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| <u>1 MINIMUM STANDARDS</u> | .1 | Materials shall be new and work shall conform to the minimum applicable standards of the Canadian General Standards Board, the Canadian Standards Association, the National Building Code of Canada 2010 (NBCC) and all applicable Provincial and Municipal codes. In the case of conflict or discrepancy the most stringent requirement shall apply. |
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| <u>2 TAXES</u> | .1 | Pay all taxes properly levied by law (including Federal, Provincial and Municipal). |
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| <u>3 FEES, PERMITS, AND CERTIFICATES</u> | .1 | Pay all fees and obtain all permits. Provide authorities with plans and information for acceptance certificates. Provide inspection certificates as evidence that work conforms to requirements of Authority having jurisdiction. |
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| <u>4 FIRE SAFETY REQUIREMENTS</u> | .1 | Comply with the National Building Code of Canada 2010 (NBCC) for fire safety in construction and the National Fire Code of Canada 2010 (NFCC) for fire prevention, fire fighting and life safety in building in use. |
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| <u>5 FIELD QUALITY CONTROL</u> | .1 | Carry out Work using qualified licensed workers or apprentices in accordance with Provincial Act respecting manpower vocational training and qualification. |
| | .2 | Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licensed workers. |
| | .3 | Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties. |
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| <u>6 HAZARDOUS MATERIALS</u> | .1 | Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and the provision of Material Safety Data Sheets (MSDS). |
| | .2 | For work in occupied buildings give the Departmental Representative 1 week notice for work involving designated substances (Ontario Bill 208) and before painting, caulking, installing carpet or using adhesives. |
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| <u>7 TEMPORARY UTILITIES</u> | .1 | Existing services required for the work, excluding power required for space heating, may be used by the Contractor without charge. Ensure capacity is adequate prior to imposing additional loads. Connect and disconnect at own expense and responsibility. |
| | .2 | Notify the Departmental Representative and utility companies of intended interruption of services, obtain requisite permission. |
| | .3 | Give the Departmental Representative 1 week notice related to each necessary interruption of any mechanical or electrical service throughout the course of the work. Keep duration of these interruptions to a minimum. Carry out all interruptions after normal working hours of the occupants, preferably on weekends. |
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| <u>8 REMOVED MATERIALS</u> | .1 | Unless otherwise specified, materials for removal become the Contractor's property and shall be taken from site and disposed of responsibly. |
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| <u>9 PROTECTION</u> | .1 | Protect finished work against damage until take-over. |
| | .2 | Protect adjacent work against the spread of dust and dirt beyond the work areas. |
| | .3 | Protect operatives and other users of site from all hazards. |
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| <u>10 USE OF SITE AND FACILITIES</u> | .1 | The contractor shall agree to install proper site separation and identification in order to maintain "Time and Space" at all times throughout the life of the project. |
| | .2 | When building operations staff require access to equipment in order to operate building, proper coordination and communication must exist between all parties. |
| | .3 | Execute work with least possible interference or disturbance to the normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated. Refer to article 25 Scheduling below for work that must be done during "off hours". |
| | .4 | Maintain existing services to building and provide for personnel and vehicle access. |
| | .5 | Where security is reduced by work provide temporary means to maintain security. |
| | .6 | Where elevators, dumbwaiters, conveyors or escalators exist Contractor may use these at Departmental Representative's discretion. Protect from damage, safety hazards and overloading of existing equipment. |
| | .7 | Sanitary facilities will be assigned for Contractor's personnel. Others shall not be used. Keep facilities clean. |
| | .8 | Closures: Protect work temporarily until permanent enclosures completed. |
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| <u>11 CUT, PATCH AND MAKE GOOD</u> | .1 | Cut existing surfaces as required to accommodate new work. |
| | .2 | Prior to cutting or drilling horizontal or vertical surfaces including concrete, concrete block or other structural substrate, determine location of reinforcing, service lines, pipes, conduits or other items by x-ray, ground penetrating radar or other appropriate method. Submit findings to Departmental Representative prior to cutting or drilling. |
| | .3 | Remove all items so shown or specified. |
| | .4 | Patch and make good surfaces cut, damaged or disturbed, to Departmental Representative's approval. Match existing material, colour, finish and texture. |
| | .5 | Install firestops and smoke seals in accordance with CAN/ULC S115-11, around pipe, ductwork, cables, and other objects penetrating fire separations to provide fire resistance not less than the fire resistance rating of surrounding floor, ceiling, and wall assembly. Fire rating of floors and wall shall be considered to contain a 2 hr. fire rating unless otherwise shown or directed on site. |
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| <u>12 SLEEVES,
HANGERS AND
INSERTS</u> | .1 | Co-ordinate setting and packing of sleeves and supply and installation of hangers and inserts. Obtain Departmental Representative's approval before cutting into structure. |
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| <u>13 EXAMINATION</u> | .1 | Examine site and conditions likely to affect work and be familiar and conversant with existing conditions. |
| | .2 | Provide photographs of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims. |
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| <u>14 SIGNS</u> | .1 | Provide common-use signs related to traffic control, information, instruction, use of equipment, public safety devices, etcetera, in both official languages or by the use of commonly-understood graphic symbols to the Departmental Representative's approval. |
| | .2 | No advertising will be permitted on this project. |
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| <u>15 ACCESS AND
EGRESS</u> | .1 | Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations. Workers must follow the normal building security/sign-in/sign-out procedures for work within building. |
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| <u>16 SCAFFOLDS AND
WORK PLATFORMS</u> | .1 | Design, install, and inspect scaffolds and work platforms required for work in accordance with relevant municipal, provincial and other regulations. |
| | .2 | Provide design drawings, signed and sealed by qualified Professional Engineer licensed in the province of Ontario, where prescribed. |
| | .3 | Additions or modifications to scaffolding must be approved by Professional Engineer in writing. |
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| <u>17 WASTE
MANAGEMENT</u> | .1 | Comply with the Environmental Protection Act, Ontario Regulations O.Reg. 102/94 and O. Reg. 103/94 for waste management program on construction and demolition projects. |
| | .2 | Conduct "waste audit" to determine waste generated during demolition or construction operations, prepare written "waste reduction work plan" and implement procedures to reduce, reuse and recycle materials to the extent possible. |
| | .3 | Provide a "source separation program" to disassemble and collect in an orderly fashion the following "materials designated for alternative disposal" from the "general waste" stream. <ul style="list-style-type: none">.1 brick and Portland cement concrete..2 cardboard (corrugated)..3 gypsum board (unfinished)..4 steel..5 wood (not including treated or laminated wood). |
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17 WASTE
MANAGEMENT
(Cont'd)

- .4 Submit complete records of all removals from site for both "materials designated for alternative disposal" and "general waste" including:
- .1 Time and date of removal
 - .2 Description of material and quantities.
 - .3 Proof that materials have been received at an Approved Waste Processing Site or certified Waste Disposal Site as required.

18 OPERATIONS AND
MAINTENANCE
MANUALS

- .1 Two (2) weeks prior to any scheduled training, submit to Departmental Representative six (6) copies of approved Operations Data and Maintenance Manual in both official languages, compiled as follows:
- .1 Bind data in vinyl hard cover 3 "D" ring type loose leaf binders for 212 x 275 mm size paper. Binders must not exceed 75 mm thick or be more than 2/3 full.
 - .2 Enclose title sheet labelled "Operation Data and Maintenance Manual," project name, date and list of contents. Project name must appear on binder face and spine.
 - .3 Organize contents into applicable sections of work to parallel project specifications breakdown. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.
- .2 Include following information plus data specified.
- .1 Maintenance instruction for finished surface and materials.
 - .2 Copy of hardware and paint schedules.
 - .3 Description: Operation of the equipment and systems defining start-up, shut-down and emergency procedures, and any fixed or adjustable set points that affect the efficiency of the operation. Include nameplate information such as make, size, capacity and serial number.
 - .4 Maintenance: Use clear drawings, diagrams or manufacturers' literature which specifically apply and detail the following:
 - .1 lubrication products and schedules.
 - .2 trouble shooting procedures.
 - .3 adjustment techniques.
 - .4 operational checks.
 - .5 Suppliers names, addresses and telephone numbers and components supplied by them must be included in this section. Components must be identified by a description and manufacturers part number.
 - .5 Guarantees showing:
 - .1 Name and address of projects.
 - .2 Guarantee commencement date (date of Interim Certificate of Completion).
 - .3 Duration of guarantee.
 - .4 Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.
 - .5 Signature and seal of Guarantor.
 - .6 Additional material used in project listed under various Sections showing name of manufacturer and source of supply.
- .3 Spare parts: List all recommended spares to be maintained on site to ensure optimum efficiency. List all special tools appropriate to unique application. All parts/tools detailed must be identified as to manufacturer, manufacturer part number and supplier (including address).
- .4 Include one complete set of final shop drawings (bound separately) indicating corrections and changes made during fabrication and installation.

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| <u>19 RECORDS</u> | .1 | As work progresses, maintain accurate records to show deviations from contract drawings. Just prior to Departmental Representative's inspection for issuance of final certificate of completion, supply to the Departmental Representative one (1) set of white prints with all deviations neatly inked in. The Departmental Representative will provide two sets of clean white prints for this purpose. |
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| <u>20 GUARANTEES AND WARRANTIES</u> | .1 | Before completion of work collect all manufacturer's guarantees and warranties and deposit with Departmental Representative. |
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| <u>21 CLEAN UP</u> | .1 | Clean up work area as work progresses. At the end of each work period, and more often if ordered by the Departmental Representative, remove debris from site, neatly stack material for use, and clean up generally. |
| | .2 | Upon completion remove scaffolding, temporary protection and surplus materials. Make good defects noted at this stage. |
| | .3 | Wash and polish glass, mirrors, ceramic tile, aluminum, chrome, stainless steel, baked or porcelain enamel, plastic laminate and other plastic surfaces, floors, hardware and washroom fixtures. Clean manufactured articles in accordance with manufacturer's directions. |
| | .4 | Clean areas under contract to a condition at least equal to that previously existing and to approval of Departmental Representative. |
| | .5 | Maintain all exterior construction facilities and areas of work throughout project, including grass cutting and snow clearing. |
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| <u>22 SECURITY CLEARANCES</u> | .1 | All personnel employed on this project will be subject to security check. Obtain requisite clearance, as instructed, for each individual required to enter the premises. |
| | .2 | Personnel will be checked daily at start of work shift and given a pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out. |
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| <u>23 BUILDING SMOKING ENVIRONMENT</u> | .1 | Smoking is not permitted in the Building. Obey smoking restrictions on building property. |
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| <u>24 DUST CONTROL</u> | .1 | Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of work and public. |
| | .2 | Maintain and relocate protection until such work is complete. |
| | .3 | Protect all furnishings within work area with 0.102 mm thick polyethylene film during construction. Remove film during non- construction hours and leave premises in clean, unencumbered and safe manner for normal daytime function. |
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- 25 SCHEDULING .1 On award of contract submit bar chart construction schedule for work, indicating anticipated progress stages within time of completion. When schedule has been reviewed by the Departmental Representative, take necessary measures to complete work within scheduled time. Do not change schedule without notifying Departmental Representative.
- .2 Carry out work during "regular hour" Monday to Friday from 07:00 to 18:00 hours.
- .3 Give the Departmental Representative 1 week notice for work to be carried out during "off hours".
- .4 Carry out the following noise generating work and hot work during "off hours" Monday to Friday from 18:00 to 07:00 hours and on Saturdays, Sundays, and statutory holidays. Coordinate with Departmental Representative for hot work permits and fire alarm bypass. Coordinate directly with Chubb Edwards for fire alarm bypass requirements. Associated costs for fire alarm bypass to be covered by Contractor.
- .1 Demolition.
 - .2 Saw cutting.
 - .3 Coring.
 - .4 Welding.
- 26 COST BREAKDOWN .1 Before submitting first progress claim submit breakdown of Contract Amount in detail as directed by Departmental Representative and aggregating the Contract Amount. After approval by Departmental Representative cost breakdown will be used as the basis of progress payments.
- 27 PRECEDENCE .1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

PART 1 – GENERAL

1.1 REGULATORY REQUIREMENTS

.1 An investigation into the presence of designated substances for the Booth Street Standalone Heating Project at 555, 601 and 615 Booth Street, Ottawa, Ontario, was performed in order to meet the requirements of the *Canada Labour Code* under Part II, Section 124 that every employer shall ensure that the health and safety at work of every person employed by the employer is protected. Also, it was performed to meet the requirements of Section 30 of the Ontario Occupational Health and Safety Act, Revised Statutes of Ontario, 1990, Chapter O.1. Furthermore, Section 125(1)(z.14) of the *Canada Labour Code* stipulates that the employer will take all reasonable care to ensure that all persons granted access to the work place, other than the employer's employees, are informed of every known or foreseeable health and safety hazard to which they are likely to be exposed in the work place. By having a Designated Substances Report (DSR) conducted, the PWGSC Departmental Representative will be able to inform his or her employees, contractors, and tenants of any designated substances that may be present and possibly disturbed throughout the duration of the project. The informed Departmental Representative will then be able to impose appropriate health and safety precautions for all applicable personnel as required.

.2 The designated substances identified in the *Occupational Health and Safety Act* and its corresponding regulations are:

- .1 **Acrylonitrile:** "Designated Substances"
O. Reg 490/09, as amended.
- .2 **Arsenic:** "Designated Substances"
O. Reg 490/09, as amended.
- .3 **Asbestos:**
 - .1 "Designated Substances"
O. Reg 490/09, as amended.
 - .2 "General – Waste Management"
O. Reg 347/90, as amended
 - .3 "Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations" *O. Reg 278/05* (as amended)
 - .4 *PWGSC Departmental Policy DP 057 – "Asbestos Management"*
- .4 **Benzene:** "Designated Substances"
O. Reg 490/09, as amended.
- .5 **Coke Oven Emissions:** "Designated Substances" *O. Reg 490/09*, as amended.
- .6 **Ethylene Oxide:** "Designated Substances"
O. Reg 490/09, as amended.

- .7 **Isocyanates:** "Designated Substances"
O. Reg 490/09, as amended.
 - .8 **Lead:**
 - .1 "Designated Substances"
O. Reg 490/09, as amended.
 - .2 "General – Waste Management"
O. Reg 347/90, as amended
 - .3 *Canada Consumer Product Safety Act's
Surface Coating Materials Regulations
SOR/2005-109 (as amended)*
 - .9 **Mercury:**
 - .1 "Designated Substances"
O. Reg 490/09, as amended.
 - .2 "General – Waste Management"
O. Reg 347/90, as amended
 - .10 **Silica:** "Designated Substances"
O. Reg 490/09), as amended.
 - .11 **Vinyl Chloride:** "Designated Substances"
O. Reg 490/09, as amended.
- .3 All contractors requesting tenders from subcontractors shall furnish this report to subcontractors.

1.2 VALIDITY DATE

- .1 El Houcine Faouzi, Environmental Analyst from Environmental Services Directorate of the Real Property Branch, PWGSC, conducted the on-site survey for this report on July 09, 2014.
- .2 The work area is located at 555, 601 and 615 Booth Street, Ottawa, Ontario. The scope of work includes:
 - Disconnection of existing steam and condensate services coming from the Central Heating Plant (CHP) tunnels and rerouting these services to exterior of building.
 - Construction of a fenced enclosure exterior to each building for the placement of a rental containerized boiler plant which will be connected into existing services to provide the required steam to existing building heating infrastructure.
 - Installation of a vent stack for each boiler extended up the side of the associated building.
 - Replacement of existing condensate pumps and controls added to integrate system with new containerized boiler plant.
- .1 The scope of work for this report involved a visual inspection of building materials and contents for the presence of suspected designated substances in the project area.

- .2 From the visual inspection suspect materials were sampled and analyzed, where appropriate, for the above substances. On the basis of the visual inspection, a total of eight (8) bulk samples of suspected lead-containing paints were collected and submitted for analysis to the EXOVA Laboratory (an accredited Canadian Association for Environmental Analytical Laboratory (CAEAL) lab) located at 146 Colonnade Road, Unit 8, Ottawa, Ontario, K2E 7Y1.
- The lead analysis of the paint sample was completed using Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) in accordance with U.S. EPA Method 6010-C.
- .3 The visual inspection was limited to readily accessible areas. Destructive testing was not included in the investigation, but is recommended prior to any major demolition. Due to the nature of building construction, some inherent limitations exist as to the possible thoroughness of the designated substance survey. No confined space was accessed for the purpose of this report.
- .4 It is possible that the designated substances aforementioned are present in non-accessible areas and concealed spaces or confined spaces. No other areas outside the defined work boundaries have been assessed.
- .5 Prior to beginning work, it must be confirmed with the Departmental Representative that no additional designated substances have been brought to the project area.
- .6 Polychlorinated biphenyls (PCBs) and halocarbons are also included as part of the survey completed on July 9, 2014.
- .7 The following previous reports were referenced as part of this report:
- Annual Reassessment of Asbestos-Containing Materials. Natural Resources Canada Building, 555 Booth Street, Ottawa, Ontario. Greenough Environmental Consulting Inc., 2013
 - Annual Reassessment of Asbestos-Containing Materials. Geological Survey Of Canada Building, 601 Booth Street, Ottawa, Ontario. Greenough Environmental Consulting Inc., 2013

- Annual Reassessment of Asbestos-Containing Materials. Geomatics Survey Building, 615 Booth Street, Ottawa, Ontario. Greenough Environmental Consulting Inc., 2013
- .8 There is a possibility that materials which could not be reasonably identified within the scope of this assessment or which were not apparent during previous site visits may exist. Should any designated substance be encountered in the course of demolition, work must be stopped, precautionary measures taken, and the Departmental Representative must be notified immediately. **Do not proceed until written instructions have been received.**

PART 2 - DESIGNATED SUBSTANCES

2.1 SURVEY RESULTS

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

Asbestos is a naturally occurring material. In general, it has historically been intentionally added to many building materials in the construction industry to increase thermal or chemical resistance properties. More common uses are thermal insulation for pipes and boilers, structural steelwork fireproofing, floor tiles and in-wall and ceiling plasters. There are two classes of asbestos-containing materials: friable and non-friable. Friable asbestos-containing materials are loose in composition or can be easily crumbled using hand pressure. Non-friable asbestos-containing materials are more durable and are held together by a binder such as cement, vinyl or asphalt.

Based on visual observations during the survey completed on July 9, 2014 and the results referenced in the previous annual assessments of ACMs in buildings 555, 601 and 615 Booth Street, the following friable ACMs were identified in the project areas:

- Straight-run Magblock pipe insulation on the steam, condensate, chilled water and hot water pipe runs through basement corridors in 601 and 615 Booth Street and at the junction between the CHP tunnel and Building 615 in the project areas.

- Parging cement compound on pipe fittings through basement corridors in 601 and 615 Booth Street and at the junction between the CHP tunnel and Building 615 in the project areas.

It should be noted that some ACMs may be concealed and thus not observed at the time of the survey. The site survey did not include a destructive, intrusive investigation for concealed materials. As a result, ESD cannot confirm materials that may not have been visible or apparent at the time of the site investigation.

Should any previously unidentified suspect ACMs be encountered as part of future work, these materials are to be treated as ACMs and handled accordingly, unless sampling and analysis proves otherwise. Materials that have not been analyzed, but are visibly similar to other materials identified as asbestos-containing, must be considered asbestos-containing unless proven otherwise by laboratory analysis.

- .4 **BENZENE:** Not Identified
- .5 **COKE OVEN EMISSIONS:** Not Identified
- .6 **ETHYLENE OXIDE:** Not Identified
- .7 **ISOCYANATES:** Not Identified
- .8 **LEAD: Identified**

Lead is a naturally occurring metal. It was used primarily in paint prior to the 1980s to increase the drying process. Lead in paint becomes a danger when it is old or damaged, as it creates lead dust and chips. Lead can also be found in soldered joints installed on piping up to the mid-1990s and in older cast iron bell and spigot joints.

- .1 According to the *Canada Consumer Product Safety Act's Surface Coating Materials Regulations SOR/2005-109* (as amended), as amended, allowable concentration of lead of surface coatings is 0.009 percent by weight (weight of lead to weight of paint), which is equivalent to 90 parts per million (ppm).
- .2 Representative paint samples, collected on July 9, 2014 from the project areas, have been analyzed for lead content.
- .3 Laboratory analysis results indicates that the lead content in the following paints exceed 90 ppm, and as such are considered to be 'lead-based', as per the Canada Consumer Product Safety Act's Surface Coating Materials Regulations SOR/2005-109.

- Beige wall paint in Mechanical Room B-34, basement of 555 Booth Street
- Grey floor paint in Mechanical Room B-34, basement of 555 Booth Street
- White paint on the corridor wall, basement of 555 Booth Street
- Beige wall paint in Room B10F, basement of 601 Booth Street
- Grey floor paint in Mechanical Room B7, basement of 601 Booth Street
- White paint on the corridor wall, basement of 601 Booth Street
- Grey floor paint in Mechanical Room G48, basement of 615 Booth Street
- Grey floor paint in Mechanical Room B10F, basement of 601 Booth Street

Laboratory results are summarized in Table 1 below.

Table 1: Lead Paint Sample Results

Sample ID	Sample Description	Sample Location	Lead Content (ppm)
SAB-Pb-1	Beige wall paint	Mechanical Room B-34, basement, 555 Booth Street	3910
SAB-Pb-2	Grey floor paint,	Mechanical Room B-34, basement, 555 Booth Street	760
SAB-Pb-3	White paint	From the corridor wall, basement, 555 Booth Street	1450
SAB-Pb-4	Beige wall paint	Room B10F, basement, 601 Booth Street	23300
SAB-Pb-5	Grey floor paint	Mechanical Room B7, basement, 601 Booth Street	4330
SAB-Pb-6	White paint	From the corridor wall, basement, 601 Booth Street	750
SAB-Pb-7	Grey floor paint	Mechanical Room G48, basement, 615 Booth Street	3360
SAB-Pb-8	Grey floor paint	Mechanical Room B10F, basement, 601 Booth Street	11800

Bold items indicate exceedences when compared with the 90 ppm threshold established in the Canada Consumer Product Safety Act's Surface Coating Materials Regulations SOR/2005-109 (as amended).

.9 **MERCURY:** Not Identified

.10 **SILICA:** Identified

Free crystalline silica is assumed present in brick and mortar, concrete, concrete block, plaster and drywall throughout the project areas.

.11 **VINYL CHLORIDE MONOMER:** Not Identified

.12 **POLYCHLORINATED BIPHENYLS (PCBs):** Not Identified

.13 **HALOCARBONS:** Not Identified

2.2 RECOMMENDATIONS

1. ASBESTOS

.1 PWGSC's Departmental Policy (DP) 057, Asbestos Management, sets policy, establishes roles and responsibilities and provides a code of practice for the management of and working with asbestos-containing materials. All work must be done in accordance with this directive, as well as all other applicable legislation. Disturbance of all asbestos (whether friable or non-friable) is regulated in Ontario by "Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations" O.Reg 278/05, as amended, which outlines the precautions required when performing work involving asbestos-containing materials. The regulation stipulates appropriate respiratory protection, work procedures and ventilation requirements that must be utilized during the disturbance of any asbestos-containing materials, or materials suspected to contain asbestos.

.2 In the event of conflict between DP-057 and "Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations" O.Reg. 278/05, as amended, the more stringent shall apply.

.3 The removal or disturbance of one square metre or less of friable asbestos containing materials (Magblock pipe insulation, parging cement on pipe fittings) must be conducted using a minimum of Type 2 asbestos work procedures. The removal or disturbance of more than one square metre of friable asbestos-containing materials must be conducted using Type 3 asbestos work procedures. Type 3 asbestos abatement operations performed in occupied buildings require daily asbestos air monitoring outside of each asbestos work area, as per PWGSC DP-057. It should be noted that the removal of good condition asbestos-containing pipe insulation and pipe fitting insulation can be conducted using Type 2 glove bag procedures, provided the material is in good condition, and a proper seal can be maintained.

2. LEAD

.1 If suspected lead-containing materials are disturbed (i.e. during dry sanding, grinding, polishing and sawing operations), then proper precautions, as outlined under "Designated Substances" O.Reg 490/09, as amended, of the Occupational Health and Safety Act, must be followed.

.2 Under Ontario Regulation 490/09, as amended of the Occupational Health and Safety Act,

regulatory limits have been established for occupational exposure limits to airborne lead that may be present in a workplace. The Time Weighted Average Exposure Values (TWAEV) to airborne lead dust or fumes should not exceed the Ministry of Labour's 0.05 milligram per cubic metre (mg/m^3) limit during the removal of paints and products containing any concentration of lead. The TWAEV represents the time-weighted average concentration for a conventional 8-hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse health effects.

.3 Contractors performing work that requires disturbance of lead-containing materials are responsible to ensure that the workers are not exposed to airborne lead dust levels in excess of the time-weighted average and Maximum Exposure Concentration for lead-containing paints.

.4 The disturbance of lead-based painted elements within the project areas will require the use of lead precautions (Type 1, Type 2 or Type 3) appropriate to the type of disturbance as per the Ontario Ministry of Labour (MoL) guideline "*Guideline: Lead on Construction Projects*". It is recommended that removal of the areas of poor condition paints and any loose, delaminating, flaking areas of paint be performed (leaving the remaining areas of paint intact and undisturbed), following the above-noted MoL guideline. The removal of poor condition lead-containing painted materials in the project areas can be performed using Type 1 work procedures, provided the work is done using non-powered hand held tools, and no manual scraping or sanding techniques are used. If these conditions cannot be met, then more stringent (Type 2 or Type 3) lead work procedures are required.

.5 The disposal of construction waste containing lead is controlled by "General – Waste Management" O.Reg 347/09, as amended, under the *Ontario Environmental Protection Act*. The classification of the waste is dependent upon the result(s) of leachate test(s). The waste can be classified as "hazardous", "non-hazardous" or "registerable solid waste", depending on the results of the leachate test.

.6 Prior to disposal, the concentration of leachable lead must be determined for waste materials with elevated lead contents following the Toxicity Characteristic Leaching Procedure (TCLP). Based upon the concentration of lead identified within the paint within the work area, the painted surfaces would be characterized as non-hazardous for disposal.

3. SILICA

.1 Silica occurs as crystalline material in cement. Crystalline silica is regulated under “Designated Substances” *O.Reg 490/09*, as amended, of the *Occupational Health and Safety Act* as a Designated Substance.

.2 Silica dust can be generated through such processes as blasting, grinding, crushing, and sandblasting silica-containing material. Since silica is presumed present in concrete drywall and ciling tiles within the project areas, appropriate respiratory protection and ventilation must be donned during the demolition and modifications of these structures.

.3 The Occupational Health and Safety Branch of the MoL has published the document entitled “*Guideline: Silica on Construction Projects*”. This document classifies the disturbance of materials containing silica as Type 1, Type 2 or Type 3 work, and assigns different levels of respiratory protection and work procedures for each classification. These work procedures should be followed when performing work involving the disturbance of silica-containing materials.

4. CONTRACTORS DUTIES

The contractor must review the designated substance report and take the necessary precautions to protect the health and safety of the workers and the environment. As per Section 30(4) of the *Ontario Occupational Health and Safety Act*, the party hiring the contractor (i.e., PWGSC Departmental Representative) shall ensure that the contractor and subcontractor (if any) for the project has received a copy of the designated substance report prior to entering a binding contract for the supply of work on the project. As per Section 27(2) (a, b, and c) of the *Ontario Occupational Health and Safety Act*, while onsite, the contractor supervisor shall exercise every reasonable precaution for the protection of a worker. If you have any questions about the designated substance report, please contact the PWGSC Departmental Representative.

END OF SECTION

PART 1 - GENERAL**1.1 LOCATION**

- .1 555 Booth Street (hereinafter referred as the Site) is located in the Northeast quadrant of the Booth Street Complex. Prior to 1955 the Site was historically used as a railway yard and an auto wrecking and trimming facility.
- .2 The Site is currently registered as a “**Class 3 - contaminated site**” under the Federal Contaminated Site Inventory.
- .3 As a Class 3, the Site is considered as a “Low Priority for Action” under the National Classification System.

**1.2 CURRENT SITE
ENVIRONMENTAL CONDITION**

- .1 Results from the Phase II Environmental Site Assessment identified: (a)
Soil contamination
 - Three borehole locations exceeded the Federal Soil Quality Guidelines for carcinogenic PAH parameters for human health.
 - Given the history of the Site uses and the laboratory results, it is reasonable to conservatively consider the soil within the entire exterior area of the Site impacted above the federal soil quality guidelines/standards.
 - The vertical extent of the impacted soil extends from the ground surface to the shallow bedrock surface with an average of about 1.5 metres below ground surface.

(b) **Groundwater contamination**

 - Groundwater samples collected at all five monitoring well locations exceeded the Federal Interim Groundwater Guidelines for most of PAH parameters
 - The presence of groundwater within fractured rock across the site facilitates the contaminants transports. For this reason, off site migration of impacts is likely.
 - The lateral extent of impacted groundwater can be conservatively estimated approximately 11,2000 m².

1.3 RELATED SPECS SECTIONS

- .1 Section 01 35 01 – Health and Safety for Contaminated Sites.
- .2 Section 01 35 02 – Environmental Procedures.
- .3 Section 01 35 03 – Special procedures for Contaminated Sites
- .4 Section 01 74 01 – Construction/Demolition Waste Management and Disposal.

END OF SECTION

PART 1 - GENERAL

- 1.1 DEFINITIONS**
- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
 - .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
 - .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
 - .4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
 - .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
 - .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
 - .7 Milestone: significant event in project, usually completion of major deliverable.
 - .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
 - .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.
- 1.2 REQUIREMENTS**
- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
 - .2 Plan to complete Work in accordance with prescribed milestones and time frame.
 - .3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.
 - .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

<u>1.3 ACTION AND INFORMATIONAL SUBMITTALS</u>	.1	Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
	.2	Submit to Departmental Representative within 5 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
	.3	Submit Project Schedule to Departmental Representative within 10 working days of receipt of acceptance of Master Plan.
<u>1.4 MASTER PLAN</u>	.1	Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
	.2	Departmental Representative will review and return revised schedules within 5 working days.
	.3	Revise impractical schedule and resubmit within 5 working days.
	.4	Accepted revised schedule will become Master Plan and be used as baseline for updates.
<u>1.5 PROJECT SCHEDULE</u>	.1	Develop detailed Project Schedule derived from Master Plan.
	.2	Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
	.1	Award.
	.2	Shop Drawings, Samples.
	.3	Permits.
	.4	Mobilization.
	.5	Demolition.
	.6	Concrete pad completion.
	.7	Fenced enclosure.
	.8	Condensate pump replacements.
	.9	Main electrical feeders.
	.10	Steam and condensate rough-in's.
	.11	Boiler plant delivery and hoisting place.
	.12	Natural gas regulator station installation.
	.13	Exterior venting.
	.14	Final connection to boiler plant.
	.15	Controls integration.
	.16	Insulation
	.17	Final connection to existing services.
	.18	Landscaping.
	.19	Testing and Commissioning.
	.20	Supplied equipment long delivery items.
	.3	Coordinate work schedule to accommodate continued operations of steam and condensate systems from CHP until such time that new boiler plant systems are ready for reliable service.

**1.6 PROJECT
SCHEDULE
REPORTING**

- .1 Update Project Schedule on bi-weekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

**1.7 PROJECT
MEETINGS**

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

PART 2 - PRODUCTS**2.1 NOT USED**

- .1 Not used.

PART 3 - EXECUTION**3.1 NOT USED**

- .1 Not used.

PART 1 - GENERAL

- 1.1 ADMINISTRATIVE**
- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
 - .2 Do not proceed with Work affected by submittal until review is complete.
 - .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
 - .4 Where items or information is not produced in SI Metric units converted values are acceptable.
 - .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
 - .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
 - .7 Verify field measurements and affected adjacent Work are co-ordinated.
 - .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
 - .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
 - .10 Keep one reviewed copy of each submission on site.
- 1.2 SHOP DRAWINGS AND PRODUCT DATA**
- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
 - .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Canada.
 - .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
 - .4 Allow 10 days for Departmental Representative's review of each submission.
 - .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

1.2 SHOP DRAWINGS
AND PRODUCT DATA
(Cont'd)

- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit electronic copy of shop drawings, product data, test reports, certificates and/or manufacturer's instructions for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .12 Delete information not applicable to project.
- .13 Supplement standard information to provide details applicable to project.
- .14 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .15 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions

1.2 SHOP DRAWINGS
AND PRODUCT DATA
(Cont'd)

- .15 (Cont'd)
- .1 (Cont'd)
in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
- .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's business address.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 MOCK-UPS

- .1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

1.5 CERTIFICATES
AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

PART 2 - PRODUCTS2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- | | | |
|-----------------------------|----|---|
| <u>1.1 GENERAL</u> | .1 | All conditions of the Contract and Section 010010 – General Instructions apply to this Section. |
| <u>1.2 RELATED SECTIONS</u> | .1 | Section 01 35 03 – Special Project Procedures for Contaminated Sites. |
| <u>1.3 REFERENCES</u> | .1 | Province of Ontario |
| | .1 | <i>Occupational Health and Safety Act</i> , R.S.O. (2004). |
| | .2 | Canada Labour Code, Canada Occupational Safety and Health Regulations (2002). |
| <u>1.4 SUBMITTALS</u> | .1 | Submit Site-specific Health and Safety Plan, within 7 days after date of Notice to Proceed and prior to mobilization to site. Address the following items .2 - .9. |
| | .2 | Safety and health risk or hazard analysis for each site task and operation. |
| | .3 | Develop checklist for items to be inspected on a daily basis. Document actions taken. |
| | .4 | Personnel training requirements including: |
| | .1 | Names of personnel and alternates responsible for site safety and health, hazards present on site, and use of personal protective equipment. |
| | .2 | Work practices by which personnel can minimize risks from hazards, safe use of engineering controls and equipment on site, medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards, and elements of site-specific Health and Safety Plan. |
| | .5 | Personal protective equipment (PPE) program addressing: |
| | .1 | Donning and doffing procedures. |
| | .2 | PPE selection based upon site hazards. |
| | .3 | PPE use and limitations of equipment. |
| | .4 | Work mission duration, PPE maintenance and storage. |
| | .5 | PPE decontamination and disposal. |
| | .6 | PPE inspection procedures prior to, during, and after use. |
| | .7 | Evaluation of effectiveness of PPE program, and limitations during temperature extremes, and other appropriate medical considerations. |
| | .8 | Medical surveillance requirements for personnel assigned to work at site. |
| | .9 | Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment. \ |

- .10 Site control measures employed at site including site map, site work zones, use of 'buddy system', site communications including site security, alerting means for emergencies, standard operating procedures or safe work practices, and identification of nearest medical assistance.
 - .11 Decontamination procedures for both personnel and equipment.
 - .12 Emergency response requirements addressing: pre-emergency planning, personnel roles, lines of authority and communication, emergency recognition and prevention, safe distances and places of refuge, site security and control, evacuation routes and procedures, decontamination procedures not covered under decontamination section, emergency medical treatment and first aid, emergency alerting and response procedures, critique of response and follow-up, PPE and emergency equipment, site topography, layout, prevailing weather conditions, and procedures for reporting incidents to local, provincial, or federal agencies.
 - .13 Written respiratory protection program for project activities.
 - .14 Procedures dealing with heat and/or cold stress.
 - .15 Confined space entry procedures.
 - .16 Spill containment program if drummed waste material is generated, excavated, stored, or managed on site.
- .6 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 3 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 3 days after receipt of comments from Departmental Representative.
- .7 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .8 Off-site Contingency and Emergency Response Plan:
- .1 Prior to commencing work involving handling of hazardous materials, develop off-site Contingency and Emergency Response Plan.
 - .2 Plan must provide immediate response to serious site occurrence such as explosion, fire, or migration of significant quantities of toxic or hazardous material from site.
- .9 Maintain the site-specific Health and Safety Plan throughout the Work, as the Project Health and Safety Manual.

1.5 REGULATORY REQUIREMENTS

- 1 Comply with specified standards and regulations to ensure safe operations at site containing hazardous or toxic materials.

1.6 SITE CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Soils contaminated with petroleum hydrocarbons (PHCs) and polycyclic aromatic hydrocarbons (PAHs).
 - .2 Soils contaminated with metals, including:
 - .1 Antimony
 - .2 Arsenic
 - .3 Cadmium
 - .4 Copper
 - .5 Lead
 - .6 Molybdenum
 - .7 Mercury
 - .8 Nickel
 - .9 Selenium
 - .10 Zinc

1.7 GENERAL REQUIREMENTS

- 1 Develop written site-specific Project Health and Safety Manual as specified in Section 01 00 10 – General Requirements prior to commencing site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Ensure Health and Safety guidelines provide for safe and minimal risk working environment for Site personnel and minimize impact of activities involving contact with hazardous materials or hazardous wastes on general public and surrounding environment.
- .3 Requests for relief from or substitution for portions of the Health and Safety guidelines specified within the Site-specific Health and Safety Plan must be submitted to Departmental Representative in writing. Departmental Representative will respond in writing, either accepting or requesting improvements.

1.8 RESPONSIBILITY

- .1 Be responsible for safety of persons and property on Site and for protection of persons off Site and environment to the extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9 HAZARD COMMUNICATION REQUIREMENTS

- .1 Comply with Workplace Hazardous Materials Information System (WHMIS) Regulation, R.R.O.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations, Part X - Hazardous Substances.
- .3 Provide Departmental Representative with Material Safety Data Sheets (MSDS) and documentation on any "hazardous" chemical that Contractor or Contractor Representatives plan to bring onto site.

1.10 WORK STOPPAGE

- .1 Give precedence to safety and health of public and Site personnel and protection of environment over cost and schedule considerations for Work.
- .2 Assign responsibility and obligation to Health and Safety Officer where required to stop or start Work when, at Health and Safety Officer's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.

1.11 UNFORESEEN HAZARDS

- .1 Should unforeseen or peculiar safety-related factors, hazards, or conditions become evident during performance of Work, stop work and immediately advise Departmental Representative verbally and in writing.

1.12 HEALTH AND SAFETY OFFICER AND REGISTERED OCCUPATIONAL HYGIENIST / CERTIFIED INDUSTRIAL HYGIENIST

- .1 Employ and assign to Work competent and authorized representative as Health and Safety Adviser. Health and Safety Adviser must:
 - .1 Have minimum 2 years' site-related working experience specific to activities associated with soil remediation and excavation.
 - .2 Have basic working knowledge of specified occupational safety and health regulations.
 - .3 Be responsible for completing Health and Safety Training Session and ensuring that personnel not successfully completing the required training are not permitted to enter site to perform Work in Exclusion Zone or Contaminant Reduction Zone.
 - .4 Be responsible for implementing, enforcing daily and monitoring Site-specific Health and Safety Plan.
 - .5 Be on Site during execution of Work.

1.13 PERSONNEL HEALTH, SAFETY, AND HYGIENE

- .1 Training: ensure personnel entering site are trained in accordance with specified personnel training requirements. Training session must be completed by Health and Safety Officer.
- .2 Levels of Protection: establish levels of protection for each Work area based on planned activity and location of activity. Minimum PPE required anticipated as follows:
- .3 Level D:
 - .1 Head, Eye, Ear Protection: hard hat, safety glasses with side shields, ear muffs or plugs.
 - .2 Clothing: standard work uniform.
 - .3 Hand Protection: disposable gloves to be worn over work gloves and disposed of at the end of each shift and following contact with soil or other contaminants.
 - .4 Foot Protection: safety shoes.
- .4 Personal Protective Equipment:
 - .1 Furnish site personnel with appropriate PPE as specified above. Ensure that safety equipment and protective clothing is kept clean and maintained.

1.13 PERSONNEL
HEALTH, SAFETY, AND
HYGIENE (CONT'D)

- .5 Develop protective equipment usage procedures and ensure that procedures are strictly followed by site personnel; include following procedures as minimum:
 - .1 Ensure prescription eyeglasses worn are safety glasses and do not permit contact lenses on site within work zones.
 - .2 Ensure footwear is steel-toed safety shoes or boots and is covered by rubber overshoes when entering or working in potentially contaminated work areas.
 - .3 Dispose of or decontaminate PPE worn on site at end of each workday.
 - .4 Decontaminate reusable PPE before reissuing.
 - .5 Ensure site personnel have passed respirator fit test prior to entering potentially contaminated work areas.
 - .6 Ensure facial hair does not interfere with proper respirator fit.
- .6 Respiratory Protection:
 - .1 Provide site personnel with extensive training in usage and limitations of, and qualitative fit testing for, air purifying and supplied-air respirators in accordance with specified regulations.
 - .2 Develop, implement, and maintain respirator program.
 - .3 Monitor, evaluate, and provide respiratory protection for site personnel.
 - .4 Ensure levels of protection as listed have been chosen consistent with site-specific potential airborne hazards associated with major contaminants identified on site.
 - .5 In absence of additional air monitoring information or substance identification, minimum levels of respiratory protection will be required as follows: Half face respirator with HEPA dust filters.
 - .6 Immediately notify Departmental Representative when level of respiratory protection required increases.
 - .7 Ensure appropriate respiratory protection during work activities. As minimum requirement, ensure that persons entering potentially contaminated work areas are supplied with and use appropriate respiratory protection.
 - .8 Assess ability for site personnel to wear respiratory protection.
 - .9 Ensure site personnel are able to pass respirator fit test prior to entering potentially contaminated work areas.
- .7 Heat Stress/Cold Stress: implement heat stress and/or cold stress monitoring program as applicable and include in site-specific Health and Safety Plan.
- .8 Personnel Hygiene and Personnel Decontamination Procedures. Provide minimum as follows:
 - .1 Suitable containers for storage and disposal of used disposable PPE.
 - .2 Potable water and suitable sanitation facility.
- .9 Emergency and First-Aid Equipment:
 - .1 Locate and maintain emergency and first-aid equipment in appropriate location on site including first-aid kit to accommodate number of site personnel; portable emergency eye wash; two 9 kg ABC type dry chemical fire extinguishers.
 - .2 Two self-contained breathing apparatus units; blankets and towels; stretcher; and 1 hand-held emergency siren.
 - .3 As minimum, provide 1 certified first-aid technician on site at all times when work activities are in progress.

HEALTH AND SAFETY FOR CONTAMINATED SITES**1.13 PERSONNEL
HEALTH, SAFETY, AND
HYGIENE (CONT'D)**

- .10 Site Communications:
 - .1 Post emergency numbers near site telephones.
 - .2 Ensure personnel use of "buddy" system and develop hand signal system appropriate for site activities.
 - .3 Provide employee alarm system to notify employees of site emergency situations or to stop Work activities if necessary.
 - .4 Furnish selected personnel with 2-way radios.
 - .5 Safety Meetings: conduct mandatory daily safety meetings for personnel, and additionally as required by special or work-related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new site conditions as encountered. Hold additional safety meetings on as-needed basis.

1.14 AIR MONITORING

- .1 Air Monitoring Program:
 - .1 Develop air monitoring program to ensure worker health and safety.
 - .2 Work upwind of excavation area.
 - .3 During progress of work activities, visually monitor air quality in and around work zones. Suppress visible dust with engineering controls as per Section 01 35 03 – Special Project Procedures for Contaminated Sites.
 - .4 Operate on-Site air monitoring equipment with personnel trained in equipment provided and under control of Health and Safety Officer.
- .2 Air Monitoring Reporting: report air monitoring results, indicating any non-compliance issues and corrective measures taken, daily to Departmental Representative on separate form.

**1.15 CONTINGENCY
AND EMERGENCY
RESPONSE**

- .1 Meet specified requirements.
- .2 Arrange and attend co-ordination meeting held with appropriate authorities including City, Fire, Hospital, Provincial and City Police, Ministry of Transportation, Ministry of Health, and Community Emergency Co-ordinator; meeting will identify off-site Emergency Response Co-ordinator through whom information and co-ordination will occur in event of incident.

1.16 SITE CONTROL

- .1 Prior to commencing work involving handling of drums and other containers, submit procedures for safe handling of drums and other containers. Implement and enforce drum handling program during activities involving drummed waste characterization including but not limited to handling, opening, sampling, staging, and consolidating.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 – EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

PART 1 - GENERAL

<u>1.1 GENERAL</u>	.1	All conditions of the Contract and Section 01 00 10 – General Instructions apply to this Section.
<u>1.2 RELATED SECTIONS</u>	.1	Section 01 74 01 – Construction/Demolition Waste Management and Disposal.
	.2	Section 01 35 03 – Special Project Procedures for Contaminated Sites.
<u>1.3 REFERENCES</u>	.1	<i>Ontario Environmental Protection Act;</i>
	.2	<i>Ontario Water Resources Act;</i>
	.3	<i>Ontario Regulation 558/00 – Waste Management;</i>
	.4	<i>Canadian Environmental Protection Act 1999;</i>
	.5	Canadian Environmental Quality Guidelines, CCME;
<u>1.4 DEFINITIONS</u>	.1	Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
	.2	Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.
<u>1.5 SUBMITTALS</u>	.1	Prior to commencing construction activities or delivery of materials to Site, submit Environmental Protection Plan 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 construction.
	.2	Address topics at level of detail commensurate with environmental issue and required construction tasks.
	.3	Environmental protection plan to include: .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.

1.5 SUBMITTALS (CONT'D)

- .3 Environmental protection plan to include: (cont'd)
 - .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 Drawings showing locations of proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on Site.
 - .6 Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.
 - .7 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.
 - .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 disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .10 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project Site.
 - .11 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.
 - .12 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 concrete curing water, clean-up water, dewatering of ground water, and disinfection water.

1.6 DISPOSAL OF WASTES

- .1 Do not bury rubbish and waste materials on Site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
- .3 Refer to Section 01 74 01 – Construction/Demolition Waste Management and Disposal for disposal of demolition and excavation-related materials.

1.7 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and Site free from water in accordance with Section 01 35 03 – Special Project Procedures for Contaminated Sites.

<u>1.7 DRAINAGE (CONT'D)</u>	.2	Do not pump water containing suspended materials into waterways, sewer or drainage systems.
	.3	Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
<u>1.8 SITE CLEARING AND PLANT PROTECTION</u>	.1	Protect trees and plants on Site and adjacent properties where indicated.
	.2	Minimize stripping of topsoil and vegetation.
<u>1.10 WORK ADJACENT TO WATERWAYS</u>	.1	Not Used.
<u>1.11 POLLUTION CONTROL</u>	.1	Maintain pollution control features installed under this contract.
	.2	Control emissions from equipment to local authorities' emission requirements.
	.3	Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads in accordance with Section 01 35 03 – Special Project Procedures for Contaminated Sites.
<u>1.12 NOTIFICATION</u>	.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

<u>2.1 NOT USED</u>	.1	Not Used.
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PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

PART 1 - GENERAL

- 1.1 GENERAL** .1 All conditions of the Contract and Section 01 00 10 – General Instructions apply to this Section.
- 1.2 RELATED SECTIONS** .1 Section 01 35 01 – Health and Safety for Contaminated Sites.
.2 Section 01 35 02 – Environmental Procedures.
.3 Section 01 74 01 – Construction/Demolition Waste Management and Disposal.
- 1.3 SUBSURFACE CONDITIONS** .1 Information on subsurface conditions, including soil characteristics and groundwater conditions, is available to the Contractor in Section 01 of the Tender Documents. If subsurface conditions differ significantly from those indicated, promptly notify the Departmental Representative. Should the Departmental Representative confirm that conditions are significantly different and that the differences impact on the work, instructions will be issued as to changes in the work.
- 1.4 REFERENCES AND CODES** .1 Perform the work in accordance with the latest revised and amended versions of all federal, provincial and municipal laws, acts, regulations, by-laws, ordinances, standards and guidelines, as they may apply to the work and in compliance with the Specifications. Should there be any discrepancy or conflict between the documents (laws, acts, regulations, by-law, ordinances, standard or guidelines), the most stringent shall apply.
.2 Wherever in these Tender Documents there is a list of statutes, regulations, by-laws, ordinances, standards, guidelines or other references under the heading “References and Codes” or any other heading, such a list should be considered to be non-exhaustive and is included for information and illustration purposes only. It shall be the responsibility of the Contractor to make appropriate inquiries with respect to the applicable requirements.
.3 Without limiting the generality of clauses 1.4.1 and 1.4.2 above, the Project must be performed in a manner that meets or exceeds the requirements of the following list, which includes but is not limited to federal, provincial and municipal laws, regulations, by-laws, ordinances, standards and guidelines:
.1 Contract documents;
.2 Specified standards, codes and reference documents;
.3 City of Ottawa Noise By-Laws;
.4 Sewer Use By-Law of the City of Ottawa;
.5 *Ontario Environmental Protection Act*;
.6 *Ontario Water Resources Act*;
.7 Guidelines for Use at Contaminated Sites in Ontario, MOE;
.8 Ontario Provincial Standard Specifications (OPSS);
.9 Occupational Health and Safety Act R.S.O.;
.10 *Ontario Regulation 558/00 – Waste Management*;
.11 *Canadian Environmental Protection Act 1999*;
.12 *Transportation of Dangerous Goods Act*;

- .13 Canadian Environmental Quality Guidelines, CCME;
- .14 City of Ottawa Traffic and Parking By-Laws; and
- .15 National Capital Act.

1.5 REGULATORY REQUIREMENT .1

Provide erosion and sediment control in accordance with federal, provincial and local regulations.

- .2 Comply with federal, provincial, and local anti-pollution laws, ordinances, codes, and regulations when disposing of waste materials, debris, and rubbish.
- .3 Work to meet or exceed minimum requirements established by federal, provincial, and local laws and regulations which are applicable.
 - .1 Contractor: responsible for complying with amendments as they become effective.
- .4 In event that compliance exceeds scope of work or conflicts with specific requirements of contract notify Departmental Representative immediately.

1.6 ENVIRONMENTAL CONTROL .1

- .1 Environmental monitoring and compliance of all site activities on the work sites shall be governed by Section 01 35 03 Special Project Procedures for Contaminated Sites and Section 01 35 02 – Environmental Procedures. The provisions detailed in these Sections apply to all personnel assigned to the work or present on the site.
- .2 Conduct all activities in an environmentally responsible manner, in compliance with all references and codes and meet current industry standards in such a manner as to reasonably minimize impact upon the environment.
- .3 The Contractor shall be responsible for cooperating with the Departmental Representative and other project personnel to ensure that all site activities comply with the provisions of the Specifications.
- .4 The Contractor shall also cooperate with the Departmental Representative's staff in obtaining bulk samples and field testing for contaminants.

1.7 DUST CONTROL .1

- .1 Implement all necessary control measures to minimize dust generated by any and all activities, as indicated in Section 01 35 03 – Special Project Procedures for Contaminated Sites and in accordance with Section 1.17.

1.8 SURFACE WATER CONTROL

- .1 Take all necessary precautions to prevent non-filtered or contaminated water from entering the storm and sanitary sewer systems or discharge beyond or outside the work area along surface routes, in compliance with the City of Ottawa Sewer Use By-Law. The Contractor shall seal all manhole covers and construct sludge traps around all storm water catch basins. The Contractor shall also inspect and/or clean out all sludge traps on a scheduled basis to ensure their satisfactory performance.
- .2 Any water removed from the excavations or resulting from decontamination activities shall be removed from site in accordance with applicable regulations.

1.9 EMERGENCY SPILL

- .1 All spills should be dealt with in the following manner:
 - .1 In accordance with the *Ontario Environmental Protection Act* and the *Canadian Environmental Protection Act 1999*;
 - .2 The responsible party shall clean up the spill immediately using all resources required to bring the Site back to pre-spill conditions;
 - .3 The Contractor shall submit to the Departmental Representative for approval a Spill or Emergency Control Plan within 7 days of the Contract award date. No work shall proceed until the Departmental Representative has provided written approval to the Contractor;
 - .4 The Contractor shall have cleanup materials on Site to deal with all types of predicted spills;
 - .5 Notification, as required by the *Ontario Environmental Protection Act* and the *Canadian Environmental Protection Act 1999* and to the Departmental Representative.
- .2 In addition to clause 1.9.1, preparation for and response to emergency spills shall be governed by Section 01 35 03 Special Project Procedures for Contaminated Sites and Section 01 35 02 – Environmental Procedures. The provisions detailed in these Sections apply to all personnel assigned to the work or present on the Site.
- .3 The Contractor shall have a written procedure incorporating the provisions of Section 01 35 03 Special Project Procedures for Contaminated Sites and Section 01 35 02 – Environmental Procedures for responding to an emergency spill within the work area, the fuelling pad, on adjacent property, on public roadways and in public areas. The procedure shall comply with existing regulatory requirements and Specifications and shall address the need for immediate control and containment of the spilled product, as well as cleanup of all affected areas and monitoring for remnant contaminants. The procedure shall provide specific details for personnel training and protection, controlling entry into sewer systems, cleanup and verification (by the Departmental Representative) of decontamination of affected areas, reporting and documentation.
- .4 The Contractor shall have suitable materials (e.g., sawdust, wood chips, absorbents, brooms, etc.) available for the cleanup of fuel spills. Any spillage of oil, grease, gasoline, diesel or other hazardous material shall be controlled by the Contractor, as required under the Canadian Environmental Protection Act, the Ontario Environmental Protection Act and reported immediately to the Departmental Representative.

1.10 SEQUENCING AND
SCHEDULING

- .1 Do not commence work involving contact with potentially contaminated materials until decontamination facilities and site hoarding are operational and approved by Departmental Representative.

1.11 EQUIPMENT
DECONTAMINATION FACILITY

- .1 Prior to commencing work involving equipment contact with potentially contaminated materials, construct equipment decontamination pad to accommodate every and all equipment assigned to the project, including the largest piece of on-Site potentially contaminated equipment.
- .2 The decontamination pad may be a portable design, and shall be located to prevent recontamination of equipment prior to entry onto public roads.
- .3 The Contractor shall be responsible for operating, modifying, improving or replacing the decontamination pad.
- .4 Provide, operate, and maintain suitable portable, high-pressure, low-volume decontamination wash unit(s) equipped with self-contained water storage tank and pressurizing system and capable of heating and maintaining wash waters to 80 degrees C and providing nozzle pressure of 1,035 kpa.
- .5 Provide, operate, and maintain necessary equipment, pumps, and piping required to collect and contain equipment decontamination wastewater and sediment and transfer materials to approved storage facilities.

1.12 SOIL STOCKPILING
FACILITIES

- .1 Provide, maintain, and operate storage/stockpiling facilities as required.
- .2 Install 6 mil polyethylene below proposed stockpile locations to prevent contact between stockpile material and ground. Equip facility with tarps capable of covering stockpiled material until Departmental Representative advises Contractor to dispose of material off Site.

1.13 WASTEWATER

- .1 Contractor to arrange for collection, removal and disposal of all wastewater from Site in accordance with all applicable regulations. Wastewater includes any water from excavation dewatering activities, wash water from equipment decontamination and all other wastewater generated on site during construction. Wastewater may be treated prior to being discharged into the municipal sewer networks in order to meet municipal sewer discharge by-laws or may be collected and disposed of by a licensed waste contractor at a facility that is licensed to accept the liquid. If wastewater is to be treated on Site, Contractor to provide a wastewater treatment system design, approvals and installation. Wastewater treatment system design to be stamped by a licensed Engineer in the Province of Ontario.
- .2 Sampling and analyses of collected wastewater to be completed by Departmental Representative prior to disposal or removal from Site by Contractor. Contractor to provide Departmental Representative access to collected wastewater and a minimum 72 hours notice prior to disposal or removal from Site.

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| <u>1.13 WASTEWATER (CONT'D)</u> | .3 | Wastewater removal plan to be submitted to Departmental Representative for approval before site work begins. |
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| <u>1.14 DRUMS</u> | .1 | Storage of Liquid Waste: 200 L steel drums meeting <i>Transportation and Dangerous Goods Act</i> , closable lids, complete with labels for marking contents and date filled. |
| | .2 | Storage of Solid Waste: 200 L steel drums meeting <i>Transportation and Dangerous Goods Act</i> , closable lids, complete with labels for marking contents and date filled. |
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| <u>1.15 VEHICULAR ACCESS AND PARKING</u> | .1 | Maintenance and Use: <ul style="list-style-type: none">.1 Prevent contamination of access roads. Immediately scrape up debris or material on access roads which is suspected to be contaminated as determined by Departmental Representative; transport and dispose of in appropriate off-Site disposal facility. Clean access roads at least once per shift..2 Departmental Representative may collect soil samples for chemical analyses from traveling surfaces of constructed and existing access routes prior to, during, and upon completion of Work. Excavate and dispose of clean soil contaminated by Contractor's activities at no additional cost to Departmental Representative. |
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| <u>1.16 DUST AND PARTICULATE CONTROL</u> | .1 | Execute work by methods provided in approved Dust Control and Soil Tracking Plan to minimize raising dust from construction operations. |
| | .2 | Implement and maintain dust and particulate control measures immediately during construction and in accordance with Province of Ontario regulations and Environment Canada's Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities. |
| | .3 | Dust control measures shall include: <ul style="list-style-type: none">.1 Instructing workers on dust control methods..2 Adjustment of the excavation rate, grading activities and soil handling to minimize dust emission..3 Use of tarpaulins over haulage trucks..4 Monitoring of dust emission visually and taking action to suppress dust, as necessary..5 Monitoring wind conditions and adjusting excavation, soil handling and/or haulage rates or suspending work, as necessary..6 Supply and have available at all times suitable dust suppressant equipment to control and prevent dust on the work site..7 Responding to dust complaints from the public and taking action as necessary to further control dust..8 Provide positive means to prevent airborne dust from dispersing into atmosphere. Use potable water for water misting system for dust and particulate control. |
| | .4 | Use chemical means for water misting system for dust and particulate control only with Departmental Representative's prior written approval. |

1.16 DUST AND PARTICULATE
CONTROL (CONT'D)

- .5 Use watertight vehicles to haul wet materials.
- .6 Prevent dust from spreading to adjacent property sites.
- .7 Departmental Representative will stop work at any time when Contractor's control of dusts and particulates is inadequate for wind conditions present at Site, or when air quality monitoring indicates that release of fugitive dusts and particulates into atmosphere equals or exceeds specified levels.
- .8 If Contractor's dust and particulate control is not sufficient for controlling dusts and particulates into atmosphere, stop work. Contractor must discuss with Departmental Representative procedures that Contractor proposes to resolve problem. Make necessary changes to operations prior to resuming excavation, handling, processing, or other work that may cause release of dusts or particulates.

1.17 DUST MONITORING

- .1 The Departmental Representative will monitor dust emissions, as well as the effectiveness of dust control methods and complaints or reports from the public and compare them to project criteria.
- .2 The Departmental Representative shall implement a formal dust monitoring and reporting program using dust samplers to measure airborne particulate loadings generated on the site to verify whether dust control procedures are adequate.
- .3 Should the dust control measures implemented by the Contractor not address the problem to the satisfaction of the Departmental Representative, the activities generating dust shall be discontinued until conditions change, to allow the operation to continue in compliance with the requirements.
- .4 Should the Departmental Representative determine that the weather conditions are such that control of dust emission becomes difficult or that exposure may occur, the Contractor will be ordered to stop any operation that is aggravating the condition and take the appropriate mitigating actions.
- .5 The Contractor shall not resume the ceased activities or operations until, in the opinion of the Departmental Representative, weather conditions and/or site conditions are suitable.

