

PART 1 GENERAL

1.01 REFERENCES

- .1 Canadian Standard Association
 - .1 CSA Z462-15 - Workplace electrical safety.
- .2 Ontario Electrical Safety Code (26th Edition/ 2015).

1.02 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide 4 prints and one electronic PDF format copy of inspection reports to Departmental Representative.
- .3 Submit digital colour photographs of each section of the inspected piers showing electrical components. Identify each picture as follows:
 - .1 Description of components being inspected.
 - .2 Voltage rating of components.
 - .3 Exact location of components.
 - .4 Date and time of inspection.

1.03 QUALITY ASSURANCE

- .1 Exploratory inspection of electrical systems to identify electrical components of the exterior lighting system mounted on Wellington Wall piers:
 - .1 Perform investigations to 4 piers total, located inside work area.
 - .2 Perform test where directed by Departmental Representative.
 - .3 Qualitative inspection: verify the actual condition of the following electrical components:
 - .1 Identify circuits number and electrical panels ;
 - .2 Circuits voltage;
 - .3 Wires: Type and size;
 - .4 Conduits: Type and size;
 - .5 Wire connectors: type;
 - .6 Underground boxes: type and size;
 - .7 Lamp socket, lamp type and wattage;
- .2 Insulation integrity test: after completing the inspection and before reconnecting the circuits, Megger all affected circuits to verify the integrity of wires.
- .3 Departmental Representative to provide an electrician and/or site representative who is knowledgeable with facility and electrical equipment and components, and who is able to assist electrical inspection agency in identifying components forming part of the total wall electrical system. Give Departmental Representative minimum 96 hours advanced notice.

PART 2 PRODUCTS

2.01 EQUIPMENT

- .1 Megger:
 - .1 Measurement range 0.01 MΩ to 2 GΩ
 - .2 Test voltages 50, 100, 250, 500, 1000 V
 - .3 Test voltage accuracy +20%, -0%
 - .4 Short-circuit test current 1 mA nominal
 - .5 Auto discharge, discharge time <0.5 second for C = 1 μF or less
 - .6 Live circuit detection Inhibit test if terminal voltage > 30 V prior to initialization of test
- .2 Unspecified Related Equipment: provide related equipment for performing inspection including, but not limited to, as follows:
 - .1 Digital still camera: 12MP minimum.
 - .2 Tools required to safely accessing panels, enclosure doors, and equipment.
 - .3 Electricians tape; black;
 - .4 Weather proof splices;
 - .5 Voltage and amperage measuring devices.
 - .6 Appropriate personal protective equipment meeting requirements for arc potential energy level, calculated for specific equipment in accordance with Z462-15 - Workplace electrical safety.
 - .7 Other equipment or supplies necessary to complete electrical equipment inspection.

PART 3 EXECUTION

3.01 EXAMINATION

- .1 Wear appropriate PPE for allowed working distance, as outlined in Z462-15 - Workplace electrical safety.
- .2 Locate and identify the equipment to be inspected.
 - .1 If equipment is not clearly or properly identified work with Departmental Representative to verify equipment to be inspected and have it properly labelled.

3.02 ELECTRICAL INVESTIGATION

- .1 Shut down and isolate all circuits to be inspected. Pad lock associated panel.
- .2 Conduct visual inspection to determine existing conditions, record observed conditions using still images.
- .3 Open the underground junction box for inspection
 - .1 Identify circuits and panel, wiring and wire connectors.
 - .2 Identify type wire's splice.

- .4 Inspect the underground conduits between the piers and underground boxes.
 - .1 Identify type of conduit, size, connectors and condition.
- .5 Remove existing light standard on the top of the piers and glass globes from fixtures; salvage for reuse.
 - .1 Loosen fasteners to remove light standards and globes; take care not to damage heritage fabric.
 - .2 Protect masonry from lubricant where required, and protect paint by covering fasteners to loosen.
 - .3 Salvage lighting components and fasteners for reuse.
- .6 Verify the following, as indicated:
 - .1 Wiring type and wire connectors.
 - .2 Lamp socket type, lamp type and voltage.
 - .3 General condition of wires and lamp socket.
- .7 Verify wires isolation between the underground boxes and the lamp post by Megger before reconnect the circuits.
- .8 Power the circuits and verify normal functioning of the lighting.
- .9 Obtain approval of Departmental Representative.
- .10 Reconnect affected components after test completion as directed by the Departmental Representative; use silicone marettes in the PVC junction box located in the grass.
- .11 Reinstall salvaged lighting components following testing as directed by the Departmental Representative; protect paint by covering fasteners to tighten.

3.03 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 02 27 30 – Electrical Investigations.
- .2 Section 04 05 00 – Common Work Results for Masonry.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide an updated site plan to locate existing undocumented irrigation system including subterranean components and record on topographical survey in CAD and PDF format.
- .3 Provide a written report summarizing findings including observations of the camera exploration, surveyed elevations of existing weeping drain, dimensions and condition illustrated with photos.
- .4 Provide a C.D. containing a video of the camera explorations and the summary report in digital format.

1.03 QUALITY ASSURANCE

- .1 Regulatory Requirements: ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable Provincial regulations.

1.04 DELIVERY, STORAGE AND HANDLING

- .1 Storage and Protection.
 - .1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Departmental Representative and at no cost to Departmental Representative.
 - .2 Remove and store materials to be salvaged, in manner to prevent damage.
 - .3 Store and protect in accordance with requirements for maximum preservation of material.
 - .4 Handle salvaged materials as new materials.

PART 2 PRODUCTS

2.01 MATERIALS

- .1 Paver joints filler: polymeric jointing sand.
- .2 Setting bed: stone screening, 0-4mm.
- .3 Loose crushed stone fill: 20mm clear crushed stone.
- .4 Granular for foundation: Granular A
- .5 Geotextile membrane : Polypropylene non-woven heavy duty fabric

2.02 EQUIPMENT

- .1 Use an excavator capable of excavating to a minimum depth of 2.0 meters.
- .1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

PART 3 EXECUTION

3.01 PREPARATION

- .1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
 - .1 Locate existing undocumented irrigation system including subterranean components; update site plan.
- .3 Notify and obtain approval of utility companies before starting demolition.
- .4 Enclose work areas containing 'TEST PITS' and 'EXPLORATORY OPENINGS' with temporary fencing in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.
 - .1 Group adjacent work areas within the same fenced area to minimize the quantity of work areas.
- .5 Perform a full topographical survey in parallel with investigations. The survey to cover the area between the wall and the drive to its north, and run the entire length of the wall, including the elevations of drainage pipe exposed by the subsurface investigations.

3.02 REMOVAL OPERATIONS

- .1 Perform test pits as indicated and as directed by Departmental Representative.
- .2 Excavate and support Work as required to expose 2 m length of wall down to bedrock – up to 1.75 m depth.
 - .1 Expose base of wall bay and adjacent pier.
- .3 Conduct test pits, namely exploratory excavation (D-Hole), at locations identified on the drawings to locate and verify the alignment and elevation of the existing weeping drain
 - .1 Clean earth off the foundations and stonework below grade for review by the Departmental Representative.
- .4 On the north side, remove existing ground cover – grass and top soil.
- .5 On the south side, dismantle existing pavers; salvage for reuse.
- .6 Excavate granular fill to expose geotextile membrane, without tearing membrane, and taking care not to damage existing utilities.
- .7 Pull back existing geotextile membrane and remove loose crushed stone fill.
- .8 Salvage existing geotextile membrane for reuse as directed by Departmental Representative; but assume complete replacement.

