing on-site services under IPM.

1.10 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning and Waste Management.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 WASTE MANAGEMENT GOALS

- .1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss Waste Management Plan and Goals.
- .2 Waste Management Goal: 80 percent of total Project Waste to be diverted from landfill sites. Provide Departmental Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.
- .3 Accomplish maximum control of solid construction waste.
- .4 Preserve environment and prevent pollution and environment damage.

1.2 RELATED REQUIREMENTS

- .1 Section 21 05 02 – Mechanical Demolition
- .2 Section 26 05 01 – Electrical Demolition

1.3 REFERENCES

- .1 Ontario's 3Rs Regulations – O. Reg. 102/94 and 103/94, as amended.

1.4 DEFINITIONS

- .1 Class III: non-hazardous waste - construction renovation and demolition waste.
- .2 Cost/Revenue Analysis Workplan (CRAW): based on information from WRW, and intended as financial tracking tool for determining economic status of waste management practices.
- .3 Demolition Waste Audit (DWA): relates to actual waste generated from project.
- .4 Inert Fill: exclusively terracotta, brick and mortar, and concrete.
- .5 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .6 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .7 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

- .8 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
 - .2 Returning reusable items including pallets or unused products to vendors.
- .10 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .11 Separate Condition: refers to waste sorted into individual types.
- .12 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.
- .13 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill.
- .14 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .15 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

1.5 DOCUMENTS

- .1 Maintain at job site, one copy of following documents:
 - .1 Demolition Waste Audit (Schedule B).
 - .2 Waste Reduction Workplan (Schedule A).
 - .3 Material Source Separation Plan.
 - .4 Cost/Revenue Analysis Workplan (Schedule C).

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare and submit following prior to project start-up:
 - .1 Submit 2 copies of completed Waste Reduction Workplan (WRW): Schedule A.

- .2 Submit 2 copies of completed Demolition Waste Audit (DWA): Schedule B.
- .3 Submit 2 copies of Cost/Revenue Analysis Workplan (CRAW): Schedule C.
- .4 Submit 2 copies of Government Chief Responsibility for the Environment: Schedule D
- .5 Submit 2 copies of Materials Source Separation Program (MSSP) description.
- .3 Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/disassembly material audit form.
 - .1 Failure to submit could result in hold back of final payment.
 - .2 Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled, co-mingled and separated off-site or disposed of (at least monthly).
 - .3 For each material reused, sold or recycled from project, include amount in tonnes or quantities by number, type and size of items and the destination.
 - .4 For each material land filled or incinerated from project, include amount in tonnes of material and identity of landfill, incinerator or transfer station.
- .4 Contractor is to provide supporting documentation to Departmental Representative in the form of weigh bills or other acceptable documentation of all waste materials removed from the site as requested by the Departmental Representative.

1.7 WASTE AUDIT

- .1 Based on the Non-Hazardous Building Materials Survey and Solid Waste Audit performed by DST Consulting Engineers Inc. and dated January 12, 2017, the demolition activities are expected to generate the following non-hazardous solid materials:
 - .1 Masonry (38.7% of materials);
 - .2 Metal (20.8% of materials);
 - .3 Drywall (12.5% of materials);
 - .4 Composites (ceramic tiles, carpet & pad, vinyl floor tiles, roofing, etc.) (5.3% of materials);
 - .5 Ceiling Tiles (5.6% of materials);
 - .6 Wood (5.3% of materials);
 - .7 Door Frames (3.4% of materials);
 - .8 Recyclable Packaging (2.3% of materials);
 - .9 Plaster (1.7% of materials);
 - .10 Electrical (1.7% of materials);
 - .11 Plastic (1.3% of materials);
 - .12 Plumbing fixtures (0.3% of materials);
 - .13 Glass (<0.1% of materials); and,

- .14 Other non-recyclables (1.3% of materials).
- .2 All materials outlined in Section 1.7.1 have been identified as reusable or recyclable with the exception of Composite Materials and other non-recyclables.
- .3 All materials leaving the site including those removed by the contractor or others for reuse and recycling should be documented.
- .4 All materials designated for reuse and recycling should be transported to approved facilities and receiving organizations and in accordance with all applicable regulations.
- .5 All materials not designated for reuse and/or recycling should be removed from the site and disposed of in accordance with all applicable regulations and by approved landfill facilities.

1.8 WASTE REDUCTION WORKPLAN (WRW)

- .1 Prepare WRW prior to project start-up.
- .2 WRW should include but not limited to:
 - .1 Destination of materials listed.
 - .2 Deconstruction/disassembly techniques and sequencing.
 - .3 Schedule for deconstruction/disassembly.
 - .4 Location.
 - .5 Security.
 - .6 Protection.
 - .7 Clear labelling of storage areas.
 - .8 Details on materials handling and removal procedures.
 - .9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.
- .3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .4 Describe management of waste.
- .5 Identify opportunities for reduction, reuse, and recycling of materials.
- .6 Post WRW or summary where workers at site are able to review content.
- .7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.
- .8 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

1.9 DEMOLITION WASTE AUDIT (DWA)

- .1 Prepare DWA prior to project start-up.
- .2 Complete DWA: Schedule B.
- .3 Provide inventory of quantities of materials to be salvaged for reuse, recycling, or disposal.

1.10 COST/REVENUE ANALYSIS WORKPLAN (CRAW)

- .1 Prepare CRAW: Schedule C.

1.11 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

- .1 Prepare MSSP and have ready for use prior to project start-up.
- .2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.
- .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .4 Provide containers to deposit reusable and recyclable materials.
- .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .6 Locate separated materials in areas which minimize material damage.
- .7 Collect, handle, separately store on-site, and transport off-site, salvaged like-materials in separate condition.
 - .1 Transport to approved and authorized recycling facility to users of material for recycling.

1.12 STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Protect surface drainage from damage and blockage.

- .6 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off-site processing facility for separation.
 - .3 Provide waybills for separated materials.

1.13 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, or oil into waterways, storm, or sanitary sewers.
- .3 Keep records of construction waste including:
 - .1 Number and size of bins.
 - .2 Waste type of each bin.
 - .3 Total tonnage generated.
 - .4 Tonnage reused or recycled.
 - .5 Reused or recycled waste destination.
- .4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.14 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises.

1.15 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 APPLICATION

- .1 Do Work in compliance with WRW that has been approved by Departmental Representative.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

- .1 Separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.
 - .1 Mark containers or stockpile areas.
 - .2 Provide instruction on disposal practices.
- .2 On-site sale of salvaged, recovered, reusable and/or recyclable materials is not permitted.
- .3 Demolition Waste:

Material Type	Recommended Diversion %	Actual Diversion %
Cardboard	100	
Plastic Packaging	100	
Steel	100	
Wood (uncontaminated)	100	
Concrete	100	
Terracotta	100	

3.4 WASTE REDUCTION WORKPLAN

.1 Schedule A:

Material Category	Person(s) Responsible	Total Quantity of Waste (unit)	Reused Amount (units) Projected	Actual	Recycled Amount (unit) Projected	Actual	Material Destination
Wood (excluding doors)							
Drywall/Gypsum							
Plaster							
Metal							
Electrical							
Composites (Blinds, Shingles, Vapour Barrier, Vinyl Flooring, Ceramic Tiles)							
Carpet & Pad							
Ceiling Tiles							
Roofing							
Windows							
Doors (Metal and Wood)							
Washroom Fixtures							
Concrete							
Mechanical Equipment (HVAC, etc.)							
Miscellaneous Waste (insulation, rubber mats, vinyl moulding)							

3.5 DEMOLITION WASTE AUDIT (DWA)

.1 Schedule B - Demolition Waste Audit (DWA):

Material Description	Quantity	Unit	Total	Volume (cum)	Weight (tonne)	Remarks and Assumptions
Wood (excluding doors)						
Drywall/Gypsum						
Metal						
Electrical						
Composites (Blinds, Shingles, Vapour Barrier, Vinyl Flooring, Ceramic Tiles)						

Material Description	Quantity	Unit	Total	Volume (cum)	Weight (tonne)	Remarks and Assumptions
Carpet & Pad						
Ceiling Tiles						
Windows						
Doors (Metal and Wood)						
Washroom Fixtures						
Roofing						
Masonry (bricks, hollow tiles, marble, stone, gravel etc.)						
Mechanical Equipment (HVAC, boiler, etc.)						

3.6 COST/REVENUE ANALYSIS WORKPLAN (CRAW)

.1 Schedule C - Cost/Revenue Analysis Workplan (CRAW):

Material Description	Total Quantity (unit)	Volume (cum)	Weight (cum)	Disposal Cost/Credit \$(+/-)	Category Sub-Total \$(+/-)
Wood (excluding doors)					
Drywall/Gypsum					
Metal					
Electrical					
Composites (Blinds, Shingles, Vapour Barrier, Vinyl Flooring, Ceramic Tiles)					
Carpet & Pad					\$
Ceiling Tiles					
Windows					
Doors (Metal and Wood)					
Washroom Fixtures					
Roofing					
Masonry (bricks, hollow tiles, marble, stone, gravel etc.)					
Mechanical Equipment (HVAC, boiler, etc.)					\$
		Cost (-) / Revenue (+)			\$

**3.7 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY
FOR THE ENVIRONMENT**

.1 Schedule D - Government Chief Responsibility for the Environment:

Ontario	Ministry of Environment and Climate Change, Ferguson Block 11th Floor, 77 Wellesley St W, Toronto, ON M7A 2T5	416-325-4000 1-800-565-4923	416-314-6790
	Environment Canada Toronto ON	416-739-4826	

END OF SECTION

Part 1 General

1.1 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 Precautionary Measures
- .6 Section 02 84 00 – PCB Remediation
- .7 Section 02 87 00 – Mercury Precautionary Measures
- .8 Section 02 89 00 – Silica Precautions

1.2 REFERENCES

- .1 Refer to Section 01 14 25 – Designated Substance Report for details on hazardous materials.
- .2 Work site may involve contact with the following:
 - .1 Asbestos
 - .2 Lead
 - .3 Mercury
 - .4 PCBs
 - .5 Silica
 - .6 Halocarbons
- .3 Canadian Environmental Protection Act, 1999 (CEPA 1999).
 - .1 Export and Import of Hazardous Waste Regulations (SOR/2002-300).
- .4 Ontario Environmental Protection Act, R.R.O 1990.
 - .1 General – Waste Management, O. Reg. 347/90, as amended.
- .5 Occupational Health and Safety Act
 - .1 Designated Substances, O.Reg. 490/09, as amended
- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .7 National Fire Code of Canada 2010.
- .8 Transportation of Dangerous Goods Act (TDG Act) 1992, (c. 34).
- .9 Transportation of Dangerous Goods Regulations.

1.3 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 Waste: any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .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.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for hazardous materials and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit to Departmental Representative current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.
 - .3 Submit hazardous materials management plan to Departmental Representative that identifies hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
- .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
- .3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.
- .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
 - .1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
 - .2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.

- .5 Transfer of flammable and combustible liquids is prohibited within buildings.
- .6 Do not transfer flammable and combustible liquids in vicinity of open flames or heat-producing devices.
- .7 Do not use flammable liquids having flash point below 38 degrees Celsius, such as naphtha or gasoline as solvents or cleaning agents.
- .8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
- .9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
- .10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are not mixed.
 - .6 Store hazardous materials and wastes in secure storage area with controlled access.
 - .7 Maintain clear egress from storage area.
 - .8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
 - .9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
 - .10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
- .11 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .12 Report spills or accidents immediately to Departmental Representative, Engineer or Consultant. Submit a written spill report to Departmental Representative within 24 hours of incident.

1.6 TRANSPORTATION

- .1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.
- .3 If hazardous waste is generated on site:
 - .1 Co-ordinate transportation and disposal with Departmental Representative.

- .2 Ensure compliance with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.
- .3 Use licensed carrier authorized by provincial authorities to accept subject material.
- .4 Prior to shipping material obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept this material.
- .5 Label container[s] with legible, visible safety marks as prescribed by federal and provincial regulations.
- .6 Ensure that trained personnel handle, offer for transport, or transport dangerous goods.
- .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
- .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Departmental Representative.
- .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

Part 2 PRODUCTS

2.1 MATERIALS

- .1 Only bring on site quantity of hazardous materials required to perform work.
- .2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

Part 3 EXECUTION

3.1 DISPOSAL

- .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.
- .3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
- .6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.
- .7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

- .8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
 - .1 Hazardous wastes recycled in manner constituting disposal.
 - .2 Hazardous waste burned for energy recovery.
 - .3 Lead-acid battery recycling.
 - .4 Hazardous wastes with economically recoverable precious metals.

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, if the material is removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
 - .2 Removal of non-friable asbestos-containing materials 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 SECTIONS

- .1 Section 01 14 25 – Designated Substance Report
- .2 Section 02 81 01 – Hazardous Materials
- .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 Precautionary Measures
- .6 Section 02 89 00 – Silica Precautions

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.205-03, 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 National Joint Council (NJC).

- .1 Part XI – Hazardous Substances.
- .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 *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 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 (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.

1.7 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 following documents for details on asbestos containing materials:
 - .1 Specification Section 01 14 25 – Designated Substance Report.
 - .2 Supplemental Designated Substances and Hazardous Materials Survey, West Memorial Building Asset Integrity Project [R.066170.001], 344 Wellington Street, Ottawa, Ontario. Prepared by DST Consulting Engineers Inc. Dated January 20, 2017. Details of ACMs are outlined within the associated Updated Room-by-Room ACM Database.
 - .3 Designated Substances Report for the West Memorial Rehabilitation Project, West Memorial Building, 344 Wellington Street, Ottawa, Ontario, Summary Report (PNs: R.011705.061 and R.067947.001). Prepared by DST Consulting Engineers Inc. Dated May 21, 2014.
- .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 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.

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 of one square metre or less of friable asbestos-containing material.
 - .2 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.
 - .3 Glove bag and removal of good condition, friable, asbestos-containing material.
- .2 Refer to the following documents for details on asbestos containing materials:
 - .1 Refer to the Specification Section 01 14 25 – Designated Substance Report for details on asbestos-containing materials.

1.2 RELATED SECTIONS

- .1 Section 01 14 25 – Designated Substance Report
- .2 Section 02 81 01 – Hazardous Materials
- .3 Section 02 82 00.01 – Asbestos Abatement: Minimum Precautions.
- .4 Section 02 82 00.03 – Asbestos Abatement: Maximum Precautions.
- .5 Section 02 83 20 – Lead Precautionary Measures
- .6 Section 02 89 00 – Silica Precautions

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.205-03, 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 National Joint Council (NJC).

- .1 Part XI – Hazardous Substances.
- .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 *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 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 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.
 - .5 Must incorporate internal closure strip if it is to be moved or used in more than one specific location.
- .10 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.
- .11 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.
- .12 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .13 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.
- .14 Occupied Area: any area of building or work site that is outside Asbestos Work Area.
- .15 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for scope of work.

1.5 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.

1.6 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 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 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 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.

1.7 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.
- .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 licenced landfill for burial.

1.8 EXISTING CONDITIONS

- .1 Refer to the following documents for details on asbestos containing materials:
 - .1 Specification Section 01 14 25 – Designated Substance Report.
 - .2 Supplemental Designated Substances and Hazardous Materials Survey, West Memorial Building Asset Integrity Project [R.066170.001], 344 Wellington Street, Ottawa, Ontario. Prepared by DST Consulting Engineers Inc. Dated January 20, 2017. Details of ACMs are outlined within the associated Updated Room-by-Room ACM Database.
 - .3 Designated Substances Report for the West Memorial Rehabilitation Project, West Memorial Building, 344 Wellington Street, Ottawa, Ontario, Summary Report (PNs: R.011705.061 and R.067947.001). Prepared by DST Consulting Engineers Inc. Dated May 21, 2014.
- .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 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 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.
 - .5 Must incorporate internal closure strip if it is to be moved or used in more than one specific location.
- .5 Tape: tape suitable for sealing polyethylene to surfaces under both dry and wet conditions using amended water.
- .6 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.
- .7 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 Pipe Insulation Removal Using Glove Bag:
 - .1 A glove bag not to be used to remove insulation from a pipe, duct or similar structure if:
 - .1 It may not be possible to maintain a proper seal for any reason including, without limitation:
 - .1 The condition of the insulation.
 - .2 The temperature of the pipe, duct or similar structure.
 - .2 The bag could become damaged for any reason including, Including, without limitation:
 - .1 The type of jacketing.
 - .2 The temperature of the pipe, duct or similar structure.
 - .2 Upon installation of the glove bag, inspect bag for any damage or defects. If any damage or defects are found, the glove bag is to be repaired or

- replaced. The glove bag to be inspected at regular intervals for damage and defects, and repair or replaced, as appropriately. The asbestos containing contents of the damaged or defective glove bag found during removal are to be wetted and the glove bag and its contents are to be removed and disposed of in an appropriate waste disposal container. Any damaged or defective glove bags are not to be reused.
- .3 Place tools necessary to remove insulation in tool pouch. Wrap bag around pipe and close zippers. Seal bag to pipe with cloth straps.
 - .4 Place hands in gloves and use necessary tools to remove insulation. Arrange insulation in bag to obtain full capacity of bag.
 - .5 Insert nozzle of garden reservoir type sprayer into bag through valve and wash down pipe and interior of bag thoroughly. Wet surface of insulation in lower section of bag.
 - .6 To remove bag after completion of stripping, wash top section and tools thoroughly. Remove air from top section through elasticized valve using a HEPA vacuum. Pull polyethylene waste container over glove bag before removing from pipe. Release one strap and remove freshly washed tools. Place tools in water. Remove second strap and zipper. Fold over into waste container and seal.
 - .7 After removal of bag ensure that pipe is free of residue. Remove residue using HEPA vacuum or wet cloths. Ensure that surfaces are free of sludge which after drying could release asbestos dust into atmosphere. Seal exposed surfaces of pipe and ends of insulation with slow drying sealer to seal in any residual fibres.
 - .8 Upon completion of Work shift, cover exposed ends of remaining pipe insulation with polyethylene taped in place.
- .6 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.
- .7 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/post-abatement 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 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.
 - .3 **Demolition of non-asbestos building materials to access concealed ACMs where demolition operations may result in building materials or equipment striking friable ACMs or disturbing ACM debris.**
- .2 Refer to the following documents for details on asbestos containing materials:
 - .1 Refer to the Specification Section 01 14 25 – Designated Substance Report for details on asbestos-containing materials.

1.2 RELATED SECTIONS

- .1 Section 01 14 25 – Designated Substance Report
- .2 Section 02 81 01 – Hazardous Materials
- .3 Section 02 82 00.01 – Asbestos Abatement: Minimum Precautions.
- .4 Section 02 82 00.02 – Asbestos Abatement: Intermediate Precautions.
- .5 Section 02 83 20 – Lead Precautionary Measures
- .6 Section 02 89 00 – Silica Precautions

1.3 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 National Joint Council (NJC).
 - .1 Part XI – Hazardous Substances.
- .9 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

1.4 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.
- .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 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.
- .11 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.
- .12 Negative pressure: 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. Negative pressure systems will require DOP testing on-site, regardless of whether exhausting to interior or outdoors prior to work operations. Include in contract sum costs due to this requirement.
 - .1 System to maintain minimum pressure differential of 0.02 inches of water 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.
- .13 Non-Friable Materials: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .14 Occupied Area: any area of building or work site that is outside Asbestos Work Area.
- .15 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.
- .16 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.

1.5 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 Submit proof satisfactory to Client and/or Client Representative that every worker who will be entering a Type 3 asbestos work area, who will be using a respirator, has successfully completed **quantitative respirator fit testing**, for the respirator type personally issued to worker.
- .4 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.
- .5 Submit layout of proposed enclosures and decontamination facilities to Departmental Representative for review prior to work.
- .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 Worker's Compensation Board status and transcription of insurance.
- .10 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.
- .11 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 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.

1.7 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.
- .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.

1.8 EXISTING CONDITIONS

- .1 Refer to the following documents for details on asbestos containing materials:
 - .1 Specification Section 01 14 25 – Designated Substance Report.
 - .2 Supplemental Designated Substances and Hazardous Materials Survey, West Memorial Building Asset Integrity Project [R.066170.001], 344 Wellington Street, Ottawa, Ontario. Prepared by DST Consulting Engineers Inc. Dated January 20, 2017. Details of ACMs are outlined within the associated Updated Room-by-Room ACM Database.
 - .3 Designated Substances Report for the West Memorial Rehabilitation Project, West Memorial Building, 344 Wellington Street, Ottawa, Ontario, Summary Report (PNs: R.011705.061 and R.067947.001). Prepared by DST Consulting Engineers Inc. Dated May 21, 2014.
- .2 Asbestos-containing piping insulation associated with heating systems is concealed behind terracotta block surfaced with non-asbestos plaster. Each wall/column cavity with this piping insulation shall be assumed to have minor quantities ($<0.1 \text{ m}^2$) of asbestos debris requiring removal.
- .3 Friable asbestos-containing material, including debris, is concealed behind/above solid building finishes, as detailed within the Updated Room-by-Room ACM Database.
- .4 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.

1.9 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.

1.10 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.

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 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.
 - .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.
- .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 ACCESSING CONCEALED ASBESTOS

- .1 **Demolition of non-asbestos building materials to access concealed ACMs must be done in accordance with the requirements of this section if demolition is done in a manner that may result in building materials or equipment striking friable ACMs or disturbing ACM debris.**

3.4 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.
- .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 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.

- .6 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.
- .7 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.

3.5 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.

3.6 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.
- .2 Contractor shall be responsible for daily air monitoring within asbestos work area(s) to ensure that respiratory safety factors for Workers are not exceeded. Results shall be posted onsite within 24-hours of sample collection.
 - .1 If air monitoring shows that respiratory safety factors are exceeded, Contractor shall implement corrective measures to reduce airborne fibre levels in the work area. If corrective measures are not successful, Contractor shall modify the type of respirators used by worker to provide higher safety factors.
- .3 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.
- .4 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 lock-down agent has fully dried, 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.

3.7 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 coatings, and other lead containing materials or materials suspected 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 81 01 – Hazardous Materials
- .3 Section 02 82 00.01 – Asbestos Abatement: Minimum Precautions
- .4 Section 02 82 00.02 – Asbestos Abatement: Intermediate Precautions
- .5 Section 02 82 00.03 – Asbestos Abatement: Maximum Precautions
- .6 Section 02 84 00 – PCB Remediation
- .7 Section 02 89 00 – Silica 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 (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 materials: Materials that are assumed to contain varying levels of lead from their historic composition.
- .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 and 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 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 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:
 - .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.
- .3 Ensure that no person required to enter the Lead Work Area has facial hair that affects seal between respirator and face.
- .4 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 Refer to the Specification Section 01 14 25 – Designated Substance Report for details on lead-containing materials.

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.

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, as amended.
- .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:
 - .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 and/or silica 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 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 Lead-containing paint, and surface coating removal:
 - .1 Methods of lead-containing paint and surface coating removal/disturbance 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 and surface coatings 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 two 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/m³, 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/m³.

- .2 If air monitoring results show airborne lead levels in excess of 0.005 mg/m³, 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/m³.
- .4 The following criteria shall be used to define an acceptable level of cleanliness after lead abatement activities:
 - .1 Where removal of paints and other surface coatings has been performed to accommodate the project scope of work:
 - .1 Visibly free of paint(s), primer(s), and surface coating(s), 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 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.
- .2 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in sealed labelled waste containers for transport.
- .3 Include in clean-up Work areas, Equipment and Access Room, Shower Room, and other contaminated enclosures.
- .4 Include in clean-up sealed waste containers and equipment used in Work and remove from work areas, at appropriate time in cleaning sequence.
- .5 A final check may be carried out to ensure that no lead dust or debris remains on surfaces as a result of dismantling operations.
- .6 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 and materials required for the safe handling, management and storage of polychlorinated biphenyl (PCB) material.
- .2 Light fixtures with T12 light ballasts are assumed to contain PCBs.
- .3 Black tar used to adhere 1" white Styrofoam insulating panels, identified above the ceiling of Room 130 and assumed present within all perimeter wall surfaces at the building, are considered PCB-containing, and shall be handled and disposed of as such. Asbestos precautions are also required where the tar is also asbestos-containing (i.e. ceiling of Room 130).
- .4 Refer to the following documentation for details on PCB-containing equipment. Contractors are to verify all site conditions themselves and base their abatement bids upon their own observations:
 - .1 Specification Section 01 14 25 – Designated Substances.

1.2 RELATED SECTIONS

- .1 Section 01 14 25 – Designated Substances
- .2 Section 02 81 01 – Hazardous Materials

1.3 REFERENCES

- .1 American Board of Industrial Hygiene (ABIH).
- .2 Canadian Council of Ministers of the Environment (CCME)
 - .1 PN1205-1995, PCB Transformer Decontamination: Standards and Protocols.
- .3 Department of Justice Canada (Jus)/CEPA SOR/92-507-SOR/2000-102, Storage of PCB Material Regulations.
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .4 Environment Canada.
 - .1 Manual for Spills of Hazardous Materials - 1985.
- .5 Chlorobiphenyls Regulations (SOR/91-152; Amended SOR/2000-102)
 - .1 Regulations Respecting Mobile System for the Destruction and Treatment of Chlorobiphenyls that are Operated by or Under Contract with Federal Institutions (SOR/90-5; amended SOR/93-231 and SOR/2000-105).
 - .2 Regulations Respecting the Storage of Material Containing Chlorobiphenyls (PCBs) SOR/92-507, Amended SOR/2000-102).
 - .3 Regulations Respecting the Import and Export of Hazardous Wastes (SOR/92-637; Amended 94-459; SOR 94-684; SOR/2000-103).
 - .4 Waste Management - PCBs, R.R.O. Regulation 362/90.
 - .5 Mobile PCB Destruction Facilities, R.R.O. Regulation 352/90.
 - .6 Regulation 347, General Waste Management, as Amended.

- .6 Revised federal *PCB Regulations* (SOR/2008-273), September 2008.
- .7 Transport Canada (TC).
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Prior to starting work, Contractor performing work of this section to provide:
 - .1 Workplace Safety and Insurance Board Clearance Certificate.
 - .2 Insurance certificates.
 - .3 Company Health and Safety Policy.
 - .4 Certificate of Approval for Transportation of PCB Waste and Location of Destruction Facility.
 - .5 WHMIS Training Certificates for Personnel.
 - .6 Material Safety Data Sheets for chemicals or material to be used.
- .2 Submittals to Local Fire Department and Departmental Representative.
 - .1 2 copies of books and records listed under Record Keeping of Control Submittals Article in PART 1 of this Section.
- .3 Waste location and description including:
 - .1 Building in which PCB waste is stored.
 - .2 Size of property used for storage site.
 - .3 Precise location of PCB waste at storage site.
 - .4 Container storage method used.
 - .5 Spill containment features in place at storage site.
 - .6 Security measures in place at storage site.
 - .7 Fire detection systems in place at storage site.

1.5 CONTROL SUBMITTALS

- .1 Record keeping: maintain and make available for review by Departmental Representative.
 - .1 Receipt of waste showing:
 - .1 Date of receipt of waste.
 - .2 Description of PCB waste including nameplate description, serial number, PCB registration number and quantity.
 - .3 Condition of PCB waste.
 - .4 Source of PCB waste.
 - .5 Name of carrier of PCB waste.
 - .6 Name of individual who accepted receipt of PCB waste.
 - .2 Removal of waste showing:
 - .1 Date of removal of PCB waste.
 - .2 Description of PCB waste including nameplate description, serial number, PCB registration number and quantity.

- .3 Condition of PCB waste.
- .4 Name of carrier of PCB waste.
- .5 Destination of PCB waste.
- .6 Name of individual authorizing transport of PCB waste.
- .3 Monthly inspection, repair and replacement reports.
- .4 Submit records to Departmental Representative as requested.

1.6 QUALITY ASSURANCE

- .1 Instruct personnel on dangers of PCB exposure, on respirator use, decontamination and applicable Federal, Provincial/Territorial and Municipal Regulations.
- .2 Obtain services of industrial hygienist certified by American Board of Industrial Hygiene to certify training, review and approve PCB removal plan, including determination of need for personnel protective equipment (PPE) in performing PCB removal work.
- .3 Complete work so that at no time do PCB's contaminate building, site or environment.

1.7 SUPERVISION

- .1 Provide on-site, a supervisor, with authority to oversee health and safety, remediation methods, scheduling, labour and equipment requirements.
- .2 One supervisor for every 10 workers is required.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Place materials defined as hazardous or toxic in designated containers from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .3 Owners or operators of storage sites.
 - .1 Provide method for determining concentration of PCBs in particular waste at request of Departmental Representative.
 - .2 Ensure personnel are familiar with and understand current PCB waste management procedures and use of personnel protection equipment and clean-up techniques.
- .4 Disposal of PCB waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations.
 - .1 Dispose of PCB waste in leak proof drums.
 - .2 Containers must be labelled with appropriate warning labels.
- .5 Create manifests describing and listing waste created and transport containers by approved means to licensed facility for storage.
 - .1 For each bulk load of PCBs: identity PCB waste, earliest date of removal from service for disposal, and weight in kilograms of the PCB waste.

- .2 For each PCB Article Container or PCB Container: unique identifying number, type of PCB waste (e.g., Styrofoam debris, small capacitors), earliest date of removal from service for disposal, and weight in kilograms of PCB waste contained.
- .3 For each PCB Article not in PCB Container or PCB Article Container: serial number if available, or other identification if there is no serial number, date of removal from service for disposal, and weight in kilograms of PCB waste in each PCB Article.

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 STORAGE GENERAL

- .1 Storage of PCB materials in accordance with CEPA SOR/92-507.

2.2 STORAGE ENCLOSURE

- .1 Isolate PCB control area by physical boundaries to prevent unauthorized entry of personnel.
- .2 Food, drink and smoking materials are not permitted in areas where PCBs are handled or PCB items are stored.
- .3 Room, building or structure with lockable entrance.
- .4 Temporary storage facility to be a fully enclosed block wall room within building with appropriate warning signs.
- .5 For walls that are not fully enclosed with block walls, use oven mesh wire fence or other fence with similar characteristics at least 2.0 metres high, with lockable entrance.
- .6 Smoking is not permitted within 15m of the PCB control area.
 - .1 Provide and post "No Smoking" signs as directed by Departmental Representative.

2.3 STORAGE CONTAINERS

- .1 Exterior containers.
 - .1 Structurally-sound and weather-sealed to hold PCB solids, PCB light ballasts, drained PCB containers or drained PCB equipment.
- .2 PCB solid and liquid storage.
 - .1 Drums and containers.
 - .1 Designed with sufficient durability and strength to prevent PCB solids and liquids from being released into environment, affected by weather, or contaminated by external sources.

- .2 Steel, or other material approved by Departmental Representative.
- .2 Drums.
 - .1 Capacity no greater than 250 litres.
 - .2 Steel of minimum 1.2 mm for solids and 1.52 mm for liquids.
 - .3 Ensure removable steel lid securely attached and complete with PCB-resistant gasket for solids or closed-head, double-bung steel drum.
 - .4 Paint or treat to prevent rusting.
- .3 Drum Liners:
 - .1 6 mil clear polyethylene bag, 914 mm x 1524 mm, with opening at 914 mm end.

2.4 FLOORING AND ACCESSORIES

- .1 Constructed of steel, concrete, or other material as approved by Departmental Representative.
- .2 Curbing and sufficient siding to contain at least twice volume of PCB liquid contained in largest item of PCB equipment on site or 25 percent of volume of PCB liquid on site, whichever is greater.
- .3 PCB Absorbing Surfaces.
 - .1 Floor, curbing and siding sealed with durable PCB-resistant coating.
- .4 Floor Opening, Floor Drains and Sumps.
 - .1 Closed and sealed to prevent escape of liquid.
 - .2 Connected to drainage system suitable for liquid dangerous goods that terminates at location where spilled liquids will be contained and recovered and where spilled liquids will not create fire hazard or risk to public health or safety.

2.5 EMERGENCY RESPONSE EQUIPMENT AND SYSTEMS

- .1 Safety requirements in storage area:
 - .1 Heat and smoke sensory controls.
 - .1 Stops ventilation fan and closes intake and exhaust dampers of fan in event of fire inside building.
 - .2 Indoor fire alarm system.
 - .1 Fully operative and maintained, inspected and tested to National Fire Code of Canada.
 - .2 Portable fire extinguishers to be selected, installed, maintained, inspected and tested to National Fire Code of Canada.
 - .3 Automatic fire suppression system, as and when required to National Fire Code of Canada.
- .2 Storage site clean-up materials.
 - .1 Ensure availability at all time of sorbent or solvents, for clean-up of liquid or solids.

- .2 Ensure availability at all times of inert absorbent in sufficient quantity to contain minor leakage.
 - .1 Place in bottom of each container holding PCB equipment or fluorescent lighting ballasts.
- .3 Respirators: Certified by a testing agency acceptable to the Ministry of Labour.
 - .1 Use approved full-face organic vapour cartridge respirator for exposure to hot PCB.
 - .2 Vapour concentration less than or equal to 5 mg/m³.
 - .1 Supplied-air respirator with full face piece, helmet or hood.
 - .2 Self-contained breathing apparatus with full face piece.
 - .3 Vapour concentration greater than 5 mg/m³ or unknown concentrations.
 - .1 Self-contained breathing apparatus with full face piece operated in positive pressure mode.
 - .2 Type C supplied-air respirator with full face piece operated in positive pressure of continuous flow mode and auxiliary self-contained breathing apparatus operated in positive pressure mode.

2.6 WARNING SIGNS AND LABELS

- .1 Label capacitors containing 0.5 kilogram or more of chlorobiphenyls with black and white serialized label, as approved by Departmental Representative in accordance with Manual of Spills of Hazardous Materials.
- .2 Label container with a capacitor containing 0.5 kg or more of chlorobiphenyls with black and white serialized, "ATTENTION PCB" label, as approved by Departmental Representative in accordance with Manual of Spills of Hazardous Materials.
- .3 Label electrical transformers, electromagnets and other equipment containing chlorobiphenyls in concentration exceeding 1% with black and white, serialized, "ATTENTION PCB" label, as approved by Departmental Representative in accordance with Manual of Spills of Hazardous Materials.
- .4 Label equipment and containers of equipment containing chlorobiphenyls in concentration exceeding 50 parts per million by weight but not greater than 1% with non-serialized, Warning Label for PCB-Contaminated Equipment as approved by Departmental Representative in accordance with Manual of Spills of Hazardous Materials.
- .5 Label containers of equipment, and drained containers containing chlorobiphenyls in concentration exceeding 1% with non-serialized, black and white, "ATTENTION PCB" label, as approved by Departmental Representative in accordance with Manual of Spills of Hazardous Materials.
- .6 Label containers of PCB material and drained containers of PCB material with chlorobiphenyl concentration exceeding 50 parts per million by weight with non-serialized, Warning Label for PCB-Contaminated Equipment as approved by Departmental Representative in accordance with Manual of Spills of Hazardous Materials.

- .7 Label doors to storage sites, fencing and other security barriers enclosing storage sites with non-serialized, black and white, "ATTENTION PCB" label, as approved by Departmental Representative in accordance with Manual of Spills of Hazardous Materials.
- .8 Maintain signs and labels in clear and legible condition.

Part 3 Execution

3.1 GENERAL

- .1 Store PCB waste materials in accordance with CEPA SOR/92-507.
- .2 Select PCB removal procedure to minimize contamination of work areas with PCB or other PCB-contaminated debris/waste. Handle PCBs such that no skin contact occurs.
- .3 As feasible, do not carry out PCB handling operations in confined spaces. Confined space means space having limited means of egress and inadequate cross ventilation.
- .4 Ensure that work operations or processes involving PCB or PCB-contaminated materials are conducted in accordance with Federal, Provincial/Territorial and Municipal Regulations and applicable requirements of this Section, including but not limited to:
 - .1 Obtaining advance approval of PCB storage sites.
 - .2 Notify Departmental Representative prior to beginning operations.
 - .3 Report leaks and spills to Departmental Representative.
 - .4 Maintain access log of employees working in PCB control area and provide copy to Departmental Representative upon completion of operations.
 - .5 Inspect PCB and PCB-contaminated items and waste containers for leaks and forward copies of inspection reports to Departmental Representative.
 - .6 Maintain spill kit for emergency spills entitled "PCB Spill Kit".
 - .7 Maintain inspection, inventory and spill records.

3.2 ACCESS TO STORAGE SITE

- .1 Keep entrance to site locked or guarded.
- .2 Maintain register at site containing name, address, telephone number and place of business of each person who enters, or is authorized to enter site.
- .3 Permit only authorized personnel to enter site.

3.3 ACCESS TO STORED MATERIAL

- .1 Store materials and equipment to permit easy access for inspection.

3.4 STORAGE PRACTICES

- .1 Stack containers only if designed for stacking.
- .2 Stack liquid containers or drums no higher than 2 containers.
- .3 Separate stacked drums from each other with pallets.

- .4 Store material to prevent it catching fire.
- .5 Store material to prevent it being released.
- .6 Store PCB material together, and away from other stored materials.
- .7 Exterior.
 - .1 Cover PCB liquid containers with waterproof roof or cover extending beyond curbing or sides of container.
 - .2 Elevate PCB waste containers and PCB equipment on pallets or other suitable devices to reduce corrosion.
 - .3 Store transformers on skids.
- .8 Interior.
 - .1 Place on skids or pallets PCB equipment and containers of PCB material not permanently secured to floor or surface.

3.5 HANDLING PCB BALLASTS

- .1 Handle light ballasts using impervious clothing (nitrile), gloves, face shields 200 mm minimum and other appropriate protective clothing necessary to prevent dermal exposure to any leaking oil. Do not use natural rubber, neoprene, or polyvinyl chloride (PVC). Wear splash-proof safety goggles where liquid oil may contact eyes.
- .2 Confirm PCB content of all light ballasts prior to disposal using *Identification of Lamp Ballasts Containing PCBs*, by Environment Canada EPS 2/CC/2 (revised), August 1991, or other appropriate references.
 - .1 If the PCB content of a ballast cannot be readily determined using appropriate references, assume that ballast contains PCBs and treat ballast as such.
- .3 Sort/separate PCB-containing ballasts from non-PCB ballasts.
- .4 Package and dispose of PCB ballasts and contaminated PPE accordingly.

3.6 Removal of PCB-Containing Black Tar

- .1 The tar adhered Styrofoam insulating panels, identified above the ceiling of Room 130 and assumed present within all perimeter wall surfaces at the building, are considered PCB-containing, and shall be handled and disposed of as such. Asbestos precautions are also required where the tar is also asbestos-containing (i.e. ceiling of Room 130). Black tar and Styrofoam panels with black tar adhered to them shall be removed to the extent practical using hand tools only prior to demolition activities. Do not use power tools. Remove PCB-containing tar using impervious clothing (nitrile), gloves, and other appropriate protective clothing necessary to prevent dermal exposure. Do not use natural rubber, neoprene, or polyvinyl chloride (PVC). Black tar, Styrofoam with black tar adhered to it, and any black tar contaminated dust/debris shall be disposed of as PCB-containing waste.
- .2 Masonry with residual PCB-containing tar can be disposed of as non-PCB-containing waste, subject to the results of its toxicity classification, with a toxicity criterion not exceeding 0.3 mg/L PCB. This masonry shall not be used as clean backfill material.

3.7 EMERGENCY RESPONSES

- .1 General.
 - .1 Immediately report to Departmental Representative PCB spills on ground or in water, PCB spills in drip pans, or PCB leaks.
 - .2 Rope off area around edges of PCB leak or spill and post "PCB Spill Authorized Personnel Only" caution sign. Immediately transfer leaking items to drip pan or other container.
 - .3 Initiate cleanup of spills as soon as possible, but no later than 48 hours of its discovery. If misting, elevated temperatures or open flames are present, or if spill is situated in confined space, notify Departmental Representative. Mop up liquid with rags or other conventional absorbent. Properly contained and dispose of spent absorbent as solid PCB waste.
 - .4 Workers to evacuate site. When leaving, shut down water in use. Only personnel trained in use of, and wearing SCUBA apparatus, will be allowed to re-enter site.
 - .5 Do not return to site until Owner's representative and Ministry of the Environment representatives have declared the area safe for re-entry.
- .2 Spill, leak, and disposal procedures.
 - .1 Permit access to only those wearing protective equipment and clothing.
 - .2 Issue poison warnings.
 - .3 Call local fire department or PCB Emergency Response Team.
 - .4 Avoid contact and inhalation.
 - .5 Remove ignition sources.
 - .6 Ventilate areas of spill or leak.
 - .7 Stop or reduce discharge if possible without risk.
 - .8 Collect spilled material for reclamation.
 - .9 Do not flush to sewer.
 - .10 Use only inert absorbents as approved by Departmental Representative.
 - .11 Wipe contaminated area with rags and kerosene, fuel oil or 1,1,1-trichloroethane (chlorothene VG solvent). Do not use acetone or toluene.
 - .12 Notify environmental authorities to determine disposal and clean-up procedures.
- .3 Fire protection and emergency procedures plan for storage sites.
 - .1 Ensure most recent revision of plan is in effect.
 - .2 Develop plan in consultation with local fire department.
 - .3 Ensure employees authorized to enter PCB storage site are familiar with contents of fire protection and emergency procedures plan.
 - .4 Send one copy to local fire department.
 - .5 Display one copy at storage site in area accessible in fire or spill situation.
 - .6 Display one copy at storage site owner's place of business.
- .4 Respirators.

- .1 Use when chlorobiphenyl concentrations are above permissible exposure levels.
- .2 Use when entering tanks or closed vessels.
- .3 Use in emergency situations.
- .5 Permissible exposure limit.
 - .1 0.5 milligram of chlorobiphenyl (54% chlorine) per cubic metre of air, averaged over 8 hours, 1.0 microgram of chlorobiphenyl (54% chlorine) per cubic metre of air up to 10 hours/day.
- .6 Fire protection.
 - .1 Wear totally encapsulated suit and self-contained breathing apparatus with full facepiece operated in positive pressure mode.

3.8 SANITATION

- .1 Promptly wash liquid-contaminated skin with soap or mild detergent and water.
- .2 Prohibit eating and smoking in areas where liquid chlorobiphenyl (54% chlorine) is handled, processed or stored.
- .3 Wash hands thoroughly with soap or mild detergent and water after handling liquid chlorobiphenyl (54% chlorine).

3.9 TRANSPORTATION AND DISPOSAL

- .1 Furnish labour, materials, and equipment necessary to store, transport, and dispose of PCB contaminated material in accordance with Federal, Provincial/Territorial and Municipal requirements.
- .2 Prepare and maintain waste shipment records and manifests as required.
- .3 Transport PCB contaminated—equipment in approved containers with removable heads in accordance with TDGA.
- .4 Store liquid PCBs in Specification approved containers in accordance with TDGA.
- .5 In addition to those requirements:
 - .1 Inspect and document vehicles and containers for proper operation and covering. Repair or replace damaged containers.
 - .2 Inspect vehicles and containers for proper markings, manifest documents, and other requirements for waste shipment.
 - .3 Perform and document decontamination procedures prior to leaving the site and again before leaving disposal site.
- .6 Shipping Documentation.
 - .1 Before transporting PCB waste, sign and date manifest.
 - .2 Return signed copy to Departmental Representative.
 - .3 Ensure that manifest accompanies PCB waste at all times.
 - .4 Ensure transporter provides copy of manifest signed and dated by disposal facility.
- .7 Solvent Cleaning.

- .1 Clean contaminated tools, and containers, after use by rinsing three times with appropriate solvent or by wiping down three times with solvent wetted rag. Suggested solvents are Stoddard solvent or hexane.
- .2 Reports.
 - .1 Prepare and submit a remediation closeout report at completion of Work.

3.10 FIELD QUALITY CONTROL

- .1 Owners or Operators of Storage Sites.
 - .1 All PCB remedial work is subject to evaluation by Departmental Representative.
 - .2 At request of Departmental Representative, measure concentration of PCBs in accordance with CEPA SOR/92-507 - Storage of PCB Material Regulations.
 - .3 Inspect storage site monthly and repair or replace, if necessary, PCB equipment, floors, drains, drainage systems, waterproof roofs or barriers, fire prevention apparatus, personnel protection equipment, security fences and materials used for clean-up at site.
 - .4 Immediately repair or replace drum, container or equipment found to be leaking PCBs.
 - .5 Immediately clean up contaminated area.
 - .6 Ensure controlled access to storage site to prevent entry by unauthorized persons.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 81 01 –Hazardous Materials

1.2 REFERENCES

- .1 Comply with current Federal, Provincial, and local requirements pertaining to mercury, 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 Provincial legislation
 - .1 Ontario Occupational Health and Safety Act, R.S.O. 1990, O. Reg. 490/09, as amended, *Designated Substances*.
 - .2 Ontario Environmental Protection Act, R.R.O. 1990, O. Reg. 347, as amended, *General Waste Management*.
- .3 Federal legislation
 - .1 Transportation of Dangerous Goods Act, 1992.

1.3 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 Waste:** any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .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 **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.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit temporary waste location and description including:
 - .1 Precise location of mercury waste.
 - .2 Container storage method used.
 - .3 Spill containment features in place at storage site.

- .4 Security measures in place at storage site.
- .2 Identification of the following, for approval by the Departmental Representative:
 - .1 Licensed hauler, with a valid Certificate of Approval from the Ontario Ministry of the Environment (MOE) for a Waste Management System to transport the associated waste material.
 - .2 Authorized waste disposal or recycling location for the mercury materials.
- .3 Mercury Abatement Section within Hazardous Materials Work Plan.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Ensure all personnel are familiar with and understand current mercury waste management procedures and use of personnel protection equipment and clean-up techniques.

1.6 RECORD KEEPING

- .1 Maintain and make available for review by the Departmental Representative or authorities having jurisdiction:
 - .1 Receipt of waste/recyclable material showing:
 - .1 Date of receipt of waste/recyclable material.
 - .2 Description of mercury waste/recyclable material including quantity.
 - .3 Condition of mercury waste/recyclable material.
 - .4 Source of mercury waste/recyclable material.
 - .5 Name of carrier of mercury waste/recyclable material.
 - .6 Name of individual who accepted receipt of mercury waste/recyclable material.
 - .2 Removal of waste/recyclable material showing:
 - .1 Date of removal of mercury waste/recyclable material.
 - .2 Description of mercury waste/recyclable material including quantity.
 - .3 Condition of mercury waste/recyclable material.
 - .4 Name of carrier of mercury waste/recyclable material.
 - .5 Destination of mercury waste/recyclable material.
 - .6 Name of individual authorizing transport of mercury waste/recyclable material.

1.7 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 MATERIALS

- .1 Cardboard Containers: Manufacturer's cardboard container suitable for packaging light tubes (closed, with no lamp ends exposed) or other equivalent containers.

- .2 Containment Drums: New 20 L metal pails with handles and sealable lids. Free from rust and punctures. Provided by Contractor.
- .3 Drum Liners: clear polyethylene bags, 0.15 mm thick.
- .4 Vermiculite: pre-packed, Industrial Grade 3, containing no asbestos.

2.2 EQUIPMENT

- .1 Mercury Spill Response Kit consisting of:
 - .1 HEPA vacuum dedicated for use with mercury spills.
 - .2 Mercury absorbent materials in sufficient quantity.
 - .3 Air-purifying cartridge respirators with mercury absorbing cartridges and an end-of-life service indicator.
 - .4 Surgical gloves to prevent skin exposure when handling droplets of mercury. HEPA vacuum dedicated for use with mercury spills.
 - .5 Neutralizing compound such as 20% calcium polysulfide or 20% sodium thiosulfide to clean spilled surfaces. Surgical gloves to prevent skin exposure when handling droplets of mercury.

Part 3 Execution

3.1 PROCEDURES

- .1 Fluorescent light tubes containing mercury vapour should be carefully removed to prevent breakage, stored in manufacturer's cardboard container (closed, with no lamp ends exposed) or other equivalent containers, and then transported to an approved recycling facility.
- .2 Adequate ventilation should be employed immediately if a number of fluorescent light tubes are accidentally broken.
- .3 Place polyethylene drum liner in containment drum. Pour a minimum of 100 mm layer of vermiculite into liner. Place mercury items in containment drum in a manner to prevent breakage. When full, or all items are placed in drum, seal liner bag with duct tape and place appropriate label on outside of containment drum.
- .4 Thermometers, barometers and other mechanical components containing mercury should be carefully removed, stored in a Containment Drum with Drum Liner, and then transported to an approved hazardous recycling or waste disposal facility.
- .5 Handle and dispose of contaminated waste as required by O. Reg. 347, as amended and the Federal Transportation of Dangerous Goods Act.
- .6 Completed copies of waste manifests or landfill site receipts should be provided 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.
 - .2 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 81 01 – Hazardous Materials
- .3 Section 02 82 00.01 – Asbestos Abatement: Minimum Precautions
- .4 Section 02 82 00.02 – Asbestos Abatement: Intermediate Precautions
- .5 Section 02 82 00.03 – Asbestos Abatement: Maximum Precautions
- .6 Section 02 84 00 – PCB Remediation
- .7 Section 02 83 20 – Lead 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 is 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