1.18 POLLUTION CONTROL

- .1 Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious toxic substances and pollutants produced by construction operations.
- .2 Be prepared to intercept, clean up, and dispose of spills or releases that may occur whether on land or water. Maintain materials and equipment required for cleanup of spills or releases readily accessible on Site.
- .3 Promptly report spills and releases potentially causing damage to environment to:
 - .1 Authority having jurisdiction or interest in spill or release including conservation authority, water supply authorities, drainage authority, road authority, and fire department.

**1.18 POLLUTION CONTROL
(CONT'D)**

- .3 (Cont'd)
 - .2 Ontario Ministry of Environment Spills Action Centres (1-800-268-6060).
 - .3 Owner of pollutant, if known.
 - .4 Person having control over pollutant, if known.
 - .5 Departmental Representative.
- .4 Contact manufacturer of pollutant if known and ascertain hazards involved, precautions required, and measures used in cleanup or mitigating actions.
- .5 Take immediate action using available resources to contain and mitigate effects on environment and persons from spill or release.
- .6 Provide spill response materials including, containers, absorbent, shovels, and personal protective equipment. Make spill response materials available at all times in which hazardous materials or wastes are being handled or transported. Spill response materials: compatible with type of material being handled.

**1.19 EQUIPMENT
DECONTAMINATION**

- .1 Commence work involving equipment contact with potentially contaminated material only after Equipment Decontamination Facility is operational.
- .2 Decontaminate equipment after working in potentially contaminated work areas and prior to subsequent work or travel on clean areas.
- .3 Perform equipment decontamination on Contractor-constructed equipment decontamination pad.
- .4 At minimum, perform following steps during equipment decontamination: mechanically remove packed dirt, grit, and debris by scraping and brushing without using steam or high-pressure water to reduce amount of water needed and to reduce amount of contaminated restate generated. Use high-pressure, low-volume, hot water or steam supplemented by detergents or solvents as appropriate and as approved by Departmental Representative. Pay particular attention to tire treads, equipment tracks, springs, joints, sprockets, and undercarriages. Scrub surfaces with long handle scrub brushes and cleaning agent. Rinse off and collect cleaning agent. Air dry equipment in Clean Zone before removing from Site or travelling on clean areas. Perform assessment as directed by Departmental Representative to determine effectiveness of decontamination.
- .5 Maintain inspection record on Site which includes: equipment descriptions with identification numbers or license plates; time and date entering decontamination facility; time and date exiting decontamination facility; and name of inspector with comment stating that decontamination was performed and completed.
- .6 Each piece of equipment will be inspected by Departmental Representative after decontamination and prior to removal from Site and/or travel on clean areas. Departmental Representative will have right to require additional decontamination to be completed if deemed necessary.
- .7 Take appropriate measures necessary to minimize drift of mist and spray during decontamination including provision of wind screens.

**1.19 EQUIPMENT
DECONTAMINATION (CONT'D)**

- .8 Collect decontamination wastewaters and sediments which accumulate on equipment decontamination pad, and dispose of in accordance with Section 1.13.
- .9 Transfer sediments to soil staging area.
- .10 Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields.
- .11 Have on hand sufficient pumping equipment, of adequate pumping capacity and associated machinery and piping in good working condition for ordinary emergencies, including power outage, and competent workers for operation of pumping equipment. Maintain piping and connections in good condition and leak-free.

1.20 WATER CONTROL

- .1 Protect Site from puddling or running water.
- .2 Prevent surface water runoff from leaving work areas.
- .3 Do not discharge decontaminated water, or surface water runoff, or groundwater which may have come in contact with potentially contaminated material, off Site or to municipal sewers without written approval of Departmental Representative.
- .4 Prevent precipitation from infiltrating or from directly running off stockpiled materials. Cover stockpiled materials with an impermeable liner during periods of work stoppage including at end of each working day.
- .5 Direct surface waters that have not contacted potentially contaminated materials to existing surface drainage systems.
- .6 Control surface drainage including ensuring that gutters are kept open, water is not directed across or over pavements or sidewalks except through approved pipes or properly constructed troughs, and runoff from unstabilized areas is intercepted and diverted to suitable outlet.
- .7 Dispose of water in manner not injurious to public health or safety, to property, or to any part of Work completed or under construction.
- .8 Provide, operate, and maintain necessary equipment appropriately sized to keep excavations, staging pads, and other work areas free from water.
- .9 With the exception of clean off-Site borrow material stockpiles, contain water from stockpiled materials. Transfer potentially contaminated surface waters to wastewater storage tanks separate from wastewater from Personnel Hygiene/Decontamination Facility or treat wastewater in wastewater treatment system.
- .10 Have on hand sufficient pumping equipment, machinery, and tankage in good working condition for ordinary emergencies, including power outage, and competent workers for operation of pumping equipment.

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| <u>1.20 WATER CONTROL (CONT'D)</u> | .11 | Contain and collect wastewaters and transfer such collected wastewaters to Contractor –supplied wastewater storage tanks or on-Site treatment facility. |
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| <u>1.21 DEWATERING</u> | .1 | Dewater various parts of Work including, without limitation, excavations, structures, foundations, and work areas. |
| | .2 | Employ construction methods, plant procedures, and precautions that ensure Work, including excavations, are stable, free from disturbance, and dry. |
| | .3 | Dewatering Methods: groundwater control systems; surface or free water control systems employing ditches, diversions, drains, pipes and/or pumps; and other measures necessary to enable Work to be carried out in dry conditions. |
| | .4 | Provide sufficient and appropriate labour, plant, and equipment necessary to keep Work free of water including standby equipment necessary to ensure continuous operation of dewatering system. |
| | .5 | Take precautions necessary to prevent uplift of structure or pipeline and to protect excavations from flooding and damage due to surface runoff. |
| | .6 | Provide access to Departmental Representative to sample and analyze water generated from dewatering activities. Treat water to meet required discharge or disposal criteria or store and dispose of water using a licensed contractor and facility licensed to accept the water in accordance with all applicable regulations and the approved Wastewater Management Plan. |
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| <u>1.22 EROSION AND SEDIMENT CONTROL</u> | .1 | Minimize amount of bare soil exposed at one time. |
| | .2 | Stabilize disturbed soils as quickly as practical. Remove accumulated sediment resulting from construction activity from adjoining surfaces. |
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| <u>1.23 PROGRESS CLEANING</u> | .1 | Co-ordinate cleaning operations with disposal operations to prevent accumulation of dust, dirt, debris, rubbish, and waste materials. |
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| <u>1.24 FINAL DECONTAMINATION</u> | .1 | Perform final decontamination of construction facilities, equipment, and materials which may have come in contact with potentially contaminated materials prior to removal from Site. |
| | .2 | Departmental Representative will direct Contractor to perform additional decontamination if required. |

1.25 REMOVAL AND DISPOSAL

- .1 Remove surplus materials and temporary facilities from Site.
- .2 Dispose of non-contaminated waste materials, litter, debris, and rubbish off Site.
- .3 Do not burn or bury rubbish and waste materials on Site.
- .4 Dispose of following materials at appropriate off-Site facility identified by Contractor and approved by Departmental Representative:
 - .1 Debris including excess construction material.
 - .2 Non-contaminated litter and rubbish.
 - .3 Wastewater generated from final decontamination operations including wastewater storage tank cleaning.
- .5 Dispose of materials in accordance with Section 01 74 01 – Construction/Demolition Waste Management and Disposal.
- .6 Wastewater sample and analysis: Departmental Representative will perform sampling and analysis of stored wastewater for disposal purposes prior to removal from Site. Results of analyses will determine whether wastewater may be disposed to storm or sanitary sewers without treatment, whether treatment is required prior to disposal to sewers, or whether wastewater shall be removed from the Site by a licensed waste contractor and disposed of at a facility licensed to accept the waste.
- .7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

1.26 RECORD KEEPING

- .1 Maintain adequate records to support information provided to Departmental Representative regarding exception reports, annual reports, and biennial reports.
- .2 Maintain bills of lading for minimum of 375 days from date of shipment or longer period required by applicable law or regulation.

END OF SECTION

PART 1 - GENERAL

- 1.1 REFERENCES**
- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .2 Province of Ontario
 - .1 Occupational Health and Safety Act, R.S.O. 1990, C.O.1, current edition and Regulations for Construction Projects, O.Reg. 213/91, current edition.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS**
- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation.
 - .3 Submit electronic copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly or as directed by Departmental Representative.
 - .4 Contractors personnel training to include, but not limited to the following:
 - .1 Training & qualifications of personnel and alternates responsible for site safety & health;
 - .2 Training requirements for hazards present on site; and
 - .3 Training for use of personnel protective equipment.
 - .5 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
 - .6 Submit copies of incident and accident reports.
 - .7 Submit WHMIS MSDS - Material Safety Data Sheets when applicable.
 - .8 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 5 days after receipt of comments from Departmental Representative.
 - .9 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
 - .10 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
 - .11 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

<u>1.3 FILING OF NOTICE</u>	.1	File Notice of Project with Provincial authorities prior to beginning of Work.
<u>1.4 SAFETY ASSESSMENT</u>	.1	Perform site specific safety hazard assessment related to project.
<u>1.5 MEETINGS</u>	.1	Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
<u>1.6 REGULATORY REQUIREMENTS</u>	.1	Do Work in accordance with Section 01 41 00 - Regulatory Requirements.
<u>1.7 GENERAL REQUIREMENTS</u>	.1	Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
	.2	Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
<u>1.8 RESPONSIBILITY</u>	.1	Assume role of constructor as described in the Ontario Occupational Health & Safety Act and Regulations for Construction projects.
	.2	Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
	.3	Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
<u>1.9 COMPLIANCE REQUIREMENTS</u>	.1	Comply with Ontario Health and Safety Act, R.S.O. 1990, C.O.1, current edition and Regulations for Construction Projects, O.Reg. 213/91, current edition.
	.2	Comply with CAN/CSA Z462-12, Workplace Electrical Safety Standard.
	.3	Comply with CAN/CSA Z460-05 (R2010), Control of Hazardous Energy.
<u>1.10 UNFORSEEN HAZARDS</u>	.1	When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

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| <u>1.11 HEALTH AND SAFETY CO-ORDINATOR</u> | .1 | Employ and assign to Work a competent and authorized representative as site supervisor responsible for health & safety. Site supervisor must: <ul style="list-style-type: none">.1 Have site-related working experience specific to activities associated with steam..2 Have working knowledge of occupational safety and health regulations..3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work..4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan..5 Be on site during execution of Work and report directly to Departmental Representative. |
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| <u>1.12 POSTING OF DOCUMENTS</u> | .1 | Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative. |
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| <u>1.13 CORRECTION OF NON-COMPLIANCE</u> | .1 | Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative. |
| | .2 | Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified. |
| | .3 | Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected. |
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| <u>1.14 BLASTING</u> | .1 | Blasting or other use of explosives is not permitted. |
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| <u>1.15 POWDER ACTUATED DEVICES</u> | .1 | Use powder actuated devices only after receipt of written permission from Departmental Representative. |
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| <u>1.16 WORK STOPPAGE</u> | .1 | Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work. |
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PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

PART 1 - GENERAL

- 1.1 REFERENCES AND CODES** .1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
- .1 Contract documents.
- .2 Specified standards, codes and referenced documents.
- 1.2 HAZARDOUS MATERIAL DISCOVERY** .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative .
- .2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Departmental Representative.
- .3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Departmental Representative.
- 1.3 BUILDING SMOKING ENVIRONMENT** .1 Comply with smoking restrictions and municipal by-laws.

PART 2 - PRODUCTS

- 2.1 NOT USED** .1 Not Used.

PART 3 - EXECUTION

- 3.1 NOT USED** .1 Not Used.

PART 1 - GENERAL

- 1.1 INSPECTION**
- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
 - .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
 - .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
 - .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.
- 1.2 INDEPENDENT INSPECTION AGENCIES**
- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
 - .2 Provide equipment required for executing inspection and testing by appointed agencies.
 - .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
 - .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.
- 1.3 ACCESS TO WORK**
- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
 - .2 Co-operate to provide reasonable facilities for such access.
- 1.4 PROCEDURES**
- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
 - .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
 - .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

- 1.5 REJECTED WORK .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

- 1.6 MILL TESTS .1 Submit mill test certificates as requested.

- 1.7 EQUIPMENT AND SYSTEMS .1 Submit adjustment and balancing reports for mechanical, electrical systems.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

- 3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

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| <u>1.1 REFERENCES</u> | .1 | Canadian Standards Association (CSA International) |
| | .1 | CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes. |
| | .2 | CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment. |
| | | |
| <u>1.2 ACTION AND INFORMATIONAL SUBMITTALS</u> | .1 | Provide submittals in accordance with Section 01 33 00 - Submittal Procedures. |
| | | |
| <u>1.3 INSTALLATION AND REMOVAL</u> | .1 | Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation. |
| | .2 | Identify areas which have to be gravelled to prevent tracking of mud. |
| | .3 | Indicate use of supplemental or other staging area. |
| | .4 | Provide construction facilities in order to execute work expeditiously. |
| | .5 | Remove from site all such work after use. |
| | .6 | Provide snow removal during period of Work. |
| | | |
| <u>1.4 SCAFFOLDING</u> | .1 | Scaffolding in accordance with CAN/CSA-S269.2 and applicable acts and regulations. |
| | .2 | Provide and maintain scaffolding, ladders, platforms and temporary stairs. |
| | | |
| <u>1.5 HOISTING</u> | .1 | Provide, operate and maintain hoists required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists. |
| | .2 | Hoists to be operated by qualified operator. |
| | .3 | Verify adequacy of existing surfaces and allowable load limits. Contractor: responsible for repair of damage to property caused by construction operations. |
| | | |
| <u>1.6 SITE STORAGE/LOADING</u> | .1 | Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products. |
| | .2 | Do not load or permit to load any part of Work with weight or force that will endanger Work. |

<u>1.7 CONSTRUCTION PARKING</u>	.1	Parking will be permitted on site with contractors designated area only.
	.2	Provide and maintain adequate access to project site.
<u>1.8 SECURITY</u>	.1	Provide and pay for responsible security provisions to guard site and contents of site after working hours and during holidays.
<u>1.9 OFFICES</u>	.1	Provide office heated to 22 degrees C and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
<u>1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE</u>	.1	Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
	.2	Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.
<u>1.11 SANITARY FACILITIES</u>	.1	Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
	.2	Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.
<u>1.12 CONSTRUCTION SIGNAGE</u>	.1	Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
	.2	Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by [Departmental Representative].
<u>1.13 CLEAN-UP</u>	.1	Remove construction debris, waste materials, packaging material from work site daily.
	.2	Clean dirt or mud tracked onto paved or surfaced roadways.
	.3	Store materials resulting from demolition activities that are salvageable.
	.4	Stack stored new or salvaged material not in construction facilities.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- 1.1 REFERENCES**
- .1 Within text of each specifications section, reference may be made to reference standards.
 - .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
 - .3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
 - .4 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- 1.2 QUALITY**
- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
 - .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
 - .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
 - .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
 - .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
 - .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.
- 1.3 STORAGE, HANDLING AND PROTECTION**
- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
 - .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
 - .3 Store products subject to damage from weather in weatherproof enclosures.
 - .4 Store cementitious products clear of earth or concrete floors, and away from walls.
 - .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

<u>1.3 STORAGE, HANDLING AND PROTECTION (Cont'd)</u>	.6	Store sheet materials, lumber and piping on flat, solid supports and keep clear of ground. Slope to shed moisture.
	.7	Store and mix paints in heated and ventilated room (not within building). Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
	.8	Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
	.9	Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.
<u>1.4 TRANSPORTATION</u>	.1	Pay costs of transportation of products required in performance of Work.
<u>1.5 MANUFACTURER'S INSTRUCTIONS</u>	.1	Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
	.2	Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
	.3	Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.
<u>1.6 CO-ORDINATION</u>	.1	Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
	.2	Be responsible for coordination and placement of openings, sleeves and accessories.
<u>1.7 CONCEALMENT</u>	.1	In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
	.2	Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.
<u>1.8 REMEDIAL WORK</u>	.1	Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
<u>1.9 LOCATION OF FIXTURES</u>	.1	Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
	.2	Inform Departmental Representative of conflicting installation. Install as directed.

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| <u>1.10 FASTENINGS</u> | <p>.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.</p> <p>.2 Prevent electrolytic action between dissimilar metals and materials.</p> <p>.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.</p> <p>.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.</p> <p>.5 Keep exposed fastenings to a minimum, space evenly and install neatly.</p> <p>.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.</p> |
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| <u>1.11 FASTENINGS - EQUIPMENT</u> | <p>.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.</p> <p>.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.</p> <p>.3 Bolts may not project more than one diameter beyond nuts.</p> <p>.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.</p> |
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| <u>1.12 PROTECTION OF WORK IN PROGRESS</u> | <p>.1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated and without approval of Departmental Representative.</p> |
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 | |
| <u>1.13 EXISTING UTILITIES</u> | <p>.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants.</p> <p>.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.</p> |
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PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- 1.1 ACTION AND INFORMATIONAL SUBMITTALS**
- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Owner or separate contractor.
 - .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.
- 1.2 MATERIALS**
- .1 Required for original installation.
 - .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.
- 1.3 PREPARATION**
- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
 - .2 After uncovering, inspect conditions affecting performance of Work.
 - .3 Beginning of cutting or patching means acceptance of existing conditions.
 - .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
 - .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.
- 1.4 EXECUTION**
- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
 - .2 Fit several parts together, to integrate with other Work.
 - .3 Uncover Work to install ill-timed Work.
 - .4 Remove and replace defective and non-conforming Work.
 - .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

1.4 EXECUTION
(Cont'd)

- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .8 Restore work with new products in accordance with requirements of Contract Documents and to acceptance of NCC, FHBRO and Departmental Representative.
- .9 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .10 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material. Submit details on proposed firestopping method in accordance with Section 01 33 00 - Submittal Procedures to verify conformance with products listing requirements.
- .11 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .12 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

<u>1.1 GENERAL</u>	.1	All conditions of the Contract and Section 010010 – General Instructions apply to this Section.
<u>1.2 RELATED SECTIONS</u>	.1	Not Used.
<u>1.3 REFERENCES</u>	.1	Not Used.
<u>1.4 WASTE MANAGEMENT GOALS</u>	.1	Accomplish maximum control of solid construction waste.
	.2	Preserve environment and prevent pollution and environment damage.
<u>1.5 DEFINITIONS</u>	.1	Class III: non-hazardous waste - construction renovation and demolition waste.
	.2	Inert Fill: inert waste - exclusively asphalt and concrete.
	.3	Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
	.4	Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
	.5	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.
	.6	Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes: <ul style="list-style-type: none">.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.
	.7	Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
	.8	Separate Condition: refers to waste sorted into individual types.
	.9	Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

<u>1.6 DOCUMENTS</u>	.1	Not Used.
<u>1.7 SUBMITTALS</u>	.1	Submittals in accordance with Section 01 33 00 - Submittal Procedures.
	.2	Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/disassembly material audit form.
	.1	Provide receipts, scale tickets, waybills, and show quantities and types of materials disposed of.
	.2	For each material land filled or incinerated from project, include amount in tonnes of material and identity of landfill, incinerator or transfer station.
<u>1.8 WASTE AUDIT (WA)</u>	.1	Not Used.
<u>1.9 WASTE REDUCTION WORKPLAN (WRW)</u>	.1	Not Used.
<u>1.10 DEMOLITION WASTE AUDIT (DWA)</u>	.1	Not Used.
<u>1.11 COST/REVENUE ANALYSIS WORKPLAN (CRAW)</u>	.1	Not Used.
<u>1.12 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)</u>	.1	Not Used.
<u>1.13 WASTE PROCESSING SITES</u>	.1	Province of Ontario: .1 Name: Ministry of the Environment .2 Telephone: 1-800-565-4923. .3 Fax: 416-323-4682.

**1.14 STORAGE,
HANDLING AND
PROTECTION**

- .1 Store materials to be reused, recycled and salvaged in locations indicated on Drawings.
- .2 Unless specified otherwise, materials for removal do not become Contractor's property.
- .3 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .4 Protect structural components not removed for demolition from movement or damage.
- .5 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
- .6 Protect surface drainage, mechanical and electrical from damage and blockage.
- .7 Separate and store materials produced during dismantling of structures in designated areas.

**1.15 DISPOSAL OF
WASTES**

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner 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.

**1.16 USE OF SITE
AND FACILITIES**

- .1 Execute work with least possible interference or disturbance to normal use of premises.
- .2 Maintain security measures established by existing facility.

1.17 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 SELECTIVE
DEMOLITION .1 Not Used.

3.2 APPLICATION .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.3 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.

END OF SECTION

PART 1 - GENERAL

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| <u>1.1 RELATED SECTIONS</u> | .1 | All Div. 23, 25 & 26 sections. |
| <u>1.2 INTENT</u> | .1 | This section specifies general requirements common to all start-up and performance verification (PV) of mechanical & electrical components, equipment and systems specified elsewhere in the specification and must be read in conjunction with said specifications. The testing, verification, & commissioning indicated in the specification forms part of commissioning requirements. |
| | .2 | Responsibility for the satisfactory completion of the building and demonstration that the requirements of commissioning are satisfied rests with the Contractor, who will employ and pay for any specialist supervision, inspection and testing as required to complete the work described. |
| | .3 | Provide all labour and material to plan, organize and implement the commissioning process for mechanical & electrical systems and equipment. Carry out initial season commissioning and follow-up seasonal commissioning which could not be carried out during initial season. |
| | .4 | Coordinate commissioning activities with all trades affected by this exercise. |
| <u>1.3 TIMING</u> | .1 | Except where otherwise specified, complete all start-up and testing prior to acceptance and hand-over of the project. |
| <u>1.4 SCHEDULING</u> | .1 | Provide start-up schedule for all equipment and systems in advance of commissioning activities. |
| <u>1.5 STARTING AND TESTING</u> | .1 | Cleanliness:
.1 Before start-up, clean all equipment and systems and verify same to be free from all contaminants.
.2 After testing, protect equipment and systems from construction activities. |
| | .2 | Conceal equipment & systems only after inspection, testing is completed and approved by Departmental Representative. |
| | .3 | Assume all liabilities and costs for starting, testing, commissioning and adjusting, including supply of testing equipment. |
| | .4 | Witnessing of starting and testing:
.1 Prior to start-up, prepare schedule for specified testing and review with Departmental Representative.
.2 Provide sufficient notice (at least 7 days) prior to commencement.
.3 Departmental Representative or designated representative must witness all or any portion of start-up and testing at his discretion. |

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| <u>1.5 STARTING AND TESTING (Cont'd)</u> | .4 | Witnessing of starting and testing:(Cont'd)
.4 Contractor to be present at all tests performed by sub-trades, suppliers, equipment manufacturers and at tests of other relevant Divisions, namely electrical & controls Divisions. |
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| <u>1.6 MANUFACTURER'S INVOLVEMENT</u> | .1 | Factory testing: manufacturer to:
.1 Coordinate time and location of testing.
.2 Provide testing documentation for approval by Departmental Representative.
.3 Arrange for Departmental Representative to witness tests.
.4 Obtain written approval of test results and documentation from Departmental Representative before delivery to site. |
| | .2 | Obtain manufacturers installation, start-up and operations instructions prior to start-up of components, equipment and systems:
.1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.
.2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.
.3 Manufacturer to be present for start-up. |
| | .3 | Integrity of warranties:
.1 Use manufacturer's trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.
.2 Verify with manufacturer that testing as specified will not void warranties. |
| | .4 | Qualifications of manufacturer's personnel:
.1 Experienced in design, installation and operation of equipment and systems.
.2 Ability to interpret test results accurately.
.3 To report results in clear, concise, logical manner. |
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| <u>1.7 CONFLICTS</u> | .1 | If requirements of this or other sections of construction or commissioning specifications conflict, report to Departmental Representative before start-up and obtain clarification. |
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| <u>1.8 PREPARATION</u> | .1 | Have Contract Documents, shop drawings, product data, and operation and maintenance data at hand during starting process. |
| | .2 | The Contractor, his suppliers, and/or manufacturers shall submit the qualification and experience of testing personnel, and/or agencies conducting factory and field testing, including evidence in support of their competence to the Departmental Representative 12 weeks after approval of shop drawings, or earlier if required to meet the requirements of Contract. |
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| <u>1.9 AUTHORITIES HAVING JURISDICTION</u> | .1 | Where specified start-up, testing or commissioning procedures duplicate authority's verification requirements, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility. |
| | .2 | Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction. Provide copies to Departmental Representative. |
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**1.10 COMMISSIONING
MEETINGS**

- .1 As part of the regular construction progress meeting Commissioning shall be dialogued as part of the agenda.
- .2 These meetings will begin at the start of construction and will continue on a bi-weekly basis until the Interim Certificate of Completion as issued.
- .3 The Departmental Representative to put forward the agenda, chair the meeting as well as record and distribute the minutes.
- .4 Based on the requirements of the agenda the attendees shall include but not be limited to:
 - .1 Contractor's representatives: Contractor's site superintendent, mechanical and electrical subcontractors, Controls sub-subcontractor and when so requested by the Departmental Representative, sub-subcontractors, suppliers and their parties involved in the Work. Contractor's representatives shall be qualified and authorized to act on behalf of the party each represents.
 - .2 Inspection and testing company representatives.
- .5 Meetings will introduce, monitor progress, and resolve any issues of deficiencies relating to the Commissioning progress.

**1.11 VERIFICATION
FORMS**

- .1 The Contractor will develop project specific verification forms. Fully completed forms, with the exception of verification results data, is to be completed and submitted from the Contractor to the Departmental Representative within 10 weeks of approval of shop drawings, or as specified.
- .2 The component forms shall be completed as follows:
 - .1 The Specified requirements shall be completed by the Contractor, and reviewed by Departmental Representative.
 - .2 The Shop Drawing information shall be completed by the Contractor and reflect the approved shop drawings. This shall be completed by hand.
 - .3 The installed information shall be completed by the Contractor from nameplates on installed equipment. This shall be completed by hand.
 - .4 The Contractor shall provide the required shop drawing information and verify the correct installations and operation of each item. This to include information such as equipment/component code, location and nameplate data.
 - .5 The systems verification cannot take place before all related components have been verified as correct.
 - .6 Integrated systems verification cannot take place before all related systems have been verified as correct.
 - .7 Verification forms will be for information and convenience to the Contractor and will not relieve the Contractor of responsibility for verification of components, systems, or integrated systems not included on the verification forms.
 - .8 A verification form is to be completed for each integrated system in a category requiring verification.
 - .9 Integrated system verification forms are to be completed by the Contractor.
 - .10 Where additional forms are required, but are not available from the Departmental Representative, develop appropriate verification forms and submit them to the Departmental Representative for approval prior to use. These additional forms will include, but not be limited to, work defined in the following sections:
 - .1 All Div. 23, 25 & 26 sections.

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| <u>1.12 DEFICIENCIES</u> | .1 | Correct deficiencies found during start-up and testing to satisfaction of Departmental Representative. |
| <u>1.13 COMPLIANCE WITH SPECIFIED PROCEDURES</u> | .1 | Failure to follow specified start-up procedures may result in re-evaluation of equipment by independent testing agency selected by Departmental Representative. |
| | .2 | Should results reveal that equipment start-up was not in accordance with specified requirements, equipment may be rejected and must immediately thereafter be removed from site and replaced with new which will also be subject to specified start-up procedures. |
| <u>1.14 OWNER'S PERFORMANCE TESTING</u> | .1 | Performance testing of any equipment or system by Owner shall not relieve Contractor from compliance with specified start-up and testing procedures. |
| <u>1.15 TESTING INSTRUMENTS</u> | .1 | Provide 2-way radios, ladders, other equipment as required to complete work. Provide measuring instruments as required. |
| | .2 | Provide safety equipment for start-up and testing personnel. |
| | .3 | Provide list of equipment and instruments to be used in start-up, testing for review and approval by Departmental Representative. |
| <u>1.16 SYSTEM DEMONSTRATION AND TESTING</u> | .1 | Prior to issuance of interim certification of completion, hold instructional seminars forming part of new boiler plant training sessions on all equipment and systems to demonstrate the complete operation, function, care and maintenance of equipment and materials to Departmental Representative's designated personnel. Arrange with the Departmental Representative for time of training. Training shall consist of live training sessions conducted in the building and shall consist of primary sessions with follow up sessions for each training session. |
| <u>1.17 SEMINAR CONTENT</u> | .1 | Design Philosophy: |
| | .1 | Contractor shall explain design philosophy of each system and include following information: |
| | .1 | An overview of how the system is intended to operate. |
| | .2 | Description of the system operation strategies. |
| | .3 | Information to help in identifying and trouble-shooting system problems. |
| | .2 | Equipment: |
| .1 | Contractor shall present information dealing with equipment. Include following in presentations: | |
| .1 | Explanation of how equipment operates. | |
| .2 | Recommended preventative and routine maintenance. | |
| .3 | Submittals: | |
| .1 | Submit report within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed with appropriate comments/feedback of questions. | |
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1.17 SEMINAR
CONTENT
(Cont'd)

- .3 Submittals:(Cont'd)
 - .2 Include in reports time and date of each demonstration, and a list of persons present.
 - .3 Wherever possible avoid scheduling beyond a maximum of three (3) consecutive days.
- .4 Conditions and Demonstrations:
 - .1 Equipment has been inspected and put into operation.
 - .2 Testing, adjusting and balancing has been performed in accordance with appropriate section and equipment and systems are fully operational.
 - .3 Provide copies of pertinent operation and maintenance manuals for use in demonstrations and instructions.
- .5 Preparation:
 - .1 Verify that conditions for demonstration and instructions comply with requirements.
 - .2 Verify that designated personnel are present.
- .6 Demonstration and Instructions:
 - .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, scheduled and preventative maintenance, and shut-down of each item of equipment at agreed upon times, at the equipment location.
 - .2 Instruct designated personnel in all phases of operation and maintenance manuals as the basis of instruction.
 - .3 Review contents of manual in detail to explain all aspects of operation and maintenance.
 - .4 Prepare and insert additional data in operation and maintenance manuals when the need for additional data becomes apparent during instructions.

1.18 FOLLOW-UP
SEMINARS

- .1 Follow-up seminar, or seminars as required will be conducted before Final Certificate of Completion. These seminars will deal with any clarifications the Departmental Representative may require as a result of initial operating experiences.

1.19 MAINTENANCE OF
EQUIPMENT

- .1 After start-up of equipment the Contractor shall maintain equipment as directed by product manufacturer.
- .2 The Contractor shall develop a written maintenance program. The product manufacturer shall endorse the maintenance program for each piece of equipment.
- .3 The maintenance program once established shall be presented to the Departmental Representative for review.
- .4 Once the written maintenance program appears to be in general conformance with the contract documents and is returned to the Contractor, the Contractor shall implement the program until the Final Certificate of Completion for the Project has been issued.

1.20 COMMISSIONING
MANUAL

- .1 Compile test reports, Verification forms, and certificates, by Division, by specification Section, into one Commissioning Manual. Submit draft manual for review and approval of the Departmental Representative two (2) weeks prior to application for Interim Acceptance of the Project. Submit four (4) copies of approved manual prior to Interim acceptance of the Project.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

- 3.1 GENERAL .1 Thoroughly overhaul and restore to new condition all equipment which has been operated by the Contractor during the construction phase.
- .2 Permanently mark all final settings in such a manner that they cannot be eradicated or obliterated in any way.
- .3 Record all final settings and record drawings.
- .4 Verify the implementation of all identification procedures as specified in the Contract Documents.
- .5 Some systems may have to be tested after the facility has been handed over, accepted, and during the warranty Period.
- .1 If necessary, occupancy shall be coordinated so as to avoid interference with, or interruption of, any integrated systems testing activities.
- 3.2 RESPONSIBILITIES .1 Departmental Representative's Responsibilities:
- .1 For ensuring that commissioning activities are carried out in accordance with commissioning plan.
- .2 The Departmental Representative will:
- .1 Assemble commissioning team and ensure co-ordination of activities with team in carrying out commissioning plan.
- .2 Chair and arrange commissioning meeting.
- .3 Witness equipment start-up on a selective basis, and review all manufacturer's start-up reports.
- .4 Witness testing and balancing measurements and procedures as necessary.
- .5 Witness all functional tests and initial all documents at time of test.
- .6 Co-sign off, as witness, all systems verification and test forms.
- .7 Co-ordinate building operators training in accordance with approved training plan.
- .8 Ensure that the commissioning documents are completed and signed off by the appropriate commissioning team members as and when required.
- .9 Review and comment on the Commissioning Plan prepared by the Contractor.
- .10 Review and comment on the Training Plan submitted by the Contractor.
- .11 Review and comment on the O&M documentation prepared by the Contractor.
- .2 The General Contractor's Responsibilities:
- .1 Co-operate fully with Departmental Representative in the execution of commissioning plan. At completion of commissioning, provide a written statement affirming that building systems are operating properly in accordance with requirements of performance specification and design intent of contract drawings and specifications.

3.2 RESPONSIBILITIES(Cont'd)

- .2 (Cont'd)
 - .2 Arrange and provide all necessary labour and materials in order to implement commissioning.
 - .3 Prepare and provide:
 - .1 A commissioning plan and commissioning schedule.
 - .2 All testing procedures, functional tests and performance verification recording forms.
 - .3 Schematics and flow diagrams necessary for commissioning.
 - .4 Start-up reports.
 - .5 An interim commissioning report which contains all required commissioning information except for that remaining to be done as seasonal or deferred commissioning work.
 - .6 Seasonal commissioning requirements.
 - .7 Submit final commissioning report to Departmental Representative.
 - .8 Arrange for provision of additional training where required.
 - .9 Turn over completed interim and final commissioning reports to Departmental Representative.
- .3 Mechanical Contractor's Responsibilities:
 - .1 Attend all commissioning activities as required.
 - .2 Deliver O&M data to the Builder for inclusion in O&M documentation.
 - .3 Ensure participation by major equipment manufacturers as required in building operator training.
 - .4 Performs all tests as identified in the Commissioning Plan and contract documents.
- .4 Electrical Contractor's Responsibilities:
 - .1 Attend all commissioning activities as required.
 - .2 Deliver O&M data to the Builder for inclusion in O&M documentation.
 - .3 Ensure participation by major equipment manufacturers as required in building operator training.
 - .4 Performs all tests as identified in the Commissioning Plan and contract documents.
- .5 Control Contractor's Responsibilities:
 - .1 Attend all commissioning activities as required.
 - .2 Deliver O&M data to the Builder for inclusion in O&M documentation.
 - .3 Ensure participation by major equipment manufacturers as required in building operator training.
 - .4 Performs all tests as identified in the Commissioning Plan and contract documents.
- .6 Testing, Adjusting and Balancing Contractor's Responsibilities:
 - .1 Attend all commissioning activities as required by Departmental Representative.
 - .2 Performs all tests identified in the Commissioning Plan and contract documents.

3.3 INTEGRATED SYSTEM TESTING

- .1 Ensure integrated system operations conform with design documents providing required and performance with proper interaction between related systems.
- .2 Verify performance of systems operating in conjunction with one another under all conditions and modes of operation. Each system is to be operated for as long as required to complete commissioning.
- .3 Reported results of testing and procedures are checked and verified to be correct with stated tolerances. If inconsistencies appear between reported results and demonstrated

3.3 INTEGRATED
SYSTEM TESTING
(Cont'd)

.3

(Cont'd)
values, the relevant testing procedures are repeated and adjustments made until
satisfactory results are obtained.

3.4 FINAL
ACCEPTANCE

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Final acceptance is not achieved until the requirements of the Commissioning Plan have
been achieved, documented and accepted by the Departmental Representative.