- .9 Salvage existing loose crushed stone fill and granular fill for reuse; assume 25% replacement. Take precautions not to contaminate salvaged material.
- .10 On the north side, gradually pull back geotextile membrane to expose face of foundations, footings, bedrock and drainage pipe.
 - .1 Perform drainage investigations with a camera (CCTV) to review slope, identify any blockage or damage; cut into drainage pipe as required.
 - .2 Repair drainage pipe following investigation to prevent leakage.
 - .3 Assume for replacement of geotextile membrane.
- .11 On the south side, gradually pull back geotextile membrane to expose face of foundations, footings and bedrock.
 - .1 Excavate as required to allow review the extent of the existing tree roots approaching the foundations.
 - .2 Clean cut roots larger than 15 mm with a sharp tool.
 - .3 Assume for replacement of geotextile membrane.
- .12 Perform 'EXPLORATORY OPENINGS BELOW GRADE' in accordance with Section 04 05 00 – Common Work Results for Masonry.

3.03 RESTORATION

- .1 Restore areas to conditions that existed prior to beginning of Work match condition of adjacent, undisturbed areas.
- .2 Reinstall loose crushed stone fill and granular fill, where replacing select new materials to match existing.
- .3 Gradually rearrange new geotextile membrane or reuse existing membrane, where not torn and accepted by the Departmental Representative for reuse.
- .4 On north side, replace ground cover with new 150 mm of top soil, cover with new sod.
- .5 On south side, backfill with granular material compacted to 95%. The granular base shall be compacted to 95% and the existing pavers reinstalled according to existing pattern.

3.04 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Remove debris, trim surfaces and leave work site clean, upon completion of Work
 - .3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling as outlined in article "WASTE MANAGEMENT" of Section 01 00 10 – General Instructions.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

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 Substances for details on lead-containing materials.

1.2 RELATED SECTIONS

- .1 Section 01 14 25 – Designated Substances
- .2 Section 02 89 00 – Silica Precautionary Measures

1.3 REFERENCES

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

1.4 DEFINITIONS

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

- .2 Authorized Visitors: Departmental Representatives or designated representatives, and representatives of regulatory agencies.
- .3 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed by placing two overlapping sheets of polyethylene over existing or temporarily framed doorway, secure each along top of doorway, secure vertical edge of one sheet along one vertical side of doorway, and secure vertical edge of other sheet along opposite vertical side of doorway. Reinforce free edges of polyethylene with duct tape and weight bottom edge to ensure proper closing. Overlap each polyethylene sheet at openings not less than 1.5 m on each side unless Site Conditions dictate otherwise.
- .4 Hazardous Material Workplan: A brief report identifying the location and quantities of hazardous materials and the methods that will be used to remove, store, transport and dispose of them.
- .5 Lead-Containing Paint: Paint that contains lead in measurable concentrations, that may result in elevated airborne lead exposure during operations that disturb the paint.
- .6 Lead-containing 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:
- .3 Safety Requirements: worker and visitor protection.
 - .1 Eating, drinking, chewing, and smoking are not permitted in the Lead Work Area.
 - .2 Washing facilities consisting of a wash basin, water, soap and towels shall be provided by the Contractor. All workers shall use these washing facilities before eating, drinking, smoking or leaving the work site. Washing facility areas are to be designated by Departmental Representative
 - .3 Protective equipment and clothing to be worn by workers while in the Lead Work Area includes:
 - .1 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres, consisting of full-body covering including head covering with snug-fitting cuffs at wrists, ankles, and neck.
 - .2 Respirator, personally issued to worker and marked as to efficiency and purpose, and acceptable to Authority having jurisdiction as suitable for level of lead exposure in the Lead Work Area. If disposable type filters are used, provide sufficient filters so that

workers can install new filters following disposal of used filters and before re-entering contaminated areas.

- .4 Ensure that no person required to enter the Lead Work Area has facial hair that affects seal between respirator and face.
- .5 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.
 - .2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from the Lead Work Area.

1.7 WASTE MANAGEMENT AND DISPOSAL

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

3.2 ABATEMENT WORK AREA PREPERATION

- .1 Implement lead precautionary measures appropriate to the work completed in accordance with MOL Guideline: Lead on Construction Projects, 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 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 Lead-containing emergency light batteries must be disposed of appropriately and recycled where possible.
 - .1 Handle lead-containing batteries in such a manner so as to prohibit generation and/or ingestion of lead dust.
- .5 Use appropriate lead precautions when handling lead-containing solder on piping.
 - .1 Handle lead-containing solder and joint caulking in such a manner so as to prohibit generation and/or ingestion of lead dust.
- .6 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 to full-shift periods.
 - .1 If airborne lead concentrations are above the protection factor of respirators in use, the Contractor shall:
 - .1 Stop abatement.
 - .2 Introduce more stringent engineering controls.
 - .3 Use a higher protection factor in respiratory protection for persons inside the Lead Work Area.
 - .2 If air monitoring shows that airborne lead concentrations outside the Lead Work Area exceed 0.025 mg/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 Following cleaning specified in Item 3.4.8 above, and when the Lead Work Area has met the air monitoring and residual lead dust levels specified in Item 3.6 as well as inspection criteria specified in Item 3.5, proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it towards the centre of the Lead Work Area. Immediately vacuum any visible paint chips, particles, dust and debris observed during cleanup using HEPA vacuum equipment.
- .3 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in sealed labelled waste containers for transport.
- .4 Include in clean-up Work areas, Equipment and Access Room, Shower Room, and other contaminated enclosures.
- .5 Include in clean-up sealed waste containers and equipment used in Work and remove from work areas, at appropriate time in cleaning sequence.
- .6 A final check may be carried out to ensure that no lead dust or debris remains on surfaces as a result of dismantling operations.
- .7 As work progresses, and to prevent exceeding available storage capacity on site, remove sealed and labelled waste containers.
 - .1 Dispose of lead-containing waste in accordance with R.R.O. 1990, Regulation 347, as amended. Ensure that waste hauler and receiver are fully aware of hazardous nature of material to be disposed of and that guidelines and regulations for lead-containing waste disposal are followed.
 - .2 Ensure that materials removed during the Work of this Section are treated, packaged, transported and disposed of as lead-containing waste.
 - .3 Clean up waste routes and loading area after each load. Use lead abatement procedures if appropriate or requested by Departmental Representative.
 - .4 Drop garbage bins at designated locations. Keep bins covered and enclosed while at the site. Bin loading area shall be kept clean at all times.
 - .5 Transport all waste to a landfill licensed by the Ontario Ministry of Environment (MOE).
 - .6 Provide Departmental Representative with copies of shipping documents and lead-containing waste manifests for each load of waste. The

Contractor is responsible to ensure that written documentation is submitted for each load of waste leaving the site.

- .7 Cooperate with MOE inspectors and immediately carry out instructions for remedial work at landfill to maintain environment, at no additional cost to the Departmental Representative.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 This section specifies requirements and procedures for silica precautionary measures. This section conforms to the requirements of the Ontario Occupational Health and Safety Act, R.S.O. 1990, Regulation 490/09 "Designated Substances".
- .2 Comply with the requirements of this Section when performing the following work:
 - .1 Work at site which may involve contact with silica dust generated through such processes as sawing, cutting, grinding, blasting and/or breaking of the silica containing material.
 - .2 Refer to the following documentation for details on silica-containing materials:
 - .1 Specification Section 01 14 25 – Designated Substances.

1.2 RELATED SECTIONS

- .1 Section 01 14 25 – Designated Substances
- .2 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. protection are dependent on the work practices and associated silica exposure risks.
 - .1 Air purifying half-mask respirator equipped with HEPA filter cartridges or supplied-air type, personally issued to the worker and marked as to efficiency and purpose, and acceptable to the Provincial Authority having jurisdiction as suitable for silica and the level of silica exposure in the Work Area. If disposable type filters are used, provide sufficient filters so that workers can install new filters following disposal of used filters and before re-entering contaminated areas.
 - .2 Eye Protection: Goggles, Safety glasses with side shields, or Face shield.
 - .3 If requested by a worker,
 - .1 Hand Protection: Gloves
 - .2 Clothing: Full body protective clothing

1.8 AIR MONITORING

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

1.9 PERMITS

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

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION