

1.1 TAXES

- .1 Pay all taxes properly levied by law (including Federal, Provincial and Municipal).

1.2 FEES, PERMITS and CERTIFICATES

- .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.

1.3 WORK BY OTHERS

- .1 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to the Departmental Representative, in writing, any defects which may interfere with proper execution of Work.
- .2 Coordinate work of other contractors and provide cooperation to facilitate installation.
- .3 Work of this Project must include provisions for co-ordinating related work, for following principal items.
 - .1 Conduit supply and installation and cut outs in doors, frames and partitions for security devices and hardware supplied and installed by the tenant's Security Systems contractor. See hardware schedule.
 - .2 Conduit supply and installation for Telecommunications and Data services and devices supplied and installed by the Departmental Representatives' telecommunications contractor. See electrical drawings.
 - .3 Installation of basefeed and power harness connections provided by furniture supplier
- .4 Work of Project which will be executed after completion of Work of this Contract, and which is specifically excluded from this Contract:
 - .1 Furniture supply and installation c/w systems furniture electrical harness system.
 - .2 Security devices supplied and installed by the tenant's Security Systems contractor
 - .3 Door hardware supplied and installed by the tenant's Security Systems contractor
 - .4 Telecommunications services and devices installed by the tenant's Security Systems contractor

1.4 TENANT FURNISHED ITEMS

- .1 Tenant Responsibilities:
 - .1 Arrange for delivery of templates, product data, samples, manufacturer's instructions, and certificates to Contractor.
 - .2 Arrange and pay for delivery to site in accordance with Progress Schedule.
 - .3 Inspect deliveries.
 - .4 Submit claims for transportation damage.
 - .5 Arrange for replacement of damaged, defective or missing items.

- .6 Arrange for manufacturer's field services; arrange for and deliver manufacturer's warranties and bonds to Contractor, for incorporation into the Operations and Maintenance Manual
- .2 Contractor Responsibilities:
 - .1 Designate submittals, delivery and installation dates for each product in progress schedule.
 - .2 Review product data, samples, and other submittals. Submit to Departmental Representative notification of observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
 - .3 Protect installed products from damage, and from exposure to elements.
 - .4 Repair or replace items damaged by Contractor or subcontractor on site (under his control).
- .3 Schedule of Tenant furnished items and services.
 - .1 Supply and installation of Door Hardware provided by the Tenant as identified in Door Hardware Schedule in Section 08 71 00 Door Hardware.
 - .2 Supply and installation of all Security systems and devices.
 - .3 Supply and installation of all Telecommunications systems and devices.

1.5 CONSTRUCTION PROGRESS SCHEDULE

- .1 Schedule and execute work with least possible interference or disturbance to the normal use of premises:
- .2 On award of contract submit bar chart construction schedule for work, indicating anticipated progress stages within time of completion. When the Departmental Representative has reviewed schedule, incorporate corrections, issue revised baseline schedule for approval or further correction, and take necessary measures to complete work within scheduled time. Do not change schedule without notifying Departmental Representative.
- .3 Return to Site as directed by Departmental Representative after construction completion, off-hours, to make final electrical connections for systems furniture and to rectify deficiencies.
- .4 Ensure that Project Schedule includes, at minimum, milestone and activity types as follows for each 4 phases:
 - .1 Award
 - .2 submittals
 - .3 permits
 - .4 mobilization
 - .5 demolition
 - .6 disconnect power from existing furniture poles
 - .7 Remove existing furniture poles (by Departmental Representative)
 - .8 new partitions
 - .9 painting
 - .10 new ceilings

- .11 new floors
- .12 lighting
- .13 electrical
- .14 piping
- .15 controls
- .16 HVAC
- .17 Testing and Commissioning
- .18 Substantial Performance
- .19 Deficiencies
- .20 Furniture installation and Client Move-in
- .21 Final electrical connection of furniture poles (dates to be provided by Departmental Representative)
- .22 Total Completion
- .5 Work can be performed at all times.
- .6 Carry out noise generating work, as defined by the Departmental Representative, during "off hours" Monday to Wednesday from 18:00 to 07:00 hours, Thursdays and Fridays from 21:00 to 07:00 hours, Saturdays from 17:00 to 11:00, and Sundays and statutory holidays from 17:00 to 07:00. After February 1st 2015, "off hours" will be from 18:00 to 06:00.
- .7 Update schedule on a monthly basis reflecting activity changes and completion, as well as activity in progress

1.6 REGULATORY REQUIREMENTS

- .1 References and Codes:
 - .1 Materials shall be new and work shall conform to the minimum applicable standards of the "References" indicated in the specification sections, the National Building Code of Canada 2010 (NBC) and all applicable Provincial and Municipal codes. In the case of conflict or discrepancy the most stringent requirement shall apply.
- .2 Building Smoking Environment:
 - .1 Smoking is not permitted in the Building. Obey smoking restrictions on building property.
- .3 Hazardous Material Discovery:
 - .1 Stop work immediately when material resembling spray or trowel-applied asbestos, Polychlorinated Biphenyl (PCB), mould or other designated substance hazardous substance is encountered during demolition work.
 - .1 Take preventative measure and promptly notify Departmental Representative.
 - .2 Do not proceed until written instructions have been received from Departmental Representative.

1.7 FIRE SAFETY REQUIREMENTS

- .1 Comply with both the National Building Code of Canada 2010 and the National Fire Code of Canada 2010 for safety of persons in buildings in the event of a fire and the protection of buildings from the effects of fire, as follows;
 - .1 The National Building Code (NBC): for fire safety and fire protection features that are required to be incorporated in a building during construction.
 - .2 The National Fire Code (NFC):
 - .1 The on-going maintenance and use of the fire safety and fire protection features incorporated in buildings.
 - .2 The conduct of activities that might cause fire hazards in and around buildings.
 - .3 Limitations on hazardous contents in and around buildings.
 - .4 The establishment of fire safety plans.
 - .5 Fire safety at construction and demolition sites.
- .2 Welding and cutting:
 - .1 At least 48 hours prior to commencing cutting, welding or soldering procedure, provide to Departmental Representative:
 - .1 Notice of intent, indicating devices affected, time and duration of isolation or bypass.
 - .2 Completed welding permit as defined by Departmental Representative.
 - .3 Return welding permit to Departmental Representative immediately upon completion of procedures for which permit was issued.
 - .2 Before welding, soldering, grinding and/or cutting work, obtain a permit from the Real property Service Provider as directed by the Departmental Representative. No hot work is shall be undertaken unless authorized by the Real property Service Provider.
- .3 Where work requires interruption or cause activation of fire alarms or fire suppression, extinguishing or protection systems:
 - .1 Provide "Watchman Service" as required by Departmental Representative; In general, watchman service is defined as an individual conversant with "Fire Emergency Procedures", performing fire picket duty within an unprotected and unoccupied (no workers) area once per hour.
 - .2 Retain services of manufacturer for fire protection systems on daily basis or as approved by Departmental Representative, to isolate and protect all devices relating to:
 - .1 modification of fire alarms, fire suppression, extinguishing or protection systems; and/or
 - .2 cutting, welding, soldering or other construction activities that might activate fire protection systems.
 - .3 Immediately upon completion of work, restore fire protection systems to normal operation and verify that all devices are fully operational.
 - .4 Inform fire alarm system monitoring agency and local Fire Department immediately prior to isolation and immediately upon restoration of normal operation.

1.8 HAZARDOUS MATERIALS

- .1 Hazardous Materials: product, substance, or organism that may cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .2 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).
- .3 For work in occupied buildings, give the Department Representative 48 hours notice for work involving designated substances (Ontario Bill 208), hazardous substances (Canada Labour Code Part II Section 10), and before painting, caulking, installing carpet or using adhesives and other materials, that cause off gassing.

1.9 TEMPORARY UTILITIES

- .1 Existing services required for work, excluding power required for space temporary 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 Maximum power supply of 110 V, 15 A is available and will be provided at no cost. Connect to existing power supply in accordance with Canadian Electrical Code and provide meters and switching.
- .3 Notify the Departmental Representative and utility companies of intended interruption of services and obtain requisite permission:
 - .1 2 weeks in advance
- .4 Give the Departmental Representative 14 days 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.

1.10 CONSTRUCTION FACILITIES

- .1 Access Scaffold:
 - .1 Scaffolding: install scaffolding in accordance with applicable construction 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.
- .2 Designated elevators: to be used by construction personnel and transporting of materials.
 - .1 Co-ordinate with Departmental Representative.
 - .2 Protect from damage, safety hazards and overloading of existing equipment.
 - .3 Freight elevator must be booked 24 hours in advance.
- .3 Site Storage:

- .1 Storage will be allowed within the area of Work only, no other storage will be available
- .2 Do not unreasonably encumber site with materials or equipment.
- .3 Move stored products or equipment that interfere with operations of Departmental Representative or other contractors.
- .4 Obtain and pay for use of additional storage or work areas needed for operations.
- .5 Do not load or permit to load any part of work with weight or force that will endanger work.
- .4 Where security is reduced by work provide temporary means to maintain security.
- .5 Sanitary facilities: the sanitary facilities on the floor of the Work may be used. Keep facilities clean.
- .6 Signage:
 - .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 and to approval of the Departmental Representative.
 - .2 No advertising will be permitted on this project.
 - .3 Maintain approved signs and notices in good condition for duration of project and dispose of off site, on completion of project or earlier, as directed by Departmental Representative.
- .7 Parking:
 - .1 Parking on-site is not available.
- .8 The first floor of the C.D. Howe Building is a cross over floor. Maintain emergency access cross over floor exiting capability at all times during construction or redirect to the second floor. See also Section 01 35 29.06 Health and Safety Requirements

1.11 TEMPORARY BARRIERS AND ENCLOSURES

- .1 Protection:
 - .1 Protect existing construction, infrastructure, and adjacent areas from damage.
 - .2 Protect work against damage until take-over.
 - .3 Protect adjacent areas and floors against the spread of dust and dirt beyond the work areas.
 - .4 Protect operatives and other users of site from all hazards.
- .2 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. When Building Operations staff requires access to equipment in order to operate the building, proper coordination and communication must exist between all parties involved

1.12 EXAMINATION and PREPARATION

- .1 Examine site and conditions likely to affect work and be familiar and conversant with existing conditions.

- .2 Before commencing work, establish location and extent of services lines in area of work and notify Departmental Representative of findings.

1.13 FIELD QUALITY CONTROL

- .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.

1.14 CLEANING

- .1 Clean up 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 Clean and polish glass, mirrors, ceramic tile, aluminum, chrome, stainless steel, baked or porcelain enamel, plastic laminate and other plastic surfaces, floors, hardware, perimeter heating units and washroom fixtures. Clean manufactured articles in accordance with manufacturer's written instructions.
- .4 Clean areas under contract to a condition equal to what previously existed and to approval of Departmental Representative.

1.15 SECURITY CHECK

- .1 Personnel will be checked-in daily at start of work shift and given a pass in exchange for acceptable personal identification, which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.

1.16 SECURITY ESCORT

- .1 All personnel employed on this project shall be escorted at all times.
- .2 Submit an escort request to Departmental Representative at least 72 hours before the service is needed. For requests submitted within the time mentioned above, the Departmental Representative will pay for the costs of the security escort. The cost incurred by a late request will be charged to the Contractor.
- .3 Any escort request may be cancelled free of charge if notification of cancellation is given at least 24 hours before the scheduled time of the escort. The cost incurred by a late cancellation will be charged to the Contractor.
- .4 The calculation of costs will be based on the average hourly rate of a security officer for a minimum of 8 hours per day for a late service request and 4 hours for late cancellations.

1.17 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. Make revisions as required by Departmental Representative. After approval by Departmental Representative cost breakdown will be used as the basis of progress payments.

1.18 PRECEDENCE

- .1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual

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

1.1 REGULATORY REQUIREMENTS

.1 An investigation into the presence of designated substances for the 1st Floor, West Space Refit and Base Building Work Project, located at the CD Howe Building, 235 Queen 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 0.1. 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 Act's
Surface Coating Materials
Regulations SOR/2005-109, as
amended (2011)*
- .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 DST Consulting Engineers Inc. (DST), conducted the on-site survey for this report on February 4, 2014.
- .2 DST staff completed a visual evaluation of building materials in select areas of the building for the presence of suspected designated substances on February 4, 2014. As per an annotated floor plan provided to DST by PWGSC that identified the project areas to be included as part of the designated substances survey, the DSR for this project specifically included the following areas, hereafter referred to as 'the project areas':
 - Former PWGSC offices, support spaces and associated public corridors on the 1st Floor – West, including:
 - Assistant Deputy Minister's Office (ADMO);
 - Governance, Policy Coordination and Planning Branch (GPP) offices;
 - Digital Policy Branch (DPB) offices;
 - Information and Communications Technologies Branch (ICTB) offices; and

- Department of National Defense (DND) offices.
- The administration and workshop areas of the commercial space on the 1st Floor West occupied by Holt Renfrew (H&R).

DST was advised by PWGSC prior to the survey portion of the DSR that the former PWGSC offices (listed above) were scheduled for a complete 'slab-to-slab' re-fit. As such, all accessible areas were included in the DSR. DST did not complete a full DSR for the building.

DST was also advised prior to the survey portion of the DSR that the planned re-fit activities for space of the 1st floor occupied by the H&R administration and workshop areas only included mechanical and electrical upgrades. As such, flooring materials were not included as part of the survey or sampling for this area, as no flooring materials are anticipated to be disturbed as part of the scheduled mechanical and electrical work in this area. If vinyl floor materials are removed or disturbed, they should be assumed to contain asbestos, unless proven otherwise by bulk sampling and laboratory analysis. It should be noted that a H&R secure storage area, accessible from behind the reception area was locked at the time of the DSS, and could not be accessed by DST or the accompanying escorts.

- .1 The scope of work for this report involved a visual inspection of building materials and contents for the presence of suspected designated substances within the project areas.
- .2 From the visual inspection, suspect materials were sampled and analyzed, (where necessary), for select designated substances. On the basis of this inspection, a total 30 bulk samples (comprised of thirty-three (33) bulk sample layers) of suspected asbestos-containing material samples were collected from the project areas.
- .3 Samples were then submitted for analysis at Paracel Laboratories Ltd., located at 300-2319 St. Laurent Boulevard, Ottawa, ON K1G 4J8.
- .4 The survey was limited to those areas that could be accessed by non-destructive means. The visual inspection and sampling was limited to readily accessible areas. Destructive testing was not included in the investigation. Due to the nature of building construction, some inherent limitations exist as to the possible thoroughness of the designated substance survey. The survey

- did not include the demolition of floors, floor finishes, solid ceilings or walls, or the sampling of pipe insulations, pipe fitting insulations and floor coverings.
- .5 It is possible that designated substances are present in non-accessible areas and concealed spaces (i.e., wall and ceiling cavities), or additional confined spaces. No other areas outside the defined work boundaries have been assessed.
- .6 Prior to beginning work, it must be confirmed with the Departmental Representative that no additional designated substances have been brought to the project area.
- .7 In addition, the survey refers to Polychlorinated Biphenyls (PCBs) and Halocarbons; however, it does not refer to other substances that may be present in the day-to-day usage for specialized equipment or areas in buildings (i.e., lead shields, fume hoods, chemicals, etc.).
- .8 There is a possibility that materials that 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 or renovation, work must be stopped, preventative 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.

Representative bulk samples, collected from materials located within the project areas have been analyzed for asbestos. Analytical results indicate that select samples contain asbestos in the project areas.

Table 1 summarizes the analytical results of bulk samples collected during the site investigation:

Table 1: Asbestos Sample Results by PLM

Sample ID	Material	Location	Asbestos Type	Asbestos content (%)
18254-01A	Black and beige paper	Concrete column meets concrete deck , GPP office, west perimeter wall column	n/d	n/a
18254-01B			n/d	n/a
18254-01C		Concrete column meets concrete, GPP office, north west corner column	n/d	n/a
18254-02A	Drywall joint compound	GPP office, southwest, internal wall above ceiling tiles	Chrysotile	<MDL
18254-02B		GPP office, south central, internal wall above ceiling tiles	n/d	n/a
18254-02C		GPP office, south central, internal wall above ceiling tiles	n/d	n/a
18254-02D		ICTB office, internal wall above ceiling tiles	n/d	n/a
18254-02E		DPB office, south, internal wall above ceiling tiles	Chrysotile	1%
18254-02F		DPB office, east, internal wall above ceiling tiles	Not analyzed – positive stop	
18254-02G		DND office, central, internal wall above ceiling tiles	Not analyzed – positive stop	
18254-03A	Red streaked VSF	GPP office, south central, conference room	n/d	n/a
18254-03B			n/d	n/a
18254-03C			n/d	n/a
18254-04A	Black sealant/caulking	GPP office, north-east corner, on drywall penetrations into the concrete ceiling deck, above suspended ceiling tiles,	Chrysotile	0.69%
18254-04B			Not analyzed – positive stop	
18254-04C			Not analyzed – positive stop	
18254-05A	Ceiling stipple	GPP office, adjacent to south entrance	n/d	n/a
18254-05B		Corridor, west	n/d	n/a
18254-05C		Corridor, east	n/d	n/a
18254-05D		Corridor, vestibule area with double doors	n/d	n/a
18254-05E		Corridor, west	n/d	n/a

Sample ID	Material	Location	Asbestos Type	Asbestos content (%)
18254-06A	2'x4' Ceiling Tiles	ICTB office	n/d	n/a
18254-06B			n/d	n/a
18254-06C			n/d	n/a
18254-07A	Remnant brown fireproofing	DPB office, above ceiling tiles	n/d	n/a
18254-07B			n/d	n/a
18254-07C			n/d	n/a
18254-08A	Drywall joint compound	Reception area	Chrysotile	1%
18254-08B		Hallway, above ceiling tiles	Not analyzed – positive stop	
18254-08C		Lunch room	Not analyzed – positive stop	

Bold items exceed the 0.5% regulated concentration of asbestos, as per O.Reg. 278/05, as amended
MDL: Method Detection Limit, n/d – none detected, n/a- not applicable

Based on limited observations noted during the survey, the following friable asbestos-containing material was identified in the H&R project area:

- Grey cement compound on six (6) pipe fittings (assumed ACM), associated with a small pad-mounted fibreglass insulated boiler in the sewing and ironing room in the H&R administration area. The associated straight-length piping was observed to be non-asbestos fibreglass. All six fittings were observed to be in good condition at the time of the survey.

Based on analytical sampling and limited observations noted during the survey, the following non-friable asbestos-containing materials were identified in the project areas:

- Drywall joint compound associated with all drywall materials throughout both of the project areas (former PWGSC offices and H&R administration offices) contains 1% Chrysotile asbestos (Samples 18254-02E and 18254-08A, respectively). All accessible instances of this ACM were observed in good condition at the time of survey. All drywall throughout the project areas should be assumed to contain asbestos, unless further laboratory analysis and delineation proves otherwise.
- A black tar/rubber material suspected to be used as an acoustic sealant applied to remnant drywall materials above the suspended ceiling tiles in the north-east corner of the former PWGSC GPP offices contains 0.69% Chrysotile asbestos (Sample 18254-04A). This ACM may be present as a sealant for drywall that is installed up to the concrete deck level in other locations within the project areas.

.4 **BENZENE:** Not Identified

.5 **COKE OVEN EMISSIONS:** Not Identified

.6 **ETHYLENE OXIDE:** Not Identified

.7 **ISOCYANATES:** Not Identified

.8 **LEAD: Suspected**

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 Act's *Surface Coating Materials Regulations* SOR/2005-109, 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 Even at very low concentrations, there may be potential for exposure to very high levels of lead depending on the activities performed that disturb the lead-containing materials. At low lead concentrations, conducting a risk assessment to assess the potential for exposure is required to determine the need to follow precautionary measures.
- .3 All paints were observed to be in good condition at the time of the site survey. As such, samples of these paints were not collected as sampling without matrix interference (i.e. removing paint without also removing non-paint substrate) would likely prove difficult. Older interior paint finishes throughout the project area are suspected to contain detectable concentrations of lead.
- .4 Lead is also expected to be present within the solder on copper piping throughout the project areas.

- .9 **MERCURY: Identified**
- Mercury is assumed present in vapour form and in the phosphor coating of T-12 fluorescent light tubes throughout the project areas.
- .10 **SILICA: Identified**
- Free crystalline silica is assumed present in concrete, drywall, stipple ceilings, and ceiling tiles throughout the project areas.
- .11 **VINYL CHLORIDE MONOMER: Not Identified**
- .12 **POLYCHLORINATED BIPHENYLS (PCBs): Suspected**
- Although not considered a designated substance, polychlorinated biphenyls (PCBs) can generally be found within fluorescent light fixture and High Intensity Discharge (HID) lamp ballasts. DST did not disassemble any of the light fixtures in the project areas to identify the presence of ballasts, as the light fixtures were energized at the time of site visit.
- During the site investigation, fluorescent light fixtures containing T12 lamp tubes were observed in the project areas. Fluorescent light ballasts associated with these light tubes are suspected to contain PCBs.
- .13 **HALOCARBONS: Not Identified**

2.2 RECOMMENDATIONS

1. **ASBESTOS**
- 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.

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.

The removal or disturbance of one square metre or less of friable asbestos containing materials (**grey cement compound 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 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.

The removal or disturbance of less than one square metre of **drywall in which the joint-filling compound** contains asbestos must be conducted using a minimum of Type 1 asbestos work procedures. The removal or disturbance of one square metre or more of drywall in which the joint filling compounds are asbestos-containing must be conducted using a minimum Type 2 asbestos work procedures.

The removal or disturbance of non-friable **black acoustic caulking/sealant** above ceiling tiles in select locations, if disturbance is necessary, can be conducted using a minimum of Type 1 asbestos work procedures, provided the material is wetted to control the spread of dust or fibres, and the work is done only by means of non-powered hand-held tools. If these conditions cannot be met, then more stringent (Type 2 or Type 3) work procedures are required.

2. LEAD

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.

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.

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.

.1 Ontario Ministry of Labour (MoL) has published the document entitled "*Guideline: Lead on Construction Projects*". This document classifies all disturbances of lead-containing materials as Type 1, Type 2a, Type 2b, Type 3a or Type 3b work, based on presumed airborne concentrations of lead generated during the work each of which will have defined work practices. Although this document is not a regulation, Ministry of Labour Inspectors use it as guidance during site inspections. Where there is conflict with the exposure limits and respiratory protection required by "Designated Substances" Regulation O.Reg 490/09, as amended, the most stringent requirements of Regulation 490/09 must apply

.2 The disposal of construction waste containing lead is controlled by "General – Waste Management" O.Reg 347/90, 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.

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. MERCURY

.1 Mercury is governed by "Designated Substances" *O.Reg 490/09*, as amended, under the Occupational Health and Safety Act. The regulation provides requirements for allowable exposure levels.

.2 In addition, mercury waste is considered a hazardous waste under "General – Waste Management" *O.Reg 347/90, as amended*, of the *Ontario Environmental Protection Act*. Fluorescent lamp tubes are considered hazardous material and should be recycled if removed from service. For information regarding the collection of fluorescent lamp tubes, please consult the PWGSC Departmental Representative.

4. 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, plaster and drywall 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.

5. POLYCHLORINATED BIPHENYLS (PCBs)

(NOT RECOGNIZED AS A DESIGNATED SUBSTANCE)

.1 During the site investigation, fluorescent light fixtures containing T12 lamp tubes were observed in

the project areas. Fluorescent light ballasts associated with these light tubes are suspected to contain PCBs. If any fluorescent light ballasts are removed during this project, please refer to the Environmental Canada, *Identification of Lamp Ballasts Containing PCBs, August 1991* report in order to identify the ballast type. Ballasts for a typical 1.2 metre fluorescent light fixture made with PCBs contain approximately 23.6 grams of PCB.

.2 If any fluorescent light ballasts are removed during this project they must be sorted by a licensed electrician.

PCB-containing equipment and/or PCB-containing material must be disposed of in accordance with:

- Canadian Environmental Protection Act's (CEPA) *PCB Regulations*
- Canadian Council of Ministers of the Environment's "*Guidelines for the Management of Wastes Containing Polychlorinated Biphenyls*
- Ontario Environmental Protection Act's O.Reg 362/90 "*Waste Management – PCB's*" (O.Reg 33/07, French version)

All PCB-containing equipment and/or PCB-containing material that is removed from the site or placed into storage shall be appropriately reported in accordance with the requirements of the CEPA PCB Regulations.

6. 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.

The contractor shall also complete all reporting requirements to comply with applicable regulations.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 47 17 Sustainable Requirements Contractor's Verification
- .2 Section 01 74 21 Construction / Demolition Waste Management and Disposal
- .3 Section 01 91 33 Commissioning (Cx) Forms

1.2 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.

1.3 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 Ontario.
- .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 5 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.
 - .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental in writing of revisions other than those requested.
 - .7 Accompany submissions with transmittal letter, in duplicate, 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 one PDF electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

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- .11 Submit PDF electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
 - .12 Submit PDF electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
 - .13 Submit PDF electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
 - .14 Submit PDF electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
 - .15 Submit PDF electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
 - .17 Submit PDF electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
 - .18 Delete information not applicable to project.
 - .19 Supplement standard information to provide details applicable to project.
 - .20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, reviewed marked-up PDF files 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.
 - .21 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 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.

- .22 Provide paper copies of submittals as requested by Departmental Representative.

1.4 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 address(es) provided by Departmental Representative.
- .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 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 MOCK-UPS

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

1.6 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic and hard copy of colour digital photography in jpg format, fine resolution, minimum weekly and as directed by Departmental Representative
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints:
 - .1 Viewpoints and their location as determined by Departmental Representative
- .4 Frequency of photographic documentation: weekly and as directed by Departmental Representative.
 - .1 Upon completion of: framing and services before concealment, and as directed by Departmental Representative.

1.7 CERTIFICATES AND TRANSCRIPTS

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

1.8 SUSTAINABLE REQUIREMENTS - VERIFICATION REPORT

- .1 Immediately upon application for Certificate of Substantial Completion of Contract

- .1 Submit sustainable requirements verification report in accordance with Section 01 4717 Sustainable Requirements-Contractor's Verification
 - .1 Include a copy in the O and M manual

1.9 COMMISSIONING AND CMMS FORMS

- .1 Immediately upon application for Certificate of Substantial Completion of Contract
 - .1 Submit Completed Commissioning and CMMS Forms
 - .1 Include a copy in the O and M manual.

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**1.1 REFERENCES**

- .1 Occupational Health and Safety Act R.S.O. 1990, c. 0.1, and Regulations for Construction Projects O. Reg. 213/91, current edition.
- .2 CAN/CSA, Z462-12 (Workplace Electrical Safety Standard)
- .3 CAN/CSA-Z460-05 (R2010) - Control of Hazardous Energy.

1.2 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within seven (7) working 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 found in work plan.
 - .3 Written safe work procedures to address the known hazards.
- .3 Submit three (3) copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, weekly.
- .4 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .5 Submit copies of incident and accident reports within 24 hours after the event.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets to Departmental Representative.
- .7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within seven (7) working days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within seven (7) working days after receipt of comments from Departmental Representative.
- .8 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.
- .9 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.

1.4 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.

1.5 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.6 GENERAL REQUIREMENTS

- .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.

1.7 RESPONSIBILITY

- .1 Be responsible and assume the role of "Constructor" as described in the Ontario Occupational Health & Safety Act and Regulations for Construction Projects for only the scope and areas of work as defined in this Project Specification.
- .2 Assume responsibility for health and safety of all other contractors present on site under the prescriptions of the present section.
- .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.

1.8 COMPLIANCE REQUIREMENTS

- .1 Comply with the Ontario Occupational Health and Safety Act, R.S.O. 1990, c. 0.1.
- .2 Comply with the Ontario Regulations for Construction Projects, O. Reg. 213/91.
- .3 Comply with CAN/CSA, Z462-12 (Workplace Electrical Safety Standard)
- .4 Comply with CAN/CSA-Z460-05 (R2010) - Control of Hazardous Energy.

1.9 UNFORSEEN HAZARDS

- .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.

1.10 CROSSOVER FLOOR

- .1 1W is a crossover floor in this building. Maintain safe crossover floor access at all times during construction either on 1W or through redirection to 2W above. When redirection to 2W is required, prepare and submit an emergency exiting plan to the Departmental Representative with the following information:
 - 1. A written description of the crossover floor redirection plan including the dates and times of the proposed redirection.
 - 2. A floor plan of 2W showing the location and description of
 - 1. Signage in French and English redirecting traffic in the event of an emergency. Provide proposed wording.

2. Installation and description of temporary door, frame and hardware allowing full access to 2W exit stairs and access to exit stairs. Existing door, frame and hardware to be stored for reinstallation after redirection plan is completed.
3. Temporary connection of temporary hardware on 2W exit stair doors noted in no. 2 above to both the fire alarm and security system.
4. Location of signage on the both sides of 2W exit stair doors stating the following:
 - “Emergency exit only. Alarm will sound!”
 - “Sortie d’urgence seulement. Une alarme retentira!”
3. Submit the plan to the Departmental Representative for review and approval.
4. Implement the plan upon approval as instructed by the Departmental Representative.

1.10 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have site-related working experience specific to activities associated with specified Work. Submit relevant experience to Departmental Representative.
 - .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.

1.11 POSTING OF DOCUMENTS

- .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.

1.12 CORRECTION OF NON-COMPLIANCE

- .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.

1.13 BLASTING

- .1 Blasting or other use of explosives is not permitted.

1.14 POWDER ACTUATED DEVICES

- .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.15 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.

END OF SECTION

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, minimum 5 days, 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 may 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, Departmental Representative 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 REPORTS

- .1 Submit 4 copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested manufacturer or fabricator of material being inspected or tested.

1.7 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

1.8 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in specifications and/or drawings. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations as specified in specific Section or drawing acceptable to Departmental Representative.
- .3 Prepare mock-ups for Departmental Representative with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups 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.
- .5 If requested, Departmental Representative will assist in preparing schedule fixing dates for preparation.
- .6 Mock-ups may remain as part of Work at the discretion of the Departmental Representative.

1.9 MILL TESTS

- .1 Submit mill test certificates as requested.

1.10 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.
- .2 Refer to Section 01 91 13 - General Commissioning (CX) Requirements for definitive requirements.

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

1.1 REFERENCES

- .1 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
 - .1 ASHRAE 55-1992, Thermal Environmental Conditions for Human Occupancy.
 - .2 ASHRAE 62-2001, Ventilation for Acceptable Indoor Air Quality.
 - .3 ASHRAE 129-1997, Measuring Air Change Effectiveness.
- .2 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.

1.2 HAZARDOUS MATERIALS

- .1 Follow methods and procedures specified in Section 02 81 01 - Hazardous Materials; Provide written reports for chemical spills.

1.3 GENERAL FIT UP DESIGN

- .1 The Crown has stated that "The CD Howe building is a green building and therefore the project needs to follow LEED Commercial Interiors (CI) certification guidelines." however application for LEED certification will not be made for this project.
 - .1 The Crown requires documentation of specific sustainable efforts and achievements made by the project which will be provided by means of the Contractor's Verification report.
- .2 Anticipated life expectancy of this fit up is 10 years.
- .3 Anticipated number of floor occupants 178.
- .4 Indicate in writing to Departmental Representative:
 - .1 Compliance Report: List energy efficient and environmentally benign products purchased for this project:
 - .2 Use Report: List materials and methods of construction used, which improved:
 - .1 Energy and water efficiency:
 - .2 Reduced hazardous by-products:
 - .3 Products, materials or systems purchased that used recycled materials:
 - .4 Products, materials or systems purchased that are constructed of materials which can be reused.
 - .5 Post-consumer content of used or recycled, materials and assemblies.
 - .3 Energy Report: List Energuide ratings for new equipment and appliances:
 - .4 List purchased assemblies and systems designed for disassembly:

1.4 GREEN FIT UP TARGETS

- .1 Reference LEED Canada-CI Version 1.0-2007.

- .1 Divert 75% of construction waste from landfill. See LEED CI MR2.2
- .2 Recycled Content: Use materials with recycled content. See LEED CI MR4.2
- .3 Regional Materials: Use regionally sourced materials manufactured within 800KM of the site. See LEED CI MR5.2
- .4 Certified Wood: Use FSC certified wood products. See LEED CI MR 7
- .5 Construction IAQ Management Plan: During Construction. See LEED CI EQ3.1
- .6 Construction IAQ Management Plan: Before Occupancy. See LEED CI EQ3.2
- .7 Low Emitting Materials: Adhesives and Sealants See LEED CI EQ 4.1
- .8 Low Emitting Materials: Paints and Coatings See LEED CI EQ 4.2
- .9 Low Emitting Materials: Carpet Systems See LEED CI EQ 4.3
- .10 Low Emitting Materials: Composite Wood & Laminate Adhesives See LEED CI EQ 4.4

1.5 INDOOR AIR QUALITY

- .1 Indoor Environmental Quality
 - .1 Provide written report indicating strategies, methods and materials that were incorporated into project to control mould growth.
 - .2 Provide floor plan indicating areas that will generate high contaminants and indicate dedicated exhaust points.
- .2 IAQ Performance
 - .1 Provide inspection report from Departmental Representative indicating that project complies with ASHRAE 62.
- .3 Carbon Dioxide (CO2) Monitoring
 - .1 Provide written report describing potential sources of external contamination and measures that have been taken to minimize impacts on interior air.
 - .2 Provide inspection letter from Departmental Representative indicating location of CO2 sensors and that project is in compliance with ASHRAE 62.
- .4 Construction IAQ Management Plan
 - .1 Provide written report indicating:
 - .1 Measures taken to minimize impacts on interior air during construction as defined in Sheet Metal and Air Conditioning National Contractors Association Indoor Air Quality Guideline for Occupied Buildings Under Construction Guideline.
 - .2 Efficiency of filtration media used during construction phase and dates filtration media was changed.
 - .3 Provisions taken to protect HVAC system from contamination during construction procedures.
 - .2 Provide letter from Departmental Representative confirming dates of fit up area flushout.

1.6 GENERAL CONSTRUCTION MATERIALS/PRACTICES

- .1 Materials and Resources
- .2 Storage and Collection of Recyclables

- .1 Provide floor plans indicating:
 - .1 Location of collection sites for recyclable materials and storage facilities and waste compactor in loading dock area.
 - .2 Location of composting facilities.
- .3 Construction Waste Management
 - .1 Submit copy of the waste audit and waste management workplan developed for project.
 - .2 Submit waybills for waste materials removed from site during construction along with destination point.
- .4 Resource Reuse
 - .1 Provide written report including specifications:
 - .1 Describing salvaged and refurbished materials used during construction, including origin of salvaged materials.
 - .2 Showing calculations that indicate what percentage of total project's materials were salvaged or refurbished.
- .5 Recycled Content
 - .1 Provide product specification and data sheets for products containing recycled content indicating the percentage of post consumer and/or post industrial content.
 - .2 Provide calculations indicating what percentage of total project's materials contained recycled content.
- .6 Local/Regional Materials
 - .1 Provide product specification and data sheets for locally manufactured materials installed.
 - .2 Provide calculations indicating what percentage of total project's materials were locally manufactured.
- .7 Rapidly Renewable Materials
 - .1 Provide product specification and data sheets for products containing rapidly renewable materials installed.
 - .2 Provide calculations indicating what percentage of total project's materials contained rapidly renewable materials.
- .8 Wood
 - .1 Provide documentation from supplier declaring that wood materials were harvested from sustainable forestry practices.
 - .2 Provide calculations indicating what percentage of total project's wood materials were certified as sustainably harvested.
- .9 Low-Emitting Materials
 - .1 Provide MSDS sheets or testing results indicating VOC emission rates for following materials:
 - .1 Adhesives.
 - .2 Sealants.
 - .3 Caulkings.

- .4 Paints and coatings.
- .5 Textile floor coverings.
- .2 Provide MSDS sheets indicating resin type for composite wood and agrifibre materials.

1.7 INSULATION

- .1 Provide product specification and data sheets indicating:
 - .1 Recycled content of each type of insulation material installed.

1.8 CEILINGS

- .1 Provide product specification sheets indicating:
 - .1 Noise reduction coefficient of installed ceiling tiles.
 - .2 Average recycled content.

1.9 PAINTS, STAINS, VARNISHES

- .1 Provide MSDS sheets for paints, stains and varnishes indicating VOC emission rate and chemical composition.

1.10 SEALANTS, ADHESIVES AND COMPOUNDS

- .1 Provide MSDS sheets for sealants, adhesives and other compounds indicating VOC emission rate and chemical composition.

1.11 FLOORING

- .1 Provide manufacturers verification that:
 - .1 Textile floor covering meet or exceed the emission rates of Carpet and Rug Institute Green Label Program.
- .2 Provide manufactures verification that resilient flooring is recyclable, manufactured with recycled content and/or manufactured from renewable resources

1.12 HVAC EQUIPMENT

- .1 Ozone Depletion and HVAC and Refrigeration Equipment
 - .1 Existing buildings: provide listing of existing HVAC and refrigeration equipment detailing refrigerant used.
 - .2 Provide copy of phase out plan for equipment that uses CFC's indicating date of conversion, removal or replacement.
- .2 Controllability of Systems
 - .1 Provide floor plans indicating location of:
 - .1 Lighting controls.
 - .2 Operable windows.
 - .3 Individual controls for airflow, temperature, and lighting.
- .3 Thermal Comfort
 - .1 Provide inspection report from Departmental Representative stating that project:

- .1 Complies with ASHRAE 55.
 - .2 Allows for inclusion of permanent temperature and humidity monitoring system to provide for control over thermal comfort performance and humidification and/or dehumidification systems of building.
 - .4 Ventilation Effectiveness
 - .1 Mechanically ventilated building: Provide inspection report from Departmental Representative stating that ventilation rates are in compliance with ASHRAE 129.
 - .2 Provide results of modelling simulation indicating that ventilation techniques used on this project achieve even air distribution and flow patterns.
 - .3 Provide documentation indicating location of filter media sites and verification that media is properly sized and easily accessible for cleaning.
- 1.13 PLUMBING FIXTURES**
 - .1 Water Use Reduction
 - .1 Provide product specification and data sheets for water consuming products indicating flow/flush performance rates.
- 1.14 ENERGY**
 - .1 Energy Performance
 - .1 Provide floor plans indication location of installed energy metres.
 - .2 Optimize Energy Performance
 - .1 Provide documentation indicating energy efficient measures incorporated into fit up.
- 1.15 MEASUREMENT AND VERIFICATION**
 - .1 Provide copy of commissioning plan.
- 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**1.1 REFERENCES**

- .1 Conform to reference standards in whole or in part as specifically requested in specifications.
- .2 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.
- .3 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.

- .6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. 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.

1.4 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Departmental Representative will be paid for by Departmental Representative. Unload, handle and store such products.

1.5 MANUFACTURER'S INSTRUCTIONS

- .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.

1.6 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.7 CO-ORDINATION

- .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.

1.8 CONCEALMENT

- .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.

1.9 REMEDIAL WORK

- .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.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.10 LOCATION OF FIXTURES

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate and subject to relocation prior to installation within a radius of up to 3000mm from the location shown to suit site conditions, interferences or other conditions determined by the Departmental Representative.
- .2 Inform Departmental Representative of conflicting installation. Install as directed.

1.11 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .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.
- .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.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.12 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.13 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

1.14 EXISTING UTILITIES

- .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.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Record location of capped service.

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**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 Departmental Representative 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 Departmental Representative or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.
 - .9 Results of scan or x-ray of concrete slab for core drilling

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 Remove samples of installed Work for testing.
- .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .8 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .10 Restore work with new products in accordance with requirements of Contract Documents.
- .11 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .12 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance with ULC listed firestop assemblies applicable for the existing construction. provide submittals for proposed firestop assemblies prior to installation for approval by Departmental Representative.
- .13 Patch and make good existing construction that is cut, damaged or disturbed in the course of the Work, to Departmental Representative's approval. Match existing material and finish texture, appearance and colour.
- .14 Remove all traces of existing construction removed in the course of the Work.
- .15 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .16 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.
- .17 At penetration of acoustically-rated partitions, completely seal voids with acoustic sealant on both sides of partition.
- .18 Install furring and blocking within partitions as required to space-out and support casework, cabinets, TV's provided by Departmental Representatives (TV quantity and general location indicated in drawings, exact location and extent of blocking to be clarified on site), wall and ceiling finishes, electrical equipment mounting boards, and other work as required.
- .19 X-ray floor at locations where cuts into the structural slab are required.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse/recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

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**1.1 WASTE MANAGEMENT GOALS**

- .1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss PWGSC's waste management goal and Contractor's proposed Waste Reduction Workplan for Construction, Renovation and /or Demolition (CRD) waste to be project generated.
- .2 PWGSC's waste management goal: to divert a minimum 75 percent of total Project Waste from landfill sites. Prior to project completion provide Departmental Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced. The overall waste diversion goal for this project is 75%.
- .3 Minimize amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse and recycling of solid waste produced by CRD activities.
- .4 Protect environment and prevent environmental pollution damage.

1.2 REFERENCES

- .1 Definitions:
 - .1 Approved/Authorized recycling facility: waste recycler approved by applicable provincial authority or other users of material for recycling approved by the Departmental Representative.
 - .2 Class III: non-hazardous waste - construction renovation and demolition waste.
 - .3 Construction, Renovation and/or Demolition (CRD) Waste: Class III solid, non-hazardous waste materials generated during construction, demolition, and/or renovation activities
 - .4 Cost/Revenue Analysis Workplan (CRAW): based on information from Waste Reduction Workplan, and intended as financial tracking tool for determining economic status of waste management practices (Schedule E).
 - .5 Inert Fill: inert waste - exclusively asphalt and concrete.
 - .6 Waste Source Separation Program (WSSP): implementation and co-ordination of ongoing activities to ensure designated waste materials will be sorted into pre-defined categories and sent for recycling and reuse, maximizing diversion and potential to reduce disposal costs.
 - .7 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
 - .8 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
 - .9 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.
 - .10 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
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- .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.
 - .1 Separate and store salvaged carpet tile identified on the demolition drawings for reuse as directed by the Departmental Representative .
 - .2 Returning reusable items including pallets or unused products to vendors.
 - .11 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
 - .12 Separate Condition: refers to waste sorted into individual types.
 - .13 Source Separation: act of keeping different types of waste materials separate beginning from the point they became waste.
 - .14 Waste Audit (WA): detailed inventory of estimated quantities of waste materials that will be generated during construction, demolition, deconstruction and/or renovation. Involves quantifying by volume/weight amounts of materials and wastes that will be reused, recycled or landfilled. Refer to Schedule A.
 - .15 Waste Diversion Report: detailed report of final results, quantifying cumulative weights and percentages of waste materials reused, recycled and landfilled over course of project. Measures success against Waste Reduction Workplan (WRW) goals and identifies lessons learned.
 - .16 Waste Management Co-ordinator (WMC) : contractor representative responsible for supervising waste management activities as well as co-ordinating required submittal and reporting requirements.
 - .17 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials generated by project. Specifies diversion goals, implementation and reporting procedures, anticipated results and responsibilities. Waste Reduction Workplan (Schedule B) information acquired from Waste Audit.
 - .2 Reference Standards:
 - .1 Ontario Ministry of Environment
 - .1 Ontario 3 R's Regulations (regulation 102/94) for waste management programs applicable to construction and demolition projects greater than 2,000 m².
 - .2 Ontario Environmental Protection Act (EPA)
 - .1 Regulation 102/94, Waste Audits and Waste Reduction Workplans.
 - .2 Regulation 103/94, Source Separation Programs.
 - .3 Canadian Construction Association (CCA)
 - .1 CCA 81-2001: A Best Practices Guide to Solid Waste Reduction.
 - .4 Public Works and Government Services Canada (PWGSC)
 - .1 2002 National Construction, Renovation and Demolition Non-Hazardous Solid Waste Management Protocol.
 - .2 CRD Waste Management Market Research Report (available from PWGSC's Environmental Services).
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- .3 Sustainable Development Strategy 2007-2009: Target 2.1 Environmentally Sustainable Use of Natural Resources.
 - .1 Real Property projects over \$1 million and in communities where industrial recycling is supported, implementation of CRD waste management practices will be completed, with waste materials being reused or recycled.
 - .2 Contractually ensure resources used in construction or maintenance are consumed and recovered in a sustainable manner.

1.3 DOCUMENTS

- .1 Post and maintain in visible and accessible area at job site, one copy of following documents:
 - .1 Waste Audit (Schedule A).
 - .2 Waste Reduction Workplan (Schedule B).
 - .3 Waste Source Separation Program.
 - .4 Schedules A and B completed for project.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Prepare and submit following prior to project start-up:
 - .1 1 copy and 1 electronic copy of completed Waste Audit (WA): Schedule A.
 - .2 1 copy and 1 electronic copy of completed Waste Reduction Workplan (WRW): Schedule B.
 - .3 1 copy and 1 electronic copy of Cost/Revenue Analysis Workplan (CRAW): Schedule E.
 - .4 1 copy and 1 electronic copy of Waste Source Separation Program (WSSP).
 - .5 1 copy of a list of all mechanical and electrical equipment currently in the CMMS Computerized Maintenance Management Systems to be removed and decommissioned.
 - .1 Obtain the existing CMMS forms from the Departmental Representative.
 - .3 Prepare and submit on monthly basis, throughout project or at intervals agreed to by Departmental Representative the following:
 - .1 Receipts, scale tickets, waybills, and/or waste disposal receipts that show quantities and types of materials reused, recycled, or disposed of.
 - .2 Updated Waste Materials Tracking form (Schedule D).
 - .3 Written monthly summary report detailing cumulative amounts of waste materials reused, recycled and landfilled, and brief status of ongoing waste management activities.
 - .4 Submit prior to final payment the following:
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- .1 Waste Diversion Report, indicating final quantities in tones by material types salvaged for reuse, recycling or disposal in landfill and recycling centres, re-use depots, landfills and other waste processors that received waste materials (See Schedule C).
- .2 Provide receipts, scale tickets, waybills, waste disposal receipts that confirm quantities and types of materials reused, recycled or disposed of and destination.

1.5 WASTE AUDIT (WA)

- .1 Departmental Representative will prepare WA prior to project start-up. WA will be provided with bid documentation (see Schedule A).
- .2 WA provides detailed inventory, estimated quantities and types of waste materials that will be generated as well as their potential to be reused and/or recycled and project's waste diversion goals and objectives.
- .3 After award of contract, contractor to review WA and confirm that anticipated quantities of waste generated are accurate and goals achievable.
- .4 If after review, contractor determines that indicated quantities or opportunities in WA are not accurate or achievable, contractor to provide written details of discrepancies and revised quantities for areas of concern. Contractor to meet with Departmental Representative to review and justify revisions.
- .5 Post on-site WA where contractor and sub-contractors are able to review content.

1.6 WASTE REDUCTION WORKPLAN (WRW)

- .1 Prepare and submit WRW (Schedule B) at least 5 days prior to project start-up.
- .2 WRW identifies strategies to optimize diversion through reduction, reuse, and recycling of materials and comply with applicable regulations, based on information acquired from WA.
- .3 WRW should include but not limited to:
 - .1 Applicable regulations.
 - .2 Specific goals for waste reduction, identify existing barriers and develop strategies to overcome them.
 - .3 Destination of materials identified.
 - .4 Deconstruction/disassembly techniques and schedules.
 - .5 Methods to collect, separate, and reduce generated wastes.
 - .6 Location of waste bins on-site.
 - .7 Security of on-site stock piles and waste bins.
 - .8 Protection of personnel, sub-contractors.
 - .9 Clear labelling of storage areas.
 - .10 Training plan for contractor and sub-contractors.
 - .11 Methods to track and report results reliably (Schedule D).
 - .12 Details on materials handling and removal procedures.
 - .13 Recycler and reclaimer requirements.
 - .14 Quantities of materials to be salvaged for reuse or recycled and materials sent to landfill.

.15 Requirements for monitoring on-site wastes management activities.

.4 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.5 Post WRW or summary where workers at site are able to review content.

.6 Monitor and report on waste reduction by documenting total volume (in tonnes) and cost of actual waste removed from project (Schedule D).

1.7 COST/REVENUE ANALYSIS WORKPLAN (CRAW)

.1 Prepare CRAW (see Schedule E) and include the following:

.1 Cost of current waste management practices.

.2 Implementation cost of waste diversion program.

.3 Savings and benefits resulting from waste diversion program.

1.8 WASTE SOURCE SEPARATION PROGRAM (WSSP)

.1 As part of Waste Reduction Workplan, prepare WSSP prior to project start-up.

.2 WSSP will detail methodology and planned on-site activities for separation of reusable and recyclable materials from waste intended for landfill.

.3 Provide list and drawings of locations that will be made available for sorting, collection, handling and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide sufficient on-site facilities and containers for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.5 Locate containers to facilitate deposit of materials without hindering daily operations.

.6 Provide training for workers in handling and separation of materials for reuse and/or recycling.

.7 Locate separated materials in areas which minimizes material damage.

.8 Clearly and securely label containers to identify types/conditions of materials accepted and assist workers in separating materials accordingly.

.9 Monitor on-site waste management activities by conducting periodic site inspections to verify: state of signage, contamination levels, bin locations and condition, personnel participation, use of waste tracking forms and collection of waybills, receipts and invoices.

.10 On-site sale of salvaged materials is not permitted unless authorized in writing by Departmental Representative and provided that site safety regulations and security requirements are adhered to.

1.9 USE OF SITE AND FACILITIES

.1 Execute Work with minimal interference and disturbance to normal use of premises.

.2 Maintain security measures established by facility and provide temporary security measures approved by Departmental Representative.

1.10 WASTE PROCESSING SITES

- .1 Contractor is responsible to research and locate waste diversion resources and service providers. Salvaged materials are to be transported off site to approved and/or authorized recycling facilities or to users of material for recycling.

1.11 QUALITY ASSURANCE

- .1 After award of Contract, a mandatory site examination will be held for this Project for Contractor and sub-contractors responsible for construction, renovation demolition/deconstruction waste management.

- .1 Date, time and location will be arranged by Departmental Representative

- .2 Waste Management Meeting: Waste Management Co-ordinator is to provide an update on status of waste diversion and management activities at each meeting. Written monthly Waste Diversion Report summary to be provided by Waste Management Coordinator (refer to the Waste Diversion Report form in Schedule C and Waste Materials Tracking form in Schedule D).

1.12 STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Protect structural components not removed and salvaged materials from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative
- .7 Protect surface drainage, mechanical and electrical from damage and blockage.
- .8 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.
- .9 Separate and store materials produced during project in designated areas.
- .10 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off site processing facility for separation.
 - .3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.
 - .4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

1.13 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 on-site as Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in the waste audit.

1.14 SCHEDULING

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 APPLICATION

- .1 Do Work in compliance with WRW and WSSP.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 00 10 – General Instructions.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 00 10 – General Instructions.
- .3 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
 - .2 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

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

3.4 WASTE DIVERSION REPORT

- .1 At completion of Project, prepare written Waste Diversion Report indicating quantities of materials reused, recycled or disposed of as well as the following:
 - .1 Identify final diversion results and measure success against goals from Waste Reduction Workplan.
 - .2 Compare final quantities/percentages diverted with initial projections in Waste Audit and Waste Reduction Workplan and explain variances.
 - .1 Supporting documentation.
 - .2 Waybills and tracking forms.
 - .3 Description of issues, resolutions and lessons learned.

3.5 WASTE AUDIT (WA)

- .1 Schedule A - Waste Audit (WA)

(1) Material Category	(2) Material Quantity Unit	(3) Estimated Waste %	(4) Total Quantity of Waste (unit)	(5) Generation Point	(6) % Recycled	(7) % Reused
Wood and Plastics Material Description						
Off-cuts						
Warped Pallet Forms						
Plastic Packaging						
Cardboard Packaging						
Other						
Doors and Windows Material Description						
Painted Frames						
Glass						
Wood						

Metal						
Other						

3.6 WASTE REDUCTION WORKPLAN (WRW)**.1 Schedule B**

(1) Material Category	(2) Person(s) Respon- sible	(3) Total Quantity of Waste (unit)	(4) Reused Amount (units) Projected	Actual	(5) Recycled Amount (unit) Projected	Actual	(6) Material(s) Destina- tion
Wood and Plastics Material Description							
Chutes							
Warped Pallet Forms							
Plastic Packag ing							
Card- board Packag ing							
Other							
Doors and Windows Material Description							
Painted Frames							
Glass							
Wood							
Metal							
Other							

3.7 COST/REVENUE ANALYSIS WORKPLAN (CRAW)**.1 Schedule E - Cost/Revenue Analysis Workplan (CRAW)**

(1) Material Description	(2) Total Quantity (unit)	(3) Volume (cum)	(4) Weight (cum)	(5) Disposal Cost/Credit \$(+/-)	(6) Category Sub-Total \$(+/-)
Wood					
Wood Stud					
Plywood					
Baseboard - Wood					
Door Trim -					

Wood					
Cabinet					
Doors and Windows					
Panel Regular					
Slab Regular					
Wood Laminate					
Byfold - Closet					
Glazing					
Metal Studs and Framing					
		(7) Cost (-) / Revenue (+)			

3.8 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

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

Province	Address	General Inquires	Fax
Ontario	Ministry of Environment and Energy, 135 St. Clair Avenue West Toronto ON M4V 1P5	416-323-4321 800-565-4923	416-323-4682
	Environment Canada Toronto ON	416-734-4494	

3.9 SCHEDULES

.1 Following Schedules are attached to this Specification:

- .1 Waste Audit - Schedule A.
- .2 Waste Reduction Workplan Form - Schedule B.
- .3 Cost/Revenue Analysis Workplan - Schedule E.
- .4 Government Chief Responsibility for the Environment – Schedule G

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE REQUIREMENTS**

- .1 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
- .2 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
- .3 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English and French.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

1.3 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems, process flow, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in dwg format on CD.

1.4 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .6 Training: provide training as required by Departmental Representative.
- .7 Include the Sustainable Requirements -Contractor's Verification report
- .8 Include copies of Commissioning and CMMS forms.

1.5 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Site Instructions
 - .5 Change Orders and other modifications to Contract.
 - .6 Reviewed shop drawings, product data, and samples.
 - .7 Field test records.
 - .8 Inspection certificates.
 - .9 Manufacturer's certificates.
 - .10 Site Instructions
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.

- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by change orders.
 - .4 Details not on original Contract Drawings.
 - .5 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

1.7 EQUIPMENT AND SYSTEMS

- .1 Obtain MMS data forms from Departmental Representative and fill in all information for all new and removed equipment. Forward all maintenance data for inclusion in Preventative Maintenance Support System (PMSS). Obtain equipment tag info from Departmental Representative and include on P-touch label. Provide copies of all MMS data forms in operating and maintenance manuals.
- .2 For each item of equipment and each system include description of unit or system, and component parts.
 - .1 Give function, normal operation characteristics and limiting conditions.
 - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .3 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

- .4 Include installed colour coded wiring diagrams.
- .5 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
 - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
 - .2 Include summer, winter, and any special operating instructions.
- .6 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .7 Provide servicing and lubrication schedule, and list of lubricants required.
- .8 Include manufacturer's printed operation and maintenance instructions.
- .9 Include sequence of operation by controls manufacturer.
- .10 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .11 Provide installed control diagrams by controls manufacturer.
- .12 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.
- .13 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .14 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .15 Include test and balancing reports as specified in Section 01 45 00 - Quality Control and 01 91 13 - General Commissioning (Cx) Requirements.
- .16 Additional requirements: as specified in individual specification sections.

1.8 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual specifications sections.

1.9 MAINTENANCE MATERIALS

- .1 Spare Parts:
 - .1 Provide spare parts, in quantities specified in individual specification sections.
 - .2 Provide items of same manufacture and quality as items in Work.
 - .3 Deliver to location as directed; place and store.

- .4 Receive and catalogue items.
 - .1 Submit inventory listing to Departmental Representative..
 - .2 Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock Materials:
 - .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
 - .2 Provide items of same manufacture and quality as items in Work.
 - .3 Deliver to site location as directed; place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Departmental Representative
 - .2 Include approved listings in Maintenance Manual.
 - .5 Obtain receipt for delivered products and submit prior to final payment.
- .3 Special Tools:
 - .1 Provide special tools, in quantities specified in individual specification section.
 - .2 Provide items with tags identifying their associated function and equipment.
 - .3 Deliver to site location as directed; place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Departmental Representative
 - .2 Include approved listings in Maintenance Manual.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and for review by Departmental Representative.

1.11 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.
- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.

-
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
 - .7 Except for items put into use with Departmental Representative's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
 - .8 Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.
 - .9 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include HVAC balancing, pumps, motors, transformers, commissioned systems fire protection, alarm systems, sprinkler systems, lightning protection systems,.
 - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
 - .11 Organization, names and phone numbers of persons to call for warranty service.

- .12 Typical response time and repair time expected for various warranted equipment.
- .4 Contractor's plans for attendance at 4 and 9 month post-construction warranty inspections.
- .5 Procedure and status of tagging of equipment covered by extended warranties.
- .6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .10 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .11 Written verification to follow oral instructions.
- .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.12 WARRANTY TAGS

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Departmental Representative.
- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
 - .1 Type of product/material.
 - .2 Model number.
 - .3 Serial number.
 - .4 Contract number.
 - .5 Warranty period.
 - .6 Inspector's signature.
 - .7 Construction Contractor.

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**1.1 RELATED REQUIREMENTS**

- .1 Section 01 78 00 CLOSEOUT SUBMITTALS
- .2 Section 01 91 33 COMMISSIONING (Cx FORMS)
- .3 Acronyms:
 - .1 AFD - Alternate Forms of Delivery, service provider.
 - .2 BMM - Building Management Manual.
 - .3 Cx - Commissioning.
 - .4 EMCS - Energy Monitoring and Control Systems.
 - .5 O M - Operation and Maintenance.
 - .6 PI - Product Information.
 - .7 PV - Performance Verification.
 - .8 TAB - Testing, Adjusting and Balancing.

1.2 GENERAL

- .1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:
 - .1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.
 - .2 Ensure appropriate documentation is compiled into the BMM.
 - .3 Effectively train O M staff.
- .2 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.
 - .1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.
 - .2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.
- .3 Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.

1.3 COMMISSIONING OVERVIEW

- .1 Cx to be a line item of Contractor's cost breakdown
- .2 Cx activities supplement field quality and testing procedures described in relevant technical sections.
- .3 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction

and Cx stages to ensure the built project is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities include transfer of critical knowledge to facility operational personnel.

- .4 Departmental Representative will issue Interim Acceptance Certificate when:
 - .1 Completed Cx documentation has been received, reviewed for suitability and approved by Departmental Representative.
 - .2 Equipment, components and systems have been commissioned.
 - .3 O M training has been completed.

1.4 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

- .1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as deemed required by Departmental Representative to ensure effective performance.
- .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

1.5 PRE-CX REVIEW

- .1 Before Construction:
 - .1 Review contract documents, confirm by writing to Departmental Representative.
 - .1 Adequacy of provisions for Cx.
 - .2 Aspects of design and installation pertinent to success of Cx.
- .2 During Construction:
 - .1 Co-ordinate provision, location and installation of provisions for Cx.
- .3 Before start of Cx:
 - .1 Have completed Cx Plan up-to-date.
 - .2 Ensure installation of related components, equipment, sub-systems, systems is complete.
 - .3 Fully understand Cx requirements and procedures.
 - .4 Have Cx documentation shelf-ready.
 - .5 Understand completely design criteria and intent and special features.
 - .6 Submit complete start-up documentation to Departmental Representative.
 - .7 Have Cx schedules up-to-date.
 - .8 Ensure systems have been cleaned thoroughly.
 - .9 Complete TAB procedures on systems, submit TAB reports to Departmental Representative for review and approval.
 - .10 Ensure "As-Built" system schematics are available.
- .4 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.6 CONFLICTS

- .1 Report conflicts between requirements of this section and other sections to Departmental Representative before start-up and obtain clarification.
- .2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit no later than 4 weeks after award of Contract:
 - .1 Name of Contractor's Cx agent.
 - .2 Draft Cx documentation.
 - .3 Preliminary Cx schedule.
 - .2 Request in writing to Departmental Representative for changes to submittals and obtain written approval at least [8] weeks prior to start of Cx.
 - .3 Submit proposed Cx procedures to Departmental Representative where not specified and obtain written approval at least [8] weeks prior to start of Cx.
 - .4 Provide additional documentation relating to Cx process required by Departmental Representative

1.8 COMMISSIONING DOCUMENTATION

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms for requirements and instructions for use.
- .2 Departmental Representative to review and approve Cx documentation.
- .3 Provide completed and approved Cx documentation to Departmental Representative.

1.9 COMMISSIONING SCHEDULE

- .1 Provide detailed Cx schedule as part of construction schedule in accordance with Section 01 0010 General Instructions.
- .2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:
 - .1 Approval of Cx reports.
 - .2 Verification of reported results.
 - .3 Repairs, retesting, re-commissioning, re-verification.
 - .4 Training.

1.10 STARTING AND TESTING

- .1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

1.11 WITNESSING OF STARTING AND TESTING

- .1 Provide 14 days notice prior to commencement.

- .2 Departmental Representative to witness start-up and testing.
- .3 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

1.12 MANUFACTURER'S INVOLVEMENT

- .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 and review with Departmental Representative.
 - .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 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.

1.13 PROCEDURES

- .1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.
- .2 Conduct start-up and testing in following distinct phases:
 - .1 Included in delivery and installation:
 - .1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.
 - .2 Visual inspection of quality of installation.
 - .2 Start-up: follow accepted start-up procedures.
 - .3 Operational testing: document equipment performance.
 - .4 System PV: include repetition of tests after correcting deficiencies.
 - .5 Post-substantial performance verification: to include fine-tuning.
- .3 Correct deficiencies and obtain approval from Departmental Representative after distinct phases have been completed and before commencing next phase.
- .4 Document required tests on approved PV forms.

- .5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:
 - .1 Minor equipment/systems: implement corrective measures approved by Departmental Representative.
 - .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Departmental Representative
 - .3 If evaluation report concludes that major damage has occurred, Departmental Representative shall reject equipment.
 - .1 Rejected equipment to be removed from site and replaced with new.
 - .2 Subject new equipment/systems to specified start-up procedures.

1.14 START-UP DOCUMENTATION

- .1 Assemble start-up documentation and submit to Departmental Representative for approval before commencement of commissioning.
- .2 Start-up documentation to include:
 - .1 Factory and on-site test certificates for specified equipment.
 - .2 Pre-start-up inspection reports.
 - .3 Signed installation/start-up check lists.
 - .4 Start-up reports,
 - .5 Step-by-step description of complete start-up procedures, to permit Departmental Representative to repeat start-up at any time.

1.15 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS

- .1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.
- .2 With assistance of manufacturer develop written maintenance program and submit Departmental Representative for approval before implementation.
- .3 Operate and maintain systems for length of time required for commissioning to be completed.
- .4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.

1.16 TEST RESULTS

- .1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.
- .2 Provide manpower and materials, assume costs for re-commissioning.

1.17 START OF COMMISSIONING

- .1 Notify Departmental Representative at least 21 days prior to start of Cx.
- .2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

1.18 INSTRUMENTS / EQUIPMENT

- .1 Submit to Departmental Representative for review and approval:
 - .1 Complete list of instruments proposed to be used.
 - .2 Listed data including, serial number, current calibration certificate, calibration date, and calibration expiry date and calibration accuracy.
- .2 Provide the following equipment as required:
 - .1 2-way radios.
 - .2 Ladders.
 - .3 Equipment as required to complete work.

1.19 COMMISSIONING PERFORMANCE VERIFICATION

- .1 Carry out Cx:
 - .1 Under actual operating conditions, over entire operating range, in all modes.
 - .2 On independent systems and interacting systems.
- .2 Cx procedures to be repeatable and reported results are to be verifiable.
- .3 Follow equipment manufacturer's operating instructions.
- .4 EMCS trending to be available as supporting documentation for performance verification.

1.20 WITNESSING COMMISSIONING

- .1 Departmental Representative to witness activities and verify results.

1.21 AUTHORITIES HAVING JURISDICTION

- .1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, 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.
- .3 Provide copies to Departmental Representative within 5 days of test and with Cx report.

1.22 COMMISSIONING CONSTRAINTS

- .1 Since access into secure or sensitive areas will be very difficult after occupancy it is necessary to complete Cx of occupancy, weather, and seasonal sensitive equipment and systems in these areas before issuance of the Interim Certificate, using, if necessary, simulated thermal loads.

1.23 EXTRAPOLATION OF RESULTS

- .1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by Departmental Representative in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

1.24 EXTENT OF VERIFICATION

- .1 Laboratory areas:
 - .1 Provide manpower and instrumentation to verify up to 100 % of reported results.
- .2 Elsewhere:
 - .1 Provide manpower and instrumentation to verify up to 30 % of reported results, unless specified otherwise in other sections.
- .3 Number and location to be at discretion of Departmental Representative
- .4 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.
- .5 Review and repeat commissioning of systems if inconsistencies found in more than 20% of reported results.
- .6 Perform additional commissioning until results are acceptable to Departmental Representative

1.25 REPEAT VERIFICATIONS

- .1 Assume costs incurred by Departmental Representative for third and subsequent verifications where:
 - .1 Verification of reported results fail to receive Departmental Representative's approval.
 - .2 Repetition of second verification again fails to receive approval.
 - .3 Departmental Representative deems Contractor's request for second verification was premature.

1.26 SUNDRY CHECKS AND ADJUSTMENTS

- .1 Make adjustments and changes which become apparent as Cx proceeds.
- .2 Perform static and operational checks as applicable and as required.

1.27 DEFICIENCIES, FAULTS, DEFECTS

- .1 Correct deficiencies found during start-up and Cx to satisfaction of Departmental Representative
- .2 Report problems, faults or defects affecting Cx to Departmental Representative in writing. Stop Cx until problems are rectified. Proceed with written approval from Departmental Representative

1.28 COMPLETION OF COMMISSIONING

- .1 Upon completion of Cx leave systems in normal operating mode.
- .2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.
- .3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Departmental Representative

1.29 ACTIVITIES UPON COMPLETION OF COMMISSIONING

- .1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

1.30 TRAINING

- .1 In accordance with Section 01 91 41 - Commissioning (Cx) - Training].

1.31 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

- .1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

1.32 OCCUPANCY

- .1 Cooperate fully with Departmental Representative during stages of acceptance and occupancy of facility.

1.33 INSTALLED INSTRUMENTATION

- .1 Use instruments installed under Contract for TAB and PV if:
 - .1 Accuracy complies with these specifications.
 - .2 Calibration certificates have been deposited with Departmental Representative
- .2 Calibrated EMCS sensors may be used to obtain performance data provided that sensor calibration has been completed and accepted.

1.34 PERFORMANCE VERIFICATION TOLERANCES

- .1 Application tolerances:
 - .1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/- 10% of specified values.
- .2 Instrument accuracy tolerances:
 - .1 To be of higher order of magnitude than equipment or system being tested.
- .3 Measurement tolerances during verification:
 - .1 Unless otherwise specified actual values to be within +/- [2] % of recorded values.

1.35 OWNER'S PERFORMANCE TESTING

- .1 Performance testing of equipment or system by Departmental Representative will not relieve Contractor from compliance with specified start-up and testing procedures.

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**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 Submittal Procedures
- .2 Section 01 78 00 Close out Submittals
- .3 Section 01 74 21 Construction/ Demolition Waste Management and Disposal
- .4 Section 01 91 13 General Commissioning (Cx) Requirements

1.2 INSTALLATION/START-UP CHECK LISTS

- .1 Include the following data:
 - .1 Product manufacturer's installation instructions and recommended checks.
 - .2 Special procedures as specified in relevant technical sections.
 - .3 Items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.
- .2 Equipment manufacturer's installation/start-up check lists are acceptable for use. As deemed necessary by Departmental Representative supplemental additional data lists will be required for specific project conditions.
- .3 Use check lists for equipment installation. Document check list verifying checks have been made, indicate deficiencies and corrective action taken.
- .4 Installer to sign check lists upon completion, certifying stated checks and inspections have been performed. Return completed check lists to Departmental Representative. Check lists will be required during Commissioning and will be included in the Operations and Maintenance Manual O&M at completion of project.
- .5 Use of check lists will not be considered part of commissioning process but will be stringently used for equipment pre-start and start-up procedures.

1.3 PRODUCT INFORMATION (PI) REPORT FORMS

- .1 Product Information (PI) forms compiles gathered data on items of equipment produced by equipment manufacturer, includes nameplate information, parts list, operating instructions, maintenance guidelines and pertinent technical data and recommended checks that is necessary to prepare for start-up and functional testing and used during operation and maintenance of equipment. This documentation is included in the BMM at completion of work.
- .2 Prior to Performance Verification (PV) of systems complete items on PI forms related to systems and obtain Departmental Representative's approval.

1.4 PERFORMANCE VERIFICATION (PV) FORMS

- .1 PV forms to be used for checks, running dynamic tests and adjustments carried out on equipment and systems to ensure correct operation, efficiently and function independently and interactively with other systems as intended with project requirements.
- .2 PV report forms include those developed by Contractor records measured data and readings taken during functional testing and Performance Verification procedures.

- .3 Prior to PV of integrated system, complete PV forms of related systems and obtain Departmental Representative's approval.

1.5 SAMPLES OF COMMISSIONING FORMS

- .1 Departmental Representative will develop and provide to Contractor required project-specific Commissioning forms in electronic format complete with specification data.
- .2 Revise items on Commissioning forms to suit project requirements.
- .3 Samples of Commissioning forms and a complete index of produced to date will be attached to this section.

1.6 CHANGES AND DEVELOPMENT OF NEW REPORT FORMS

- .1 When additional forms are required, but are not available from Departmental Representative develop appropriate verification forms and submit to Departmental Representative for approval prior to use.
 - .1 Additional commissioning forms to be in same format as provided by Departmental Representative.

1.7 COMMISSIONING FORMS

- .1 Use Commissioning forms to verify installation and record performance when starting equipment and systems.
- .2 Strategy for Use:
 - .1 Departmental Representative provides Contractor project-specific Commissioning forms and CMMS Forms with Specification data included.
 - .2 Contractor will provide required shop drawings information and verify correct installation and operation of items indicated on these forms.
 - .3 Confirm operation as per design criteria and intent.
 - .4 Identify variances between design and operation and reasons for variances.
 - .5 Verify operation in specified normal and emergency modes and under specified load conditions.
 - .6 Record analytical and substantiating data.
 - .7 Verify reported results.
 - .8 Form to bear signatures of recording technician and reviewed and signed off by Departmental Representative.
 - .9 Submit immediately after tests are performed.
 - .10 Reported results in true measured SI unit values.
 - .11 Provide Departmental Representative with originals of completed forms.
 - .12 Maintain copy on site during start-up, testing and commissioning period.
 - .13 Forms to be both hard copy and electronic format with typed written results in Building Management Manual in accordance with Section 01 91 51 - Building Management Manual (BMM).

1.8 LANGUAGE

- .1 Commissioning forms to be completed in English and French.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 CMMS COMPUTERIZED MAINTENANCE MANAGEMENT SYSTEMS FORMS**

- .1 Complete a CMMS form for each item of mechanical and electrical equipment specified in Divisions 10, 23, 25, 26, 28 in excel format in English and French. Sample of the CMMS form is attached on the next page titled "EQUIPMENT INFORMATION FORM-CMMS". The Departmental Representative will provide the excel template to the successful bidder.
- .1 Submit a list of the existing equipment to be removed with submittals requested under Section 01 74 21 CONSTRUCTION/DEMOLITION WASTE MANAGEMENT AND DISPOSAL
- .2 Submit completed CMMS forms for new equipment upon application for certificate of Substantial Completion.

EQUIPMENT INFORMATION FORM - CMMS

Building ID / Name <input type="text"/>			Project Number <input type="text"/>	Project Name <input type="text"/>
Equipment Description <input type="text"/>			Replaces Equipment Number <input type="text"/>	
Equipment Group <input type="text"/>			Supplier <input type="text"/>	Purchase Price <input type="text"/>
Equipment Category <input type="text"/>			Model Number <input type="text"/>	Manufacturer <input type="text"/>
Unit <input type="text"/>			Serial Number <input type="text"/>	Purchase Date <input type="text"/>
Parent Equipment Number <input type="text"/>			Certification Expiry <input type="text"/>	Installation Date <input type="text"/>
Location ("Floor #"- "Room #"- "Section/Wing") <input type="text"/>			Est. Service Life (YRS) <input type="text"/>	Warranty Expiry Date <input type="text"/>
Location (Specific Details) <input type="text"/>			Is Equipment Regulated ? <input type="checkbox"/> Yes <input type="checkbox"/> No	Tenant Owned <input type="checkbox"/> Yes <input type="checkbox"/> No

Electrical Specifications		Mechanical Specifications		Fire Suppression		Environmental	
Volts <input type="text"/>	HP <input type="text"/>	C.F.M./G.P.M. <input type="text"/>	Capacity <input type="text"/>	Type <input type="text"/>	<input type="checkbox"/> Refrigerant <input type="checkbox"/> Glycol		
Amps or KVA <input type="text"/>	RPM <input type="text"/>	Belts Size <input type="text"/>	Belts Quantity <input type="text"/>	Capacity (kg/lbs) <input type="text"/>	Type <input type="text"/>	Capacity <input type="text"/>	ton/kw <input type="text"/>
Phases <input type="text"/>	# Circuit (Panels) <input type="text"/>	Pre-Filters Size <input type="text"/>	Pre-Filters Quantity <input type="text"/>	Actuation Type (Auto/Man) <input type="text"/>	Storage Tanks <input type="checkbox"/> 1 Ext. Above ground <input type="checkbox"/> Double Wall		
Fuse size <input type="text"/>	Fuse Quantity <input type="text"/>	Main Filters Size <input type="text"/>	Main Filters Quantity <input type="text"/>	Sprinkler System/ <input type="text"/>	<input type="checkbox"/> 2 Ext. Underground <input type="checkbox"/> Berm		
Seasonal Maintenance Start: <input type="text"/> Finish: <input type="text"/>				Year of Installation <input type="text"/>	<input type="checkbox"/> 3 Interior		
				Capacity <input type="text"/>	Litres <input type="text"/>		
				Fuel Type <input type="text"/>			

Deleted Equipment

Equipment Number	Reason / Justification

Notes/Comments/Additional Info

Submitted by: (Print Name)**Date**

Preventive Maintenance Set Up

Frequency	Required	Job Plan No	Schedule Date
	Yes		Month / Year
Weekly	<input type="checkbox"/>		
Monthly	<input type="checkbox"/>		
Quarterly	<input type="checkbox"/>		
Semi-Annual	<input type="checkbox"/>		
Annual	<input type="checkbox"/>		
	<input type="checkbox"/>		
	<input type="checkbox"/>		
	<input type="checkbox"/>		
Warranty	<input type="checkbox"/>		

CMMS Use Only

<input type="checkbox"/> Equipment Created	<input type="checkbox"/> Schedule Created
<input type="checkbox"/> Equipment added to List	<input type="checkbox"/> Equipment Replaced
<input type="checkbox"/> EITO	Yes N/A
Equipment No. Label Provided	<input type="checkbox"/> <input type="checkbox"/>
Warranty Card Provided	<input type="checkbox"/> <input type="checkbox"/>

CMMS Use Only

Entered in E1:

Date:

END OF SECTION

Part 1 General**1.1 TRAINEES**

- .1 Trainees: personnel selected for operating and maintaining this facility. Includes PropertyManager, building operators, maintenance staff, security staff, and technical specialists as required.
- .2 Trainees will be available for training during later stages of construction for purposes of familiarization with systems.

1.2 INSTRUCTORS

- .1 Departmental Representative will provide:
 - .1 Descriptions of systems.
 - .2 Instruction on design philosophy, design criteria, and design intent.
- .2 Contractor and certified factory-trained manufacturers' personnel: to provide instruction on the following:
 - .1 Start-Up, operation, shut-down of equipment, components and systems.
 - .2 Control features, reasons for, results of, implications on associated systems of, adjustment of set points of control and safety devices.
 - .3 Instructions on servicing, maintenance and adjustment of systems, equipment and components.
- .3 Contractor and equipment manufacturer to provide instruction on:
 - .1 Start-up, operation, maintenance and shut-down of equipment they have certified installation, started up and carried out PV tests.

1.3 TRAINING OBJECTIVES

- .1 Training to be detailed and duration to ensure:
 - .1 Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.
 - .2 Effective on-going inspection, measurements of system performance.
 - .3 Proper preventive maintenance, diagnosis and trouble-shooting.
 - .4 Ability to update documentation.
 - .5 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

1.4 TRAINING MATERIALS

- .1 Instructors to be responsible for content and quality.
- .2 Training materials to include:
 - .1 "As-Built" Contract Documents.
 - .2 Operating Manual.
 - .3 Maintenance Manual.

- .4 Management Manual.
- .5 TAB and PV Reports.
- .3 Departmental Representative and Commissioning Manager and Property Manager will review training manuals.
- .4 Training materials to be in a format that permits future training procedures to same degree of detail.
- .5 Supplement training materials:
 - .1 Transparencies for overhead projectors.
 - .2 Multimedia presentations.
 - .3 Manufacturer's training videos.
 - .4 Equipment models.

1.5 SCHEDULING

- .1 Include in Commissioning Schedule time for training.
- .2 Deliver training during regular working hours, training sessions to be 3 hours in length.
- .3 Training to be completed prior to acceptance of facility.

1.6 RESPONSIBILITIES

- .1 Be responsible for:
 - .1 Implementation of training activities,
 - .2 Coordination among instructors,
 - .3 Quality of training, training materials,
- .2 Upon completion of training, provide written report, signed by Instructors, witnessed by Departmental Representative.

1.7 TRAINING CONTENT

- .1 Training to include demonstrations by Instructors using the installed equipment and systems.
- .2 Content includes:
 - .1 Review of facility and occupancy profile.
 - .2 Functional requirements.
 - .3 System philosophy, limitations of systems and emergency procedures.
 - .4 Review of system layout, equipment, components and controls.
 - .5 Equipment and system start-up, operation, monitoring, servicing, maintenance and shut-down procedures.
 - .6 System operating sequences, including step-by-step directions for starting up, shut-down, operation of valves, dampers, switches, adjustment of control settings and emergency procedures.
 - .7 Maintenance and servicing.
 - .8 Trouble-shooting diagnosis.
 - .9 Inter-Action among systems during integrated operation.

- .10 Review of O M documentation.
- .3 Provide specialized training as specified in relevant Technical Sections of the construction specifications.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION