

1.1 DESCRIPTION OF .1
WORK

In general, the work of this contract is to complete a renovation to the MacKenzie Building at the Canadian Coast Guard College in Sydney, Nova Scotia, where the Marine Communication and Traffic Services (MCTS) call center is located. This project will provide a new space on level 300 for MCTS, including addition to stairwell and a new elevator. The work shall include, but is not limited to, the supply and installation of all products, services, labour, materials and equipment required to complete the project. In general, work under this contract is to consist of:

.1 Relocate existing culvert on West side of the building.

.2 Remove two existing deciduous trees on the West side of the building.

.3 Excavation (including breaking and removal of bedrock if required), backfilling and compacting of engineered fill where required for foundations.

.4 Supply and installation of concrete foundation footings and walls including reinforcing for the vestibule and elevator shaft.

.5 Slab on grade, welded wire fabric reinforcing and underslab granular layer.

.6 Supply and installation of concrete elevator and sump pits. Sump pit to include a gas tight custom framed cover.

.7 Concrete block walls including reinforcing and grout for block walls where indicated.

.8 Supply and installation of concrete pads and associated reinforcing at exterior doors.

.9 Sealing and finishing of all concrete slab-on-grades, interior and exterior.

.10 Supply and installation of timber wall framing and prefabricated timber trusses, including roof and floor sheathing.

.11 Removal and replacement of existing floor sheathing in an isolated area.

.12 Miscellaneous steel framing.

.13 A new hydraulic passenger elevator.

.14 A new vestibule.

.15 A new masonry elevator shaft.

.16 New stairs between Level 200 and 300 and elevator pit ladder.

.17 A new weather-tight building envelope system for new additions to the building.

.18 New windows at locations indicated on drawings.

1.1 DESCRIPTION OF WORK
(Cont'd)

(Cont'd)
.19 New interior and exterior doors at locations indicated on drawings.
.20 New Door Hardware
.21 Roofing assemblies over new construction.
.22 Exterior openings for Mechanical penetrations.
.23 Miscellaneous metals.
.24 New interior partitions as indicated on drawings.
.25 New interior floor, wall and ceiling finishes as indicated on drawings.
.26 Interior countertops, cabinets and finish carpentry.
.27 Firestopping and smoke seals.
.28 Interior and exterior mechanical work including heating, ventilation, air conditioning, controls, plumbing and fire protection.
.29 Interior and exterior electrical work including supply and installation of lighting, power service, fire alarm and service to mechanical and electrical equipment.
.30 Commissioning, warranties, maintenance manuals and record drawings.

.2 Site of Work is located at: Canadian Coast Guard College, 1190 Westmount Road, Sydney, Nova Scotia, B1R 2J6.

1.2 FAMILIARIZATION WITH SITE

Before submitting a bid, it is recommended that bidders visit the site to review and verify the form, nature and extent of the work, materials needed, the means of access and the temporary facilities required to perform the Work.

1.3 CODES AND STANDARDS

- .1 Perform work in accordance with the 2010 National Building Code of Canada and any other code of provincial or local application, including all amendments up to bid closing date, provided that in any case of conflict or discrepancy, the more stringent requirement shall apply.
- .2 Materials and workmanship must meet or exceed requirements of specified standards, codes and referenced documents.

1.4 INTERPRETATION
OF DOCUMENTS

- .1 Supplementary to the Order of Precedence article of the General Conditions of the Contract, the Division 01 sections take precedence over the technical specification sections in other Divisions of the Specification Manual.

1.5 TERM ENGINEER

- .1 Unless specifically stated otherwise, the term Engineer where used in the Specifications and on the Drawings shall mean the Departmental Representative as defined in the General Conditions of the Contract.

1.6 SETTING OUT
WORK

- .1 Contractor will set stakes to define location, alignment and elevations of work. Give Departmental Representative reasonable notice of construction layout requirements.
- .2 Contractor will provide only those survey control points and set such stakes as necessary to define general location, alignment and elevations of work. Give Departmental Representative reasonable notice of requirements for such control points and stakes.
- .3 Set grades and lay out work in detail from control points and grades established by Contractor.
- .4 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .5 Provide devices needed to lay out and construct work.
- .6 Supply such devices as straight edges and templates required to facilitate Departmental Representative's inspection of work.
- .7 Supply stakes and other survey markers required for laying out work.

1.7 COST BREAKDOWN

- .1 Before submitting first progress claim submit breakdown of Contract price in detail as directed by Departmental Representative and aggregating contract price. Required forms will be provided for application of progress payment.
- .2 List items of work numerically following the same division/section number system of the specification manual and thereafter sub-divide into major work components and building systems as directed by Departmental Representative.
- .3 Upon approval, cost breakdown will be used as basis for progress payment.

1.8 DOCUMENTS
REQUIRED

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract Drawings
 - .2 Specifications
 - .3 Addenda
 - .4 Reviewed Shop Drawings
 - .5 List of outstanding shop drawings
 - .6 Change Orders
 - .7 Other modifications to Contract
 - .8 Field Test Reports
 - .9 Copy of Approved Work Schedule
 - .10 Health and Safety Plan and other safety related documents
 - .11 Other documents as stipulated elsewhere in the Contract Documents.

1.9 PERMITS

- .1 In accordance with the the General Conditions, obtain and pay for building permit, certificates, licenses and other permits as required by municipal, provincial and federal authorities.
- .2 Provide appropriate notifications of project to municipal and provincial inspection authorities.
- .3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.

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| 1.9 PERMITS
(Cont'd) | .4 | Submit to Departmental Representative, copy of application forms and approval documents received from above referenced authorities. |
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| 1.10 ALTERATIONS,
ADDITIONS OR
REPAIRS TO EXISTING
BUILDING | .1 | Execute work with least possible interference or disturbance to building operations occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work. |
| | .2 | Where security has been reduced by work of Contract, provide temporary means to maintain security. |
| | .3 | Where elevators, dumbwaiters, conveyors or escalators exist in building, only those assigned for Contractor's use may be used for moving workers and material within building. Protect walls of passenger elevators, to approval of Departmental Representative prior to use. Accept liability for damage, safety of equipment and overloading of existing equipment. |
| | .4 | Provide temporary dust screens, barriers, warning signs in locations where renovation and alteration work is adjacent to areas which will be operative during such work. |
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| 1.11 ROUGHING-IN | .1 | Be responsible for obtaining manufacturer's literature and for correct roughing-in and hook-up of equipment, fixtures and appliances. |
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| 1.12 CUTTING,
FITTING AND
PATCHING | .1 | Ensure that cutting and patching required by all trades is included in total bid price submitted for the work. |
| | .2 | Execute cutting, including excavation, fitting and patching required to make work fit properly. |
| | .3 | Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work. This includes patching of openings in existing work resulting from removal of existing services. |
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| 1.12 CUTTING,
FITTING AND
PATCHING
(Cont'd) | .4 | Do not cut, bore, or sleeve load-bearing members, except where specifically approved by Departmental Representative. |
| | .5 | Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly. |
| | .6 | Fit work airtight to pipes, sleeves ducts and conduits. |
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| 1.13 CONCEALMENT | .1 | Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise. |
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| 1.14 LOCATION OF
FIXTURES | .1 | Location of equipment, fixtures and outlets, shown or specified shall be considered as approximate. Actual location shall be as required to suit conditions at time of installation and as is reasonable. |
| | .2 | Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance. |
| | .3 | Inform Departmental Representative when impending installation conflicts with other new or existing components. Follow directives for actual location. |
| | .4 | Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative. |
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| 1.15 EXISTING
SERVICES | .1 | Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to pedestrian, vehicular traffic,tenant operations. |
| | .2 | Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings. |
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1.15 EXISTING
SERVICES
(Cont'd)

- .3 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. This includes disconnection of electrical power and communication services to tenant's operational areas. Adhere to approved schedule and provide notice to affected parties.
- .4 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.
- .5 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .6 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .7 Protect, relocate or maintain existing active services as required. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction over service. Record locations of maintained, re-routed and abandoned service lines.

1.16 BILINGUAL
NOTATIONS

- .1 Any items supplied and installed under this contract which have operating instructions on them such as door hardware, washroom accessories, push button activation controls powered hand dryers, mechanical equipment such as water coolers, etc., and which can be expected to be used by the public and building tenants, must have such operating instructions in bilingual format - English and French.
- .2 Factory embossed or recessed symbols illustrating equipment operation is an acceptable alternate to lettering.
- .3 Items supplied with factory - embossed or recessed lettering in one official language with an applied sticker or decal representing the second official language is not acceptable unless the Departmental Representative gives prior approval before any such items are ordered.

1.16 BILINGUAL
NOTATIONS
(Cont'd)

- .4 Internationally recognized colour coding such as red and blue center pieces for plumbing brass is acceptable.
- .5 No extra costs will be paid for re-stocking or re-ordering of materials and equipment due to Contractor's failure to fully meet bilingual signage requirements specified herein.
- .6 Ensure that all trades are made aware of above requirements.

1.17 BUILDING
SMOKING
ENVIRONMENT

- .1 Comply with smoking restrictions.

1.18 ASBESTOS
DISCOVERY

- .1 Demolition of spray or trowel-applied asbestos can be hazardous to health. Should material resembling spray or trowel-applied asbestos be encountered in course of work, stop work and notify Departmental Representative immediately. Do not proceed with relevant work until written instructions have been received from Departmental Representative.

1.19 CONTRACTOR'S
SITE OFFICE

- .1 Office space adjacent to the work site will be provided to the contractor for their use at no cost. Contractor to ensure space is kept clean and returned to CCGC in same condition. Contractor to provide own equipment. There is no space available for site trailer. Space can be made for tool crib if requested.

1.1 SUBMITTALS

- .1 Upon acceptance of bid and prior to commencement of work, submit to Departmental Representative the following work management documents:
 - .1 Work Schedule as specified herein.
 - .2 Shop Drawing Submittal Schedule specified in section 01 33 00
 - .3 Waste Management Plan specified in section 01 74 21
 - .4 Environmental Plan specified in section 01 35 43
 - .5 Health and Safety Plan specified in section 01 35 29
 - .6 Hot Work Procedures specified in section 01 35 24
 - .7 Lockout Procedures specified in section 01 35 25
 - .8 Dust Control Plan specified in section 01 50 00.
 - .9 List of workers requiring security clearance and those to be placed on Site Security Control list as specified in section 01 35 54.
 - .10 Project cost breakdown.

1.2 WORK SCHEDULE

- .1 Upon acceptance of bid submit:
 - .1 Detailed work schedule within 7 calendar days of contract award.
- .2 Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.
- .3 Provide sufficient details in schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.
- .4 Work schedule content to include as a minimum the following:
 - .1 Bar (GANTT) Charts, indicating all work activities, tasks and other project elements, their anticipated durations, planned dates for achieving key activities and major project milestones supported with;
 - .2 Written narrative on key elements of work illustrated in bar chart, providing sufficient details to demonstrate a reasonable

1.2 WORK SCHEDULE
(Cont'd)

- .4 (Cont'd)
- .2 (Cont'd)
- implementation plan for completion of project within designated time.
- .3 Generally Bar Charts derived from commercially available computerized project management system are preferred but not mandatory.
- .5 Work schedule must take into consideration and reflect the work phasing, required sequence of work, special conditions and operational restrictions as specified below and indicated on drawings.
- .6 Schedule work in cooperation with the Departmental Representative. Incorporate within Work Schedule, items identified by Departmental Representative during review of schedule.
- .7 Completed schedule shall be approved by Departmental Representative. When approved, take necessary measures to complete work within scheduled time. Do not change schedule without Departmental Representative's approval.
- .8 Ensure that all subtrades and subcontractors are made aware of the work restraints and operational restrictions specified.
- .9 Schedule Updates:
- .1 Submit on a when requested by Departmental Representative.
- .2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.
- .3 Identify problem areas, anticipated delays, impact on schedule and proposed corrective measures to be taken.
- .10 Departmental Representative will make interim reviews and evaluate progress of work based on approved schedule. Frequency of such reviews will be as decided by Departmental Representative. Address and take corrective measures on items identified by reviews and as directed by Departmental Representative. Update schedule accordingly.
- .11 In every instance, change or deviation from the Work Schedule, no matter how minimal the

- 1.2 WORK SCHEDULE (Cont'd) .11 (Cont'd)
risk or impact on safety or inconvenience to tenant or public might appear, will be subject to prior review and approval by the Departmental Representative.
- 1.3 PROJECT PHASING .1 Contractor is to develop a construction schedule with Departmental Representative prior to performing work. Be aware that Facility and tenants must be kept operational for the full duration of work of this contract. Building services to areas under use by tenants must also be maintained at all times during the Facility's operational hours and as specifically defined in operational restrictions specified in this section.
- 1.4 OPERATIONAL RESTRICTIONS .1 The Contractor must recognize that building occupants will be affected by implementation of this contract. The Contractor must perform the work with utmost regard to the safety and convenience of building occupants and users. All work activities must be planned and scheduled with this in mind. The Contractor will not be permitted to disturb any portion of the building without providing temporary facilities as necessary to ensure safe and direct passage through disturbed or otherwise affected areas.
- .2 Contractor to meet with the Departmental Representative on a weekly basis to identify intended work areas, activities and scheduling for the coming week.
- .3 Canadian Coast Guard College operates 24 hours a day, 7 days a week and 365 days a year. The campus houses classrooms, faculty and administration offices, residences, laboratories, food services, recreation facilities and marine facilities. In addition, the Canadian Coast Guard operates a Marine Communication and Traffic Service center on the campus, providing essential vessel safety services for the Gulf of St. Lawrence. Classroom hours are generally 8am until 4pm, Monday to Friday, excluding Statutory holidays. Shutdowns of any systems that impact operations of the campus must be scheduled and

1.4 OPERATIONAL
RESTRICTIONS
(Cont'd)

- .3 (Cont'd)
approved by the Departmental Representative two weeks in advance so that notices to CCGC staff and students can be circulated. Shutdowns will generally be scheduled to occur after 5 pm and before 7 am on weekdays or anytime on weekends. Schedules must be updated weekly. Contractors' schedules will be circulated to CCGC security and DFO by PWGSC when approved as notice of work anticipated for the following two weeks. To assure that construction work may proceed productively without risk to safety of building occupants and the public, and due to the nature of the tenant's operation be aware that certain work of this contract must be carried out during "Off-Hours".
- .4 Off Hours: means a period of time which is outside the daily operational hours of the tenants of the Facility. For the purposes of this contract, Off-Hours are defined as follows:
.1 Weeknight Off-Hours: between the hours of 17:00 and 07:00 for each weekday Monday to Thursday inclusive.
.2 Weekend Off-Hours: between the hours of 17:00 Friday evening to 07:00 Monday morning.
.3 Dependent on the nature and location of the construction activity and due to an unanticipated operational requirement of the Tenant, certain off-hour periods may be redefined by adjusting the start and end time periods or cancellation of a specific off-hour workshift during the course of the Work.
- .5 The following work shall be performed during Off-Hours:
.1 Work which requires the use of products controlled by WHMIS and for which MSDS sheets indicate toxic or hazardous materials requiring special handling and application procedures;
.2 Use of materials having high solvent content or other content emitting strong noxious fumes or odours;
.3 Cleaning and preparing of occupied areas for daytime use by tenants immediately following an off-hour workshift;
.4 Work within a tenant occupied area including corridors, stairwells and other circulation routes under use;

1.4 OPERATIONAL
RESTRICTIONS
(Cont'd)

- .5 (Cont'd)
 - .5 Work which requires the temporary disconnection of power and communication services to occupied areas;
 - .6 Testing of fire alarms and other emergency annunciating system;
 - .7 Work which creates excessive noise or vibration creating interference with tenant operations.
- .6 Departmental Representative reserves the right to stop certain daytime work activities, if the nature of that activity generates excessive noise or dust and have Contractor re-schedule that particular work to be performed during the Off-Hour period.
- .7 Ensure that all trades are aware of the "Off-Hour" requirements of this contract and ensure that any extra costs incurred as a result is included in the Contractor's bid price for the work. No extra cost will be paid due to failure by General Contractor or his sub-contractors to recognize the off-hour requirements and other restrictions specified herein and to include all necessary allowances within their bids.
- .8 See section 01 35 54 in regards to:
 - .1 Special security requirements which must be observed in the course of work.
 - .2 Provision of security personnel by Contractor as part of the Work.
- .9 Facility circulation maintained:
 - .1 Ensure that entrances, corridors, stairwells, fire exits and other circulation routes are maintained free and clear providing safe and uninterrupted passage for Facility users and public at all times during the entire work.
 - .2 Maintain those areas clean and free of construction materials and equipment. Provide temporary dust barriers and other suitable enclosures to ensure users are not exposed to construction activities and are protected from exposure to dust, noise and hazardous conditions.
 - .3 Maintain fire escape routes accessible and fire fighting access open all times for the duration of the project.
 - .4 Do not under any circumstances block fire exit doors. Do not leave construction

1.4 OPERATIONAL
RESTRICTIONS
(Cont'd)

- .9 Facility circulation maintained:(Cont'd)
 - .4 (Cont'd)
materials or debris in corridors, stairwells
building entrances and exits.
- .10 Safety Signage:
 - .1 Provide on site, and erect as required during progress of work, proper bilingual signage, mounted on self-supporting stands, warning the public and building occupants of construction activities in progress and alerting need to exercise caution in proceeding through disturbed areas of the facility, and directing building occupants through any detours which may be required.
 - .2 Signage to be professionally printed and mounted on wooden backing, coloured and to express messages as directed by the Departmental Representative.
 - .3 Generally maximum size of sign should be in the order of 1.0 square meters. Number of signs required will be dependent on number of areas in facility under renovation at any one time.
 - .4 Include costs for the supply and installation of these signs in the bid price.
- .11 Dust and Dirt Control:
 - .1 See section 01 50 00 and 01 74 11 for dust control and cleaning requirements.
 - .2 Effectively plan and implement dust control measures and cleaning activities as an integral part of all construction activities. Review all measures with the Departmental Representative before undertaking work, especially for major dust generating activities.
 - .3 Do not allow demolition debris and construction waste to accumulate on site and contribute to the propagation of dust.
 - .4 As work progresses, maintain construction areas in a tidy condition at all times. Remove gross dust accumulations by cleaning and vacuuming immediately following the completion of any major dust generating activity.
 - .5 Immediately remove all debris and dust from within occupied areas as generated by work therein during a given workshift.
 - .6 Disconnect and seal-off ductwork of HVAC servicing the construction area to stop spread of dust into other areas of Facility.

1.4 OPERATIONAL
RESTRICTIONS
(Cont'd)

- .11 Dust and Dirt Control:(Cont'd)
- .7 Avoid situations and practises which results in dust and dirt being brought from the construction areas or from the exterior and tracked inside the building into occupied areas used by tenants and the public.
- .8 Stop workers with soiled footwear from entering building. This includes roofing mechanics and heavy civil workers.
- .9 Inform workers and make them sensitive to the need for dust and dirt control. Stringently enforce rules and regulations, immediately address non-compliance.
- .10 Keep access doors to work areas closed at all times. Use only designated doors for entry or egress.
- .12 Work in Occupied Areas:
- .1 Where work must be carried out in an occupied area beyond the boundaries of the enclosed construction site, perform such work during the non-operational off-hour periods of the Facility.
- .2 Ensure that all dust, dirt, debris, construction waste, materials, tools and equipment are completely removed at the end of each "off-hour" workshift. Clean and reinstate area ready for daytime use by tenant.
- .3 Provide temporary dust barriers around immediate work areas and place fabric drop sheets over workstations, equipment and other furnishings located immediately adjacent to such work.
- .4 Conduct work in such a way as to minimize the creation of dust and to avoid contaminating areas beyond the immediate location.
- .5 Discuss and obtain Departmental Representative's approval beforehand on the type and extent of dust barriers, protective devices and measures needed.
- .6 Be responsible for temporarily moving office furnishings, workstations, computer equipment and other objects as needed to gain access and conduct work. Reinstall all dislocated items at end of each workshift making the area operational again.
- .7 Disconnect and reconnect any power and communications systems feeding workstations as required.
- .8 Clean such areas as well as those corridors and routes used to gain entry and access.
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1.4 OPERATIONAL
RESTRICTIONS
(Cont'd)

- .13 Cleaning of tenant occupied areas used by Contractor:
- .1 Clean lobbies, corridors, stairs and other circulation routes used by workers to gain access to work by conducting cleaning, vacuuming and washing of floors, walls and other soiled surfaces.
 - .2 Meager attempts at controlling dust and ineffective unprofessional cleaning procedures will not be tolerated.
 - .3 Failure to provide effective dust control, allowing construction dust and dirt to escape beyond construction areas and contaminate occupied areas and building circulation areas will result in Contractor being ordered to immediately provide professional cleaning services without delay to remedy the situation and conduct all cleaning to the extent as determined by Departmental Representative. Alternatively, Departmental Representative may, at certain times and at own discretion, obtain the services of an independent building cleaning agency when cleaning being provided by Contractor is ineffective or tardy in response. Costs of such services will be charged against Contractor in the form of financial penalties or holdback assessments against the Contract.
- .14 Ensure that all sub-trades are made aware of and abide by the contents of this section and in particular the work restrictions specified herein due to tenant operational requirements.

1.5 PROJECT MEETINGS

- .1 Schedule and administer project meetings, held on a minimum weekly basis, for entire duration of work and more often when directed by Departmental Representative as deemed necessary due to progress of work or particular situation.
- .2 Prepare agenda for meetings.
- .3 Notify participants in writing 4 days in advance of meeting date.
- .1 Ensure attendance of all subcontractors.
 - .2 Departmental Representative will provide list of other attendees to be notified.

1.5 PROJECT MEETINGS.4
(Cont'd)

Hold meetings at project site or where approved by Departmental Representative.

- .5 Preside at meetings and record minutes.
 - .1 Indicate significant proceedings and decisions. Identify action items by parties.
 - .2 Distribute to participants by mail or by facimile within 3 calendar days after each meeting.
 - .3 Make revisions as directed by Departmental Representative.
 - .4 Departmental Representative will advise whether submission of minutes by Email is acceptable. Decision will be based on compatibility of software among participants.

1.6 WORK
COORDINATION

- .1 The General Contractor is responsible for coordinating the work of the various trades and predetermining where the work of such trades interfaces with each other.
 - .1 Designate one person from own employ having overall responsibility to review contract documents and shop drawings, plan and manage such coordination.
- .2 The General Contractor shall convene meetings between trades whose work interfaces and ensure that they are fully aware of the areas and the extent of where interfacing is required.
 - .1 Provide each trade with the plans and specs of the interfacing trade, as required, to assist them in planning and carrying out their respective work.
 - .2 Develop coordination drawings when deemed required illustrating potential interference between work of various trades and distribute to all affected parties including structural trade.
 - .1 Pay particularly close attention to overhead work above ceilings and within or near to building structural elements.
 - .2 Coordination drawings to identify all building elements, services lines, rough-in points and indicate from where various services are coming.
 - .3 Review coordination drawings at purposely called meetings. Have subcontractors sign-off on drawings and publish minutes of each meeting.

1.6 WORK
COORDINATION
(Cont'd)

- .2 (Cont'd)
 - .4 Plan and coordinate work in such a way to minimize quantity of service line offsets.
 - .5 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.
- .3 Submission of shop drawings and ordering of prefabricated equipment or prebuilt components shall only occur once coordination meeting for such items has taken place between trades and all conditions affecting the work of the interfacing trades has been made known and accounted for.
- .4 Work Cooperation:
 - .1 Ensure cooperation between trades in order to facilitate the general progress of the work and avoid situations of spatial interference.
 - .2 Ensure that each trade provides all other trades reasonable opportunity for the completion of the work and in such a way as to prevent unnecessary delays, cutting, patching and the need to remove and replace completed work.
- .5 No extra costs to the Contract will be considered by the Departmental Representative as a result of Contractor's failure to effectively coordinate all portions of the Work. Disputes between the various trades as a result of their not being informed of the areas and extent of interface work shall be the sole responsibility of the General Contractor to be resolved at own cost.

1.7 OTHER CONTRACTS

- .1 Another contract will be in progress at the site during the course of this work.
- .2 The project title and subject matter of these contracts are:
 - .1 Electrical Distribution System Replacement (1A).
- .3 The General Contractor is to be determined.
- .4 Further contracts may be let during the period that this contract is in progress.

1.7 OTHER CONTRACTS .5
(Cont'd)

Cooperate with other Contractors in carrying out their respective works and carry out all instructions from the Departmental Representative in this regard.

- .6 Connect properly and coordinate work with that of other Contractors, if required. If any part of the work under this Contract depends for its proper execution or result upon the work of another Contractor, report promptly to the Departmental Representative, in writing, any defects in the work of such other Contractors as may interfere with the proper of this work.

1.1 RELATED
SECTIONS

- .1 Section 01 45 00 - Testing and Quality Control.
- .2 Section 01 78 00 - Closeout Submittals.

1.2 SUBMITTAL
GENERAL REQUIREMENTS

- .1 Submit to Departmental Representative for review requested submittals specified in various sections of the specifications including shop drawings, samples, permits, compliance certificates, test reports, work management plans and other data required as part of the work.
- .2 Submit with reasonable promptness and in orderly sequence so as to allow for Departmental Representative's review and not cause delay in Work. Failure to submit in ample time will not be considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed.
- .3 Do not proceed with work until relevant submissions have been reviewed.
- .4 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .5 Where items or information is not produced in SI Metric units, provide soft converted values.
- .6 Review submittals prior to submission. Ensure that necessary requirements have been determined and verified and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents.
 - .1 Submittals not stamped, signed, dated and identified as to specific project will be returned unexamined by Departmental Representative and considered rejected.
- .7 Verify field measurements and affected adjacent Work are coordinated.
- .8 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

1.2 SUBMITTAL
GENERAL REQUIREMENTS
(Cont'd)

- .9 Contractor's responsibility for errors, omissions or deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative's review.
- .10 Submittal format: a project SharePoint site is being developed by PWGSC for DFO. Shop Drawings, Submittals, schedules, record drawings, commissioning reports, etc., will be uploaded by the contractor to the site, for review and approvals by designers, PWGSC resources and DFO personnel. Non-legible submittals or facsimiles will not be accepted and be returned for resubmission. Electronic submittals are to be in Portable Document Format (PDF). Each submission is to be issued as a separate file. PDF submittals to be generated at a suitable scanned resolution so that it can be read easily and interpreted without ambiguity. Optimize the file size to allow for reasonable electronic transmission while maintaining clarity at the drawing.
- .11 Make changes or revision to submissions which Departmental Representative may require, consistent with Contract Documents and resubmit as directed by Departmental Representative. When resubmitting, identify in writing of any revisions other than those requested.
- .12 Keep one reviewed copy of each submittal document on site for duration of Work.

1.3 SHOP DRAWINGS
AND PRODUCT DATA

- .1 The term "shop drawings" means fabrication drawings, erection drawings, diagrams, illustrations, schedules, performance charts, technical product data, brochures, specifications, test reports installation instructions and other data which are to be provided by Contractor to illustrate compliance with specified materials and details of a portion of work.
- .2 Shop Drawing Quantities:
 - .1 Ensure sufficient hard copies are printed to enable one complete set to be included in each of the maintenance manuals specified in 01 78 00.

1.3 SHOP DRAWINGS .3
AND PRODUCT DATA
(Cont'd)

Shop Drawings Format:

.1 Opaque white scans of drawings, in PDF of original drawings or standard drawings to clearly illustrate work specific to project requirements. Maximum sheet size to be 1000 x 707 mm. PDF to be scanned at a resolution so that it can be easily interpreted.

.2 Product Data from manufacturer's standard catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products, to be original full colour brochures, clearly marked indicating applicable data and deleting information not applicable to project. Scans are acceptable.

.3 Non or poorly legible drawings, files, scans, photocopies or facsimiles will not be accepted and returned not reviewed.

.4 Shop Drawings Content:

.1 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where items or equipment attach or connect to other items or equipment, confirm that all interrelated work has been coordinated, regardless of section or trade from which the adjacent work is being supplied and installed.

.2 Supplement manufacturer's standard drawings and literature with additional information to provide details applicable to project.

.3 Delete information not applicable to project on all submittals.

.4 Equipment installation/start-up data: include manufacturer's recommended installation instructions, pre-start and start-up checklists for those pieces of equipment and systems designated to be commissioned as specified in section 01 91 13.

.5 Allow 14 calendar days for Departmental Representative's review of each submission.

.6 Adjustments or corrections made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, advise Departmental Representative in writing prior to proceeding with Work.

1.3 SHOP DRAWINGS .7
AND PRODUCT DATA
(Cont'd)

- If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections and comments are made, fabrication and installation may proceed upon receipt of shop drawings. If shop drawings are rejected and noted to be Resubmitted, do not proceed with that portion of work until resubmission and review of corrected shop drawings, through same submission procedures indicated above.
- .8 Be advised that costs and expenses incurred by Departmental Representative to conduct more than one review of incorrectly prepared shop drawing submittal for a particular material, equipment or component of work may be assessed against the Contractor in the form of a financial holdback to the Contract.
- .9 Accompany each submission with transmittal letter, in duplicate, containing:
- .1 Date.
 - .2 Project title and project number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .10 Submissions shall include:
- .1 Date and revision dates.
 - .2 Project title and project 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 Cross references to particular details of contract drawings and specifications section number for which shop drawing submission addresses.
 - .6 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.

1.3 SHOP DRAWINGS
AND PRODUCT DATA
(Cont'd)

- .10 Submissions shall include:(Cont'd)
- .6 (Cont'd)
- .6 Standards.
- .7 Operating weight.
- .8 Wiring diagrams.
- .9 Single line and schematic diagrams.
- .10 Relationship to adjacent work.
- .11 After Departmental Representative's review, distribute copies.
- .12 The review of shop drawings by the Departmental Representative or by an authorized Consultant or designate is for sole purpose of ascertaining conformance with general concept. This review shall not mean that the client approves the detail design inherent in the 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 all requirements of the construction and Contract Documents. 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 all sub-trades.

1.4 SAMPLES

- .1 Submit for review samples as specified in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples to Departmental Representative's office or to other address as directed. Do not drop off samples at construction site except for pre-approved circumstances previously approved 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.

1.4 SAMPLES
(Cont'd)

- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments will result in a cost increase to the Contract notify Departmental Representative in writing 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.

- 1.1 RELATED WORK .1 Section 01 35 29 Health and Safety Requirements
- 1.2 REFERENCES .1 Fire Protection Standards issued by Fire Protection Services, Labour Program Division of Service Canada:
.1 FCC No. 301-June 1982 Standard for Construction Operations.
.2 FCC No. 302-June 1982 Standard for Welding and Cutting.
.2 FCC standards may be viewed at:
.1 <http://www.hrsdc.gc.ca/en/lp/lo/fp/standards/commissioner.shtml>
.2 Fire Protection Services - Atlantic Region office, Halifax, N.S, Tel. (902) 426-6053.
- 1.3 DEFINITIONS .1 Hot Work defined as:
.1 Welding work
.2 Cutting of materials by use of torch or other open flame devices
.3 Grinding with equipment which produces sparks.
.4 Use of open flame torches such as for roofing work.
- 1.4 SUBMITTALS .1 Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within 14 calendar days of acceptance of bid.
.2 Submit in accordance with section 01 33 00.
- 1.5 FIRE SAFETY REQUIREMENTS .1 Implement and follow fire safety measures during Work. Comply with following:
.1 National Fire Code.
.2 Fire Protection Standards FCC 301 and FCC 302.
.3 Federal and Provincial Occupational Health and Safety Acts and Regulations.
.2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise
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- 1.5 FIRE SAFETY REQUIREMENTS (Cont'd)
- .2 (Cont'd)
in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.
- 1.6 HOT WORK AUTHORIZATION
- .1 Obtain Departmental Representative's written "Authorization to Proceed" before conducting any form of Hot Work on site.
- .2 To obtain authorization submit to Departmental Representative:
- .1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.
 - .2 Description of the type and frequency of Hot Work required.
 - .3 Sample Hot Work Permit to be used.
- .3 Upon review and confirmation that effective fire safety measures will be implemented and followed during performance of hot work, Departmental Representative will give authorization to proceed as follows:
- .1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
 - .2 Subdivide the work into pre-determined, individual activities, each activity requiring a separately written authorization to proceed.
- .4 Requirement for individual authorization will be based on:
- .1 Nature or phasing of work;
 - .2 Risk to Facility operations;
 - .3 Quantity of various trades needing to perform hot work on project or;
 - .4 Other situation deemed necessary by Departmental Representative to ensure fire safety on premises.
- .5 Do not perform any Hot Work until receipt of Departmental Representative's written "Authorization to Proceed" for that portion of work.
- .6 In tenant occupied Facility, coordinate performance of Hot Work with Facility Manager through the Departmental Representative. When directed, perform Hot Work only during non-operative hours of the Facility. Follow

1.6 HOT WORK
AUTHORIZATION
(Cont'd)

- .6 (Cont'd)
Departmental Representative's directives in this regard.

1.7 HOT WORK
PROCEDURES

- .1 Develop and implement safety procedures and work practises to be followed during the performance of Hot Work.
- .2 Hot Work Procedures to include:
- .1 Requirement to perform hazard assessment of site and immediate work area beforehand for each hot work event in accordance with Safety Plan specified in section 01 35 29.
 - .2 Use of a Hot Work Permit system with individually issued permit by Contractor's Superintendent to worker or subcontractor granting permission to proceed with Hot Work.
 - .3 Permit required for each Hot Work event.
 - .4 Designation of a person on site as a Fire Safety Watcher responsible to conduct a fire safety watch for a minimum duration of 60 minutes immediately following the completion of the Hot Work.
 - .5 Compliance with fire safety codes, standards and occupational health and safety regulations specified.
 - .6 Site specific rules and procedures in force at the site as provided by the Facility Manager.
- .3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Label document as being the Hot Work Procedures for this contract.
- .4 Procedures shall clearly establish responsibilities of:
- .1 Worker performing hot work,
 - .2 Person issuing the Hot Work Permit,
 - .3 Fire Safety Watcher,
 - .4 Subcontractor(s) and Contractor.
- .5 Brief all workers and subcontractors on Hot Work Procedures and of Permit system. Stringently enforce compliance.

1.8 HOT WORK
PERMIT

- .1 Hot Work Permit to include the following:
- .1 Project name and project number;
 - .2 Building name and specific room or area where hot work will be performed;
 - .3 Date of issue;
 - .4 Description of hot work type needed;
 - .5 Special precautions to be followed, including type of fire extinguisher needed;
 - .6 Name and signature of permit issuer.
 - .7 Name of worker to which the permit is issued.
 - .8 Permit validity period not to exceed 8 hours. Indicate start time/date and termination time/date.
 - .9 Worker's signature with time/date of hot work completion.
 - .10 Stipulated time period of safety watch.
 - .11 Fire Safety Watcher's signature with time/date.
- .2 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.
- .3 Each Hot Work Permit to be completed in full, signed and returned to Contractor's Superintendent for safe keeping on site.

1.9 FIRE PROTECTION.
AND ALARM SYSTEMS

- .1 Fire protection and alarm systems shall not be:
- .1 Obstructed.
 - .2 Shut-off, unless approved by Departmental Representative.
 - .3 Left inactive at the end of a working day or shift.
- .2 Do not use fire hydrants, standpipes and hose systems for purposes other than fire fighting.
- .3 Costs incurred, from the fire department, Facility owner resulting from negligently setting off false alarms will be charged to the Contractor in the form of financial progress payment reductions and holdback assessments against the Contract.
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|---------------------------|----|--|
| 1.10 DOCUMENTS
ON SITE | .1 | Keep Hot Work Permits and Hazard assessment documentation on site for duration of Work. |
| | .2 | Upon request, make available to Departmental Representative or to authorized safety Representative for inspection. |

1.1 RELATED WORK

- .1 Section 01 35 29: Health and Safety

1.2 REFERENCES

- .1 CSA C22.1-2012 - Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
- .2 CAN/CSA C22.3 No.1-2010 - Overhead Systems.
- .3 CSA C22.3 No.7-2010 - Underground Systems.
- .4 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

1.3 DEFINITIONS

- .1 Electrical Facility: means any system, equipment, device, apparatus, wiring, conductor, assembly or part thereof that is used for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy, and that has an amperage and voltage that is dangerous to persons.
- .2 Guarantee of Isolation: means a guarantee by a competent person in control or in charge that a particular facility or equipment has been isolated.
- .3 De-energize: in the electrical sense, that a piece of equipment is isolated and grounded, e.g. if the equipment is not grounded, it cannot be considered de-energized (DEAD).
- .4 Guarded: means that an equipment or facility is covered, shielded, fenced, enclosed, inaccessible by location, or otherwise protected in a manner that, to the extent that is reasonably practicable, will prevent or reduce danger to any person who might touch or go near such item.
- .5 Isolate: means that an electrical facility, mechanical equipment or machinery is separated or disconnected from every source of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making it dangerous.
-

1.3 DEFINITIONS
(Cont'd)

- .6 Live/alive: means that an electrical facility produces, contains, stores or is electrically connected to a source of alternating or direct current of an amperage and voltage that is dangerous or contains any hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous to persons.

1.4 COMPLIANCE
REQUIREMENTS

- .1 Comply with the following in regards to isolation and lockout of electrical facilities and equipment:
.1 Canadian Electrical Code
.2 Federal and Provincial Occupational Health and Safety Acts and Regulations.
.3 Regulations and code of practise as applicable to mechanical equipment or other machinery being de-energized.
.4 Procedures specified herein.
- .2 In event of conflict between any provisions of above authorities the most stringent provision will apply.

1.5 SUBMITTALS

- .1 Submit copy of lockout procedures, sample of lockout permit and lockout tags proposed for use in accordance with Section 01 33 00. Submit within 14 calendar days of acceptance of bid.

1.6 ISOLATION OF
EXISTING SERVICES

- .1 Obtain Departmental Representative's written authorization prior to working on existing live or active electrical facilities and equipment and before proceeding with isolation of such item.
- .2 To obtain authorization, submit to Departmental Representative the following documentation:
.1 Written request to isolate the particular service or facility and;
.2 Copy of Contractor's Lockout Procedures.
- .3 Make a Request for Isolation for each event, unless directed otherwise by Departmental Representative, as follows:
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1.6 ISOLATION OF
EXISTING SERVICES
(Cont'd)

- .3 (Cont'd)
 - .1 Fill-out standard form in current use at the Facility as provided by Departmental Representative or;
 - .2 Where no form exist, make written request indicating:
 - .1 The equipment, system or service to be isolated and it's location;
 - .2 Duration of isolation period (ie: start time & date and completion time & date).
 - .3 Voltage of service feed to system or equipment being isolated.
 - .4 Name of person making the request.
 - .4 Do not proceed with isolation until receipt of written notification from Departmental Representative granting the Isolation Request and authorizing to proceed with the work.
 - .1 Note that Departmental Representative may designate another person at the Facility being authorized to grant the Isolation Request.
 - .5 Conduct safe, orderly shut down of equipment or facility. De-energize, isolate and lockout power and other sources of energy feeding the equipment or facility.
 - .6 Determine in advance, as much as possible, in cooperation with the Departmental Representative, the type and frequency of situations which will require isolation of existing services.
 - .7 Plan and schedule shut down of existing services in consultation with the Departmental Representative and the Facility Manager. Minimize impact and downtime of Facility operations. Follow Departmental Representative's directives in this regard.
 - .8 Conduct hazard assessment as part of the process in accordance with health and safety requirements specified Section 01 35 29.

1.7 LOCKOUTS

- .1 De-energize, isolate and lockout electrical facility, mechanical equipment and machinery from all potential sources of energy prior to working on such items.

1.7 LOCKOUTS
(Cont'd)

- .2 Develop and implement clear and specific lockout procedures to be followed as part of the Work.
- .3 Prepare typed written Lockout Procedures describing safe work practices, procedures, worker responsibilities and sequence of activities to be followed on site by workforce to safely isolate an active piece of equipment or electrical facility and effectively lockout and tagout it's sources of energy.
- .4 Include as part of the Lockout Procedures a system of lockout permits managed by Contractor's Superintendent or other qualified person designated by him/her as being "in-charge" at the site.
 - .1 A lockout permit will be issued to specific worker providing a Guarantee of Isolation before each event when work must be performed on a live equipment or electrical facility.
 - .2 Duties of person managing the permit system to include:
 - .1 Issuance of permits and lockout tags to workers.
 - .2 Determining permit duration.
 - .3 Maintaining record of permits and tags issued.
 - .4 Making a Request for Isolation to Departmental Representative when required as specified above.
 - .5 Designating a Safety Watcher, when one is required based on type of work.
 - .6 Confirming equipment or facility has been properly isolated.
 - .7 Collecting and safekeeping lockout tags returned by workers as a record of the event.
- .5 Clearly establish, describe and allocate responsibilities of:
 - .1 Workers.
 - .2 Person managing the lockout permit system.
 - .3 Safety Watcher.
 - .4 Subcontractor(s) and General Contractor.
- .6 Generic procedures, if used, must be edited and supplemented with pertinent information to reflect specific project requirements.
 - .1 Incorporate site specific rules and procedures in force at site as provided by

1.7 LOCKOUTS
(Cont'd)

- .6 (Cont'd)
 - .1 (Cont'd)
Facility Manager through the Departmental Representative.
 - .2 Clearly label the document as being the Lockout procedures applicable to work of this contract.
- .7 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.
- .8 Use industry standard lockout tags.
- .9 Provide appropriate safety grounding and guards as required.

1.8 CONFORMANCE

- .1 Brief all workers and subcontractors on requirements of this section. Stringently enforce use and compliance.

1.9 DOCUMENTS
ON SITE

- .1 Post Lockout Procedures on site in common location for viewing by workers.
- .2 Keep copies of Request for Isolation forms and lockout permits and tags issued to workers on site for full duration of Work.
- .3 Upon request, make available to Departmental Representative or to authorized safety Representative for inspection.

- | | | |
|--|----|---|
| <u>1 GENERAL</u> | .1 | Perform all the Work activities in accordance with the applicable occupational health and safety legislation and the conditions set forth in the Master Health and Safety Plan found in Appendix A. |
| <u>2 REFERENCES</u> | .1 | Province of Nova Scotia, Occupational Health and Safety Act S.N.S. 1996, including latest amendments, and all regulations pursuant of this Act. |
| | .2 | Master Health and Safety Plan (See Appendix A) |
| | .3 | Canada Labour Code, Part2,including all regulations pursuant to the Code. |
| <u>3 ACTION AND INFORMATIONAL SUBMITTALS</u> | .1 | Make submittals in accordance with Section 01 33 00 - Submittal Procedures. |
| | .2 | Submit a site-specific (Assignment) Health and Safety Plan. The extent of the Plan will be in accordance with conditions set forth in the MHASP based on the designation of the scale of the Project (Reference Section 00 21 13, Sub Section 15. Health and Safety Designation of Project Scale. For projects deemed to be large scale, the Plan must be submitted fifteen (15) days prior to commencement of site work. For projects deemed to be "small scale", the Plan must be submitted five (5) days prior to commencement of site work. The Health and Safety Plan must include: <ul style="list-style-type: none"> .1 Results of a site specific safety assessment of the hazards anticipated to be encountered. .2 The corrective actions to be implemented by the Contractor to mitigate the hazards identified. .3 Roles and responsibilities of on-site personnel specific to health and safety, particularly the Health and Safety Coordinator. .4 Details of the Contractors emergency response plan. .5 Details of Personal Protective Equipment to be used. |

3 ACTION AND
INFORMATIONAL
SUBMITTALS
(Cont'd)

- .2 (Cont'd)
 - .6 Provision for supervision of employees by a competent person.
 - .7 Provisions for training of employees.
 - .8 Identification of critical or hazardous tasks
 - .9 Provisions for regular workplace inspections.
 - .10 Provisions for incident reporting and investigations.
 - .11 Provisions for safety meetings.
 - .12 Name of Contractor's designated Health and Safety Representative.
 - .13 Details of the Contractors On-site Commutations Plan, as it related to the sharing of work related safety information to workers, subcontractors, and where applicable facility personnel.
 - .3 Submit one (1) copy of Contractor's site health and safety inspection reports to the Departmental Representative on a daily basis.
 - .4 Submit to the Departmental Representative copies of reports or directions issued by Provincial health and safety officers within 24 hours.
 - .5 Submit copies of incident reports to the Departmental Representative within 24 hours of occurrence.
 - .6 Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding training, use, handling, labeling, storage and disposal of hazardous materials and maintain(onsite) WHMIS MSDS - Material Safety Data Sheets for all controlled products taken to the site by the Contractor.
 - .7 The Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within five (5) days after receipt of plan. Revise the plan as deemed appropriate and resubmit plan to the Departmental Representative within three (3) days after receipt of comments Departmental Representative.
 - .8 The 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
-

3 ACTION AND
INFORMATIONAL
SUBMITTALS
(Cont'd)

- .8 (Cont'd)
responsibility for construction Health and Safety.
- .9 The Departmental Representative makes no representation and provides no warranty for the accuracy, completeness and legislative compliance of the Health and Safety Plan.
- .10 Responsibilities for errors and omissions in the Health and Safety Plan is not relieved by review of Health and Safety Plan by Departmental Representative.
- .11 Submit the name of the person assigned to the role of Health and Safety Coordinator along with the qualifications of this person.
- .12 Submit all building permits, compliance certificates and other permits required.
- .13 Submit proof of coverage from the Nova Scotia Worker Compensation Board (Worksafe Nova Scotia).

4 FILING
OF NOTICE

- .1 File any necessary "Notice of Project" with the applicable Provincial and Municipal authorities prior to beginning of Work. Permits required by the above parties will be obtained at the Contractor's cost.

5 SAFETY
ASSESSMENT

- .1 Upon arriving on the site, prior to conducting Work activities, perform a site specific hazard assessment of the actual hazards related to project. This assessment must be submitted to the Departmental Representative within 24 hours of completion.
 - .2 The Contractor will be provided with information on hazards within the facility that are not readily apparent. Such information is to be incorporated into the hazard assessment noted above. Information provided to the Contractor will not be construed as being complete and inclusive of the potential health and safety hazards encountered during Work.
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5 SAFETY ASSESSMENT (Cont'd)	.3	Material Safety Data Sheets of pertinent hazardous and controlled products stored by the Owner on the site will be provided upon request.
6 MEETINGS	.1	Schedule and administer a Health and Safety meeting with the Departmental Representative prior to commencement of Work.
	.2	Conduct an orientation meeting with employees assigned to the site, outlining the site specific health and safety issues. Document this meeting and submit documentation to the Departmental Representative within 24 hours of occurrence.
	.3	Conduct daily safety briefings (toolbox talks) with their employees. Such meeting will be documented and made available to the Departmental Representative within 24 hours of occurrence.
7 REGULATORY COMPLIANCE	.1	Comply with the requirements contained in the Nova Scotia Occupational Health and Safety Act, and all regulations pursuant to the Act.
	.2	Comply with the requirements of the Federal and Provincial Transportation of Dangerous Goods (TDG) Act and Regulations.
	.3	Comply with the requirements of the Canada Labour Code, Part II and Regulations, where the requirements are more stringent than those of the province of Nova Scotia.
	.4	Observe and comply with a construction safety measures set forth in Part 8 of the National Building Code.
8 GENERAL REQUIREMENTS	.1	Implement appropriate measures of site control that adequately defines their work zone and provides the physical barricading necessary to prevent unauthorized access and prevent the migration of potentially harmful components and/or compounds from the work zone. Appropriate measures to include fencing, barricade, warning signage.

8 GENERAL
REQUIREMENTS
(Cont'd)

- .2 Implement a system for incident reporting and investigations. The following events require mandatory reporting to the Departmental Representative within 24 hours of occurrence:
 - .1 Work related fatality.
 - .2 Injury or illness requiring first aid or medical attention.
 - .3 Fire, explosion or electrical flash.
 - .4 Property damage in excess of \$1000.
 - .5 Incidents resulting in, or that could result in an investigation by a regulatory agency.
 - .6 Near Misses.
- .3 Provide the Departmental Representative with all documents requested to support regulatory compliance within 24 hours of the request being made.
- .4 Provide a safety orientation to persons granted access to the work site.
- .5 Confirm and monitor persons granted access to the work site wear the prescribed PPE.
- .6 Secure the work site against entry during times of inactivity to protect persons against harm. This may include the use of security guards where adequate protection cannot be achieved by other means.

9 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conducting of work.
- .2 Comply with and enforce compliance by their employees and subcontractors with the safety requirements of Contract Documents, applicable regulations, ordinances, and with the site-specific Health and Safety Plan.
- .3 Develop site specific rules designed to aid in employee, facility personnel and public protection and implement a disciplinary process designed to correct employee behavior where safety infractions have occurred

10 UNFORESEEN
HAZARDS

- .1 When an unforeseen or peculiar safety-related factor, hazard, or condition occurs during performance of work, stop Work and reassess the work method to ensure the safety and health of their employees, and that of facility users and facility employees. Where unforeseen hazards occur, the Departmental Representative will have the right to request the Contractor review and potentially amend their submitted health and safety Plan to address unforeseen hazards.

11 HEALTH AND
SAFETY CO-ORDINATOR

- .1 Employ a Health and Safety Coordinator who will be on site full time and be responsible for the implementation and monitoring of the Health and Safety program and will have the authority to implement health and safety changes. The Health and Safety Coordinator will be given authority to stop and start the work when, in the Health and Safety Coordinator's discretion, it is necessary or advisable for reasons of health and safety. The Health and Safety Coordinator must:
- .1 Have working knowledge of occupational safety and health regulations and the site related work being conducted.
 - .2 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.
 - .3 Be responsible for implementing, enforcing and monitoring the Contractor's Health and Safety Plan.
 - .4 Be on site during at all times during the execution of work. (Note: The Health and Safety Coordinator may perform other functions, provided such functions do not interfere with that of health and safety requirements.)
- .2 The Departmental Representative reserves the right to reject the Contractor's Health and Safety Coordinator should he/she be inadequately trained or that persons' other assigned duties create conflict in exercising the duties of the Health and Safety Coordinator.

<u>12 POSTING OF DOCUMENTS</u>	.1	Applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of the Province of Nova Scotia and in consultation with Departmental Representative.
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<u>13 CORRECTION OF NON-COMPLIANCE</u>	.1	Immediately address health and safety non-compliance issues identified by authority having jurisdiction, the Owner or by the Departmental Representative.
	.2	Provide the Departmental Representative with a written report of action taken to correct non-compliance of health and safety issues within 24 hours of notice of the non-compliance.
	.3	The Departmental Representative and/or the Owner may stop work if non-compliance of health and safety regulations is not corrected.
	.4	Periodic reviews of the Work may be carried out by the Departmental Representative to monitor compliance with the implementation of the Health and Safety Program. Inspections will include visual inspections as well as testing and sampling that may be required to ensure the highest possible level of health and safety at the site. The Departmental Representative will have the right to: <ul style="list-style-type: none"> .1 Demand a higher level of safety if, in the opinion of the Departmental Representative, it is deemed necessary. .2 Issue a stop work order immediately for any work which is considered, in the opinion of the Departmental Representative, to be an immediate danger to life and health (IDLH) or of imminent risk to the environment. .3 The Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns

<u>14 WORK STOPPAGE</u>	.1	Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
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15 POWDER	.1	Use of powder actuated devices requires
<u>ACTUATED DEVICES</u>		receipt of permission from the Departmental Representative.

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| <u>1.1 RELATED WORK</u> | .1 | Waste Management and Disposal: Section 01 74 21. |
| <u>1.2 DEFINITIONS</u> | .1 | Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment. |
| <u>1.3 FIRES</u> | .1 | Fires and burning of rubbish on site not permitted. |
| | .3 | Provide supervision, attendance and fire protection measures as directed. |
| <u>1.4 HAZARDOUS MATERIAL HANDLING</u> | .1 | Store and handle hazardous materials in accordance with applicable federal and provincial laws, regulations, codes and guidelines. Store in location that will prevent spillage into the environment |
| | .2 | Label containers to WHMIS requirements and keep MSDS data sheets on site for all hazardous materials. |
| | .3 | Maintain inventory of hazardous materials and hazardous waste stored on site. List items by product name, quantity and date when storage began. |
| | .4 | Store and handle flammable and combustible materials in accordance with National Fire Code. |
| | .5 | Transport hazardous materials in accordance with federal Transportation of Dangerous Goods Regulations and applicable Provincial regulations. |
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1.5 DISPOSAL OF
WASTES

- .1 Do not bury rubbish and waste materials on site. Dispose in accordance with project waste management requirements specified in section 01 74 21.
- .2 Do not dispose of hazardous waste or volatile materials, such as mineral spirits, paints, thinners, oil or fuel into waterways, storm or sanitary sewers or waste landfill sites.
- .3 Dispose of hazardous waste in accordance with applicable federal and provincial laws, regulations, codes and guidelines.

1.6 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with governing regulations and requirements.
- .4 Provide control devices such as filter fabrics, sediment traps and settling ponds to control drainage and prevent erosion of adjacent lands. Maintain in good order for duration of work.

1.7 SITE AND
PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.

1.7 SITE AND
PLANT PROTECTION
(Cont'd)

- .5 Restrict tree removal to areas indicated or designated by Departmental Representative.

1.8 WORK ADJACENT
TO WATERWAYS

- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material without Departmental Representative's approval.
- .3 Do not dump excavated fill, waste material or debris in waterways.
- .4 At borrow sites, design and construct temporary crossings to minimize erosion to waterways in strict conformance with provincial environmental regulations.
- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .7 Do not blast under water or 100 m of spawning beds.
- .8 Do not refuel any type of equipment within 100 meters of a water body. Maintain equipment in good working condition with no fluid leaks, loose hoses or fittings.

1.9 POLLUTION
CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment to local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide

1.9 POLLUTION
CONTROL
(Cont'd)

- .4 (Cont'd)
dust control for temporary roads and around
entire construction site.
- .5 Have appropriate emergency spill response
equipment and rapid clean-up kit on site
located adjacent to hazardous materials
storage area. Provide personal protective
equipment required for clean-up.
- .6 Report, spills of petroleum and other
hazardous materials as well as accidents
having potential of polluting the environment
to Federal and Provincial Department of the
Environment.
 - .1 Notify Departmental Representative and
submit a written spill report to Departmental
Representative within 24 hours of occurrence.

1.10 WILDLIFE
PROTECTION

- .1 Should nests of migratory birds in wetlands
be encountered during work, immediately notify
Departmental Representative for directives to
be followed.
 - .1 Do not disturb nest site and
neighbouring vegetation until nesting is
completed.
 - .2 Minimize work immediately adjacent to
such areas until nesting is completed.
 - .3 Protect these areas by following
recommendations of Canadian Wildlife Service.

1.1 GENERAL

- .1 Due to nature of this Facility, and client operations therein, security regulations pertaining to site will be in place during the work resulting in need for:
 - .1 Control and limit movement of construction workers at the site and inside the building; each day all contractors, sub-contractors, and delivery personnel will be required to sign in and sign out of the main security desk of Alert and receive an ID card.
 - .2 Escort and continuous supervision of workers by security personnel; DFO will provide and pay for security escorts for all interior work.
 - .3 Workers must undergo a security clearance process;
 - .4 Specific rules and regulations as specified in this section and as directed by the Departmental Representative to be stringently followed.
- .2 It is the Contractor's responsibility to:
 - .1 Submit necessary documentation required and obtain security clearances for all workers;
 - .2 Become familiar with and abide by security rules and regulations;
 - .3 Brief all workers and subcontractors in respect of the security regulations and ensure that they abide by all rules and directives.
- .3 The Departmental Representative will coordinate a pre-construction meeting between Contractor, Facility Management and Security Personnel who will provide details and directives on control and movement on site.
- .4 Any infraction of site security regulations on the part of the Contractor, members of work force or any Subcontractor in his employ, could result in:
 - .1 Financial penalties in the form of progress payment reduction or holdback assessments being levied against the Contractor and;
 - .2 Demand immediate removal of offending party from the site.

1.2 SECURITY
PERSONNEL

- .1 DFO will provide adn pay for security escorts (commissionaires) for all interior work.
- .2 One (1) Commissionaire to be on site at all times when work is carried out, having the following responsibilities:
 - .1 Limit movement of workers to within the boundaries established by the Departmental Representative for each work phase;
 - .2 Maintain security control list of workers authorized to be on site as determined by Contractor and the Departmental Representative;
 - .3 Manage the distribution and control of worker ID tags;
 - .4 Escort workers who need to circulate on site beyond the established boundaries of work, including the corridors, stairwells and elevators used for access to and from work areas.
 - .5 Escort and supervise short term visitors who need access to the work site such as for material deliveries or to conduct inspections.
- .3 Commissionaire(s) will be present on site for entire workshift including workbreaks and time period after workshifts until all workers have left site.
- .4 Commissionaire will stay within the actual construction area and provide surveillance of all workers ensuring that security rules and requirements are obeyed and to limit movement to approved work areas of site.
- .5 Commissionaire must also escort workers from approved entrance doors and work area(s).
- .6 Escort and supervision of workers by Commissionaire is required at all times regardless as to whether workshifts are in the daytime or during Facility off hours.
- .7 Commissionaire shall report directly to the Departmental Representative and to the Facility security personnel and ensure that site security directives are obeyed by all workers.
 - .1 Empower Commissionaire with authority to remove any worker deemed non-compliant with security directives.

1.3 SECURITY
CLEARANCE REQ'TS

- .1 All persons employed by Contractor or by subcontractors who will be working on site must undergo the following check:
 - .1 Apply for PWGSC personnel security clearance screening and obtain a Reliability Status.
- .2 Persons do not have security clearance, as specified above, will not be allowed to circulate freely in restricted areas of site and must be under constant escort and surveillance by security personnel.
 - .1 Restricted area defined as: interior of buildings and exterior areas of site.
- .3 Departmental Representative will advise when worker security clearance has been received and whether escort and supervision is still needed for any worker.
- .4 Escort and supervision functions specified herein is still required on the project after workers having obtained security clearance.

1.4 SECURITY
CLEARANCE APPLICATION

- .1 Within 1 week following notification of acceptance of bid, submit application form for all workers who require security clearance.
 - .1 Make application for all workers as one submission to facilitate processing and minimize delays.
- .2 To obtain the PWGSC Reliability Status clearance, the following information is required for each applicant:
 - .1 "Personnel Screening, Consent and Authorization Form" (Form No. TBS/SCT #330-23E (Rev. 2006/02) completed by each worker.
 - .2 Contractor Declaration to Public Works & Government Services Canada (PWGSC Security Form "A") completed by Contractor attesting to having conducted an assessment of reliability for each worker applicant verifying employment and other reference data.
 - .3 Proof of applicant's identity consisting of a picture ID such as a Canadian Motor Vehicle Driver's License or other similar official ID card.
 - .4 Proof of applicant's Canadian citizenship consisting of a provincial issued birth certificate, baptismal certificate, citizenship certificate or passport.

1.4 SECURITY .2
CLEARANCE APPLICATION
(Cont'd)

(Cont'd)

.5 Include both forms along with a clear legible photocopy of the citizenship and identity documents submitted as one complete package for each applicant.

- .3 Fingerprinting will also be required if:
- .1 Applicant indicates that he/she has a previous criminal conviction on Form #330-23E;
 - .2 Security clearance search process results in two persons with same identity and/or same name/initials, such as having the same name.

- .4 Departmental Representative will provide details as to what procedures, location and time where workers must go should fingerprints are needed.

- .5 Processing Time:
- .1 The PWGSC departmental processing time to obtain all security clearances is estimated to be 4 weeks from date of receipt of required documentation.
 - .2 To avoid delays, prepare worker documentation as soon as possible, however submit documentation for each applicant as one package and send information for entire workforce as one submission. Ensure forms are fully completed, signed and that all information and photo identification is clear and legible.
 - .3 Be aware that processing time for applicants with criminal convictions may take longer and could extend to 6 months duration.
 - .1 An interview with such applicant may also be required as part of the security clearance process.

- .6 Facilitate workers security clearance process as follows:
- .1 Prepare comprehensive list of workers who will require security clearance throughout project, including those of subcontractors.
 - .2 Provide copy of list to Departmental Representative.
 - .3 Coordinate and expedite submission of various subcontractors.
 - .4 Brief and assist applicants in preparing and submitting documentation.
 - .5 Review documentation of each applicant for completeness before submission.

1.4 SECURITY .6
CLEARANCE APPLICATION
(Cont'd)

(Cont'd)

.6 Have each worker keep a copy of their completed application form in case the initial submission gets lost.

.7 Submit documentation in an organized manner with transmittal letter clearly identifying project for which worker clearance is required.

.7 Send submission(s) directly to Departmental Representative or to the approved mailing address as directed by Departmental Representative.

.8 Persons who have not been successful in obtaining security clearance, upon documentation review by PWGSC, will not be allowed further access on site and cannot work on project any longer.

1.5 SECURITY PASSES .1

Visitor or worker ID Tags are required for all personnel requiring access.

.2 ID Tags will be provided by the Facility Security, issued to Contractor for distribution to authorized workers which shall also be placed on the Security Control List specified below.

.3 All persons while on site, must wear the ID Tag issued to him regardless of daytime or nighttime work.

.4 Be responsible to obtain ID Tags before work commences, including those required by subcontractors, and continually control their distribution and use by workers. Submit request for tags as early as possible prior to commencement of work.

.5 For the duration of this contract, anyone not in possession of the ID Tag will not be allowed access on site.

.6 At end of project, return to Departmental Representative all tags issued to workers and to subcontractors.

.1 The Departmental Representative will levy a financial penalty in the form of a holdback assessment against the Contract for

1.5 SECURITY PASSES .6
(Cont'd)

(Cont'd)
.1 (Cont'd)
each pass not returned regardless of the reason the pass is not returned.

- .7 Immediately report any lost, stolen or destroyed ID Tags to the Departmental Representative.

1.6 SECURITY
CONTROL LIST

- .1 Provide a list of employee names from workforce and from subcontractors who will be present at site during the course of work.
- .2 List to include each person's name, address and telephone number.
- .3 Submit copy of list to Departmental Representative and to Security Commissionaire for control of workers.
- .4 Update list as work progresses.
- .5 Ensure that each worker can provide proof of identity upon demand, when requested by Facility's Security Personnel, Departmental Representative or by Facility Management.

1.7 BUILDING ACCESS .1

- .1 Keys and door security access cards necessary for access to restricted areas may be issued at the discretion of the Departmental Representative. Follow all instructions in regards to use, care and disposition of all keys and access cards so issued.
- .2 Keys and security access cards given to the Commissionaire for his sole possession, as determined by Departmental Representative, shall not under any circumstances be given to any worker or subcontractor.
- .3 Do not, under any circumstances, make or allow workers to make duplicates of keys issued.
- .4 At end of project, return to Departmental Representative all keys and access cards issued. Departmental Representative will deduct from final contract payment, \$25.00 for

1.7 BUILDING ACCESS .4 (Cont'd)
 (Cont'd) each item not returned, regardless of the reason.

.5 Immediately report to Departmental Representative any lost, stolen or destroyed keys and door security access cards.

1.8 SITE SECURITY .1 Where work of this contract requires use of a permanently locked door, it is Contractor's responsibility to ensure that door is unlocked and locked after each use or provide a competent security guard, posted at door, when door must remain open for an elongated period of time during a particular workshift.
 .1 Notify Building Security or Departmental Representative when security doors will be used and stringently follow all directives to ensure building security is effectively maintained.

.2 Where work of this contract results in removal of doors or walls (providing security to the exterior or between spaces and suites), erect temporary security hoarding over openings constructed in such a way to provide the same degree of security as doors/walls removed.

.3 When work must be carried out during Off Hours or beyond the work hours previously agreed upon at start of work, provide notice within 48 hours beforehand to minimize impact on Facilit's security and tenant operations.

.4 Off Hours are defined in section 01 14 10.

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.

1.2 INSPECTION

- .1 Give timely notice requesting inspection of Work designated for special tests, inspections or approvals by Departmental Representative or by inspection authorities having jurisdiction.
- .2 In accordance with the General Conditions, Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.
- .3 If Contractor covers or permits to be covered Work designated for special tests, inspections or approvals before such is made, uncover Work until particular inspections or tests have been fully and satisfactorily completed and until such time as Departmental Representative gives permission to proceed.
- .4 Pay costs to uncover and make good work disturbed by inspections and tests.

1.3 TESTING

- .1 Tests on materials, equipment and building systems as specified in various sections of the Specifications is the responsibility of the Contractor except where stipulated otherwise.
 - .1 Provide all necessary instruments, equipment and qualified personnel to perform tests.
 - .2 At completion of tests, turn over 2 sets of fully documented tests reports to the Departmental Representative. Submit in accordance with Section 01 33 00.
 - .1 Obtain additional copies for inclusion of a complete set in each of the maintenance manuals specified in Section 01 78 00.
 - .3 Unspecified tests may also be made by Departmental Representative, at the discretion of the Departmental Representative. The costs of these tests will be paid for by the Departmental Representative.
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1.3 TESTING
(Cont'd)

.4 Where tests or inspections reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests and inspections incurred by Departmental Representative as required to verify acceptability of corrected work.

1.4 ACCESS TO WORK

.1 Facilitate Departmental Representative's access to Work. If part of Work is being fabricated at locations other than construction site, make preparations to allow access to such Work whenever it is in progress.

.2 Furnish labour and facility to provide access to the work being inspected and tested.

.3 Cooperate to facilitate such inspections and tests.

1.5 REJECTED WORK

.1 Remove and replace defective Work, whether result of poor workmanship, use of defective or damaged products and whether incorporated in Work or not, which has been identified by Departmental Representative as failing to conform to Contract Documents.

.2 Make good damages to new and existing construction and finishes resulting from removal or replacement of defective work.

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- 1.1 SITE ACCESS AND PARKING .1 The Departmental Representative will designate Contractor's access to project site as well as parking facilities for equipment and workers.
- .2 Maintain existing roads and parking areas at site, where used by Contractor, for duration of contract.
- .1 Keep clean and free of mud and dirt by washing on a regular basis.
- .2 Provide snow removal in areas located within construction site or enclosed by work.
- .3 Make good and repair damage resulting from Contractor's use of existing roads, asphalted areas and lawns on site.
- 1.2 BUILDING ACCESS .1 Use only access doors, and circulation routes and elevators within building as designated by Departmental Representative to access interior work.
- 1.3 CONTRACTOR'S SITE OFFICE .1 Space will be provided at the college for an on-site office and lunch room. Be responsible for and provide own site office, if required, including electricity, heat, lights and telephone. Locate site office as directed by Departmental Representative.
- 1.4 MATERIAL STORAGE.1 Material storage space on site is limited. Coordinate delivery to minimize storage period on site before being needed for incorporation into work.
- 1.5 SITE ENCLOSURES .1 Provide temporary fence to enclose various construction areas of work site.
- .2 Erect steel fence using new 1200 mm high galvanized steel wire fence fabric supported by steel posts spaced at maximum 2.4 m oc.
- .1 Provide one pedestrian gate.
- .2 Maintain fence in good repair.
- .3 Make all gates lockable and provide keyed padlocks.
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- 1.5 SITE ENCLOSURES (Cont'd)
- .4 Obtain Departmental Representative's approval beforehand of location and layout of all temporary fence enclosures.
 - .5 Provide battery powered lanterns around the perimeter of the site enclosure to clearly mark its location at night.
 - .6 Provide warning signs affixed to all fenced areas, identifying those enclosed areas as "Construction Zones" with access restricted to only those persons so authorized by General Contractor.
 - .7 Do not construe fencing as an acceptable replacement for pedestrian walkway and hoarding requirements specified below.
- 1.6 INTERIOR HOARDING
- .1 Erect hoarding inside building to isolate construction areas and protect occupants for duration of work.
 - .2 Construct hoarding as follows:
 - .1 Height: to underside of floor or roof above.
 - .2 Framing type: 92mm steel studs spaced at 400mm oc.
 - .3 Covering: 12 mm thick drywall sheathing.
 - .4 Sealed to abutting surfaces so that hoarding is dust tight and sound sealed. Provide acoustic insulation.
 - .5 Access Doors: two (2) quantity, steel, pedestrian doors, soundsealed,dust tight and lockable.
 - .6 Scribed to underside and profile of ceiling above.
- 1.7 INTERIOR DUST CONTROL AND DUST BARRIERS
- .1 Control creation and spread of dust and dirt to building interior and in particular to areas within premises still under use by occupants.
 - .2 Develop and implement a dust control plan, addressing effective measures to carry out work with least amount of dust being created and propagated.
 - .1 Carefully evaluate the type of work to be undertaken and the physical layout of each work area on site.
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1.7 INTERIOR DUST .2
CONTROL AND
DUST BARRIERS
(Cont'd)

(Cont'd)

.2 Provide specifically tailored strategy for each work area.

.3 Pre-determine location and placement of dust barriers to confine resulting dust to immediate work area.

.4 Inform Departmental Representative of the proposed dust control measures to be followed at each work area and for each major dust generating activities. Obtain Departmental Representative's approval before proceeding with work.

.3 Dust control plan to incorporate as a minimum the following dust protection and cleaning requirements:

.1 Erect dustproof partitions completely around work area to fully isolate construction from other parts of the building.

.2 Construct dust partitions as follows:

.1 Use 10 mm polyethylene installed and sealed tightly to abutting walls, ceilings and floor with continuous duct tape along all edges and seams. Support in position with 38 x 89 wood framing at 400 mm o.c. Locate seams only at framing members and overlap sheeting by minimum of 150 mm.

.2 Use 12 mm thick drywall installed to steel stud framing spaced at 400 o.c. for areas located in public and corridors in use by occupants

.1 Erect from floor to underside of ceiling above, sheeting applied to occupied side of partition. Install polyethylene for remainder of partition height to underside of floor/roof deck above.

.2 Scribe, cut and fit sheeting tight to shape of structural steel, deck profile and to other obstructions in ceiling space and abutting walls.

.3 Use compressable neoprene gaskets around perimeter of partition and at all protrusions to achieve airtight construction.

.4 Where partition is exposed to public view, tape and finish drywall joints and paint surface to color approved by the Departmental Representative.

1.7 INTERIOR DUST .3
CONTROL AND
DUST BARRIERS
(Cont'd)

(Cont'd)

.3 Provide a "dust tight" and lockable access door(s) within dust partition or between rooms for worker entry into work area. This is of particular importance for situations where excessive dust will be generated.

.4 Provide additional dust barriers, placed tightly to underside of the floor/roof deck above, in locations where existing walls are used as part of the dust barrier system but simply terminate at the finished ceiling level resulting in an open space above, or other similar condition, permitting dust to migrate beyond the construction areas.

.5 Make all dust barriers airtight, effectively blocking and stopping all dust migration.

.6 Inspect dust barriers at various intervals during each work shift. Immediately fix tears, unsealed edges and maintain barriers effectively sealed for the entire work duration.

.7 Shut down existing ventilation system feeding construction space, or disconnect and seal-off supply and return air ducts to stop dust from contaminating other areas.

.8 Immediately clean areas in use by occupants and public contaminated by work.

.1 Vacuum carpets, wash floors and walls. Remove accumulated dust from all surfaces. Clean and remove smears, scuffs and marks.

.4 Meager attempts at controlling dust will not be tolerated. Failure to provide effective dust control during work and to perform satisfactory cleaning thereafter will result in Departmental Representative to proceed and obtain a separate cleaning service agency to perform cleaning to tenant's satisfaction with cost for such services being charged against this Contract in the form of financial holdbacks.

.5 Obtain Departmental Representative's approval before erecting any dust partitions simply to underside of finish ceiling.

.6 Construction of dust barriers, enclosures and placement of temporary protective devices to be performed during Facility non-operational off-hour periods.

1.8 SANITARY
FACILITIES

- .1 Sanitary facilities are available at the site and may be used by Contractor's work force. Make arrangements for the use of such facilities through the Departmental Representative.

1.9 ENCLOSURE OF
STRUCTURE

- .1 Provide temporary weathertight enclosures and protection for exterior openings until permanently enclosed.
- .2 Provide weathertight and heated enclosures to conduct exterior work during winter and other inclement weather conditions. Erect to allow accessibility for installation of materials and working inside of enclosure.
- .3 Design enclosures to withstand wind pressure and snow loading.

1.10 POWER

- .1 Power supply is available and will be provided for construction usage at no cost.
 - .1 Make arrangements for the use of such services through the Departmental Representative.
- .2 Provide and pay all costs to supply and install temporary cabling, panelboards, switching devices and other equipment as required to connect into power source, provide adequate ground fault protection and extend power supply from existing source to work areas. Perform work and make all connections in accordance with the Canadian Electrical Code, in compliance with the federal and provincial Occupational Health and Safety Regulations as specified in section 01 35 29 and to lockout requirements specified in section 01 35 25.
- .3 Provide and maintain temporary lighting to conduct work. Ensure illumination level is not less than 162lx in all locations.
- .4 Electrical power and lighting systems installed under this Contract can be used for construction requirements provided that guarantees are not affected thereby. Make good damage. Replace lamps which have been used over period of 3 months.

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- 1.11 WATER SUPPLY .1 Water supply is available in existing building and will be provided for construction usage at no cost. Make arrangements for the use and transportation of such services to work area through the Departmental Representative.
- .2 Permanent water supply system installed under this Contract can be used for construction requirements provided that guarantees are not affected thereby. Make good damage.
- 1.12 SCAFFOLDING .1 Design, construct and maintain scaffolding in rigid, secure and safe manner in accordance with CAN/CSA-S269.2-M87(R2003).
- .2 Erect scaffolding independent of walls. Remove when no longer required.
- 1.13 HEATING AND VENTILATING .1 Supply, install and pay for costs of temporary heat and ventilation used during construction, including costs of installation, fuel, operation, maintenance and removal of equipment. Use of direct-fired heaters discharging waste products into work areas will not be permitted.
- .2 Provide temporary heat and ventilation in enclosed areas as required to:
- .1 Facilitate progress of work.
- .2 Protect work and products against dampness and cold.
- .3 Prevent moisture condensation on surfaces.
- .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
- .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .3 Maintain minimum temperature of 10 degrees C, or higher where specified, as soon as finishing work is commenced and maintain until acceptance of structure by Departmental Representative.
- .1 Maintain ambient temperature and humidity levels as required for comfort of office personnel.
-

1.13 HEATING AND
VENTILATING
(Cont'd)

- .4 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .5 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct-fired combustion units to outside.
- .6 Submit bid assuming existing equipment and systems will not be used for temporary heating and ventilating.
- .7 Upon acceptance of bid, Departmental Representative may permit use of permanent system providing agreement can be reached on:
 - .1 Conditions of use, special equipment, protection and maintenance.
 - .2 Saving on Contract price.
 - .3 Provisions relating to warranties on equipment.

1.14 CONSTRUCTION
SIGN AND NOTICES

- .1 Upon request by Departmental Representative, erect a self supporting project sign in location indicated.
- .2 Departmental Representative will provide a vinyl sign facing for installation by Contractor on sign framework. Sign frame to be plywood face of approximately 1200 x 2400 mm in

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- 1.14 CONSTRUCTION .2 (Cont'd)
SIGN AND NOTICES
(Cont'd)
- .3 size complete with required wood framing at
400 mm o.c and support posts.
- .4 Install sign plumb and level in neat wood
framework and securely anchor in ground by
posts to withstand wind pressure of 160 km/h.
- .4 Contractor or subcontractor advertisement
signboards are not permitted on site.
- .5 Safety and Instruction Signs and Notices:
.1 Signs and notices for safety and
instruction shall be in both official
languages or commonly understood graphic
symbols conforming to CAN3-Z321-96(R2006).
- .6 Maintenance and Disposal of Site Signs:
.1 Maintain approved signs and notices in
good condition for duration of project and
dispose of off site on completion of project
or earlier if directed by Departmental
Representative.
- 1.15 REMOVAL OF .1 Remove temporary facilities from site when
TEMPORARY
FACILITIES
-

1.1 GENERAL

- .1 Use new material and equipment unless otherwise specified.
- .2 Within 7 days of written request by Departmental Representative, submit following information for any materials and products proposed for supply:
 - .1 Name and address of manufacturer.
 - .2 Trade name, model and catalogue number.
 - .3 Performance, descriptive and test data.
 - .4 Compliance to specified standards.
 - .5 Manufacturer's installation or application instructions.
 - .6 Evidence of arrangements to procure.
 - .7 Evidence of manufacturer delivery problems or unforeseen delays.
- .3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.
- .4 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.
- .5 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.

1.2 PRODUCT QUALITY

- .1 Contractor shall be solely responsible for submitting relevant technical data and independent test reports to confirm whether a product or system proposed for use meets contract requirements and specified standards.
- .2 Final decision as to whether a product or system meets contract requirements rest solely with the Departmental Representative.

1.3 ACCEPTABLE
MATERIALS AND
ALTERNATIVES

- .1 Acceptable Materials: When materials specified include trade names or trade marks or manufacturer's or supplier's name as part of the material description, select and only use one of the names listed for incorporation into the Work.

1.3 ACCEPTABLE
MATERIALS AND
ALTERNATIVES
(Cont'd)

- .2 Alternative Materials: Submission of alternative materials to trade names or manufacturer's names specified must be done during the bidding period.
- .3 Substitutions: After contract award, substitution of a specified material will be dealt with as a change to the Work in accordance with the General Conditions of the Contract.

1.4 MANUFACTURERS
INSTRUCTIONS

- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods to be used. Do not rely on labels or enclosure provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing of any conflict between these specifications and manufacturers instructions, so that Departmental Representative will designate which document is to be followed.

1.5 AVAILABILITY

- .1 Immediately notify Departmental Representative in writing of unforeseen or unanticipated material delivery problems by manufacturer. Provide support documentation as per clause 1.1.2 above.

1.6 WORKMANSHIP

- .1 Ensure quality of work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.
- .2 Remove unsuitable or incompetent workers from site.
- .3 Ensure cooperation of workers in laying out work. Maintain efficient and continuous supervision on site at all times.
- .4 Coordinate work between trades and subcontractors. See section 01 14 10 in this regard.

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| 1.6 WORKMANSHIP
(Cont'd) | .5 | Coordinate placement of openings, sleeves and accessories. |
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| 1.7 FASTENINGS -
GENERAL | .1 | Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work and in humid areas. |
| | .2 | Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood or organic material plugs not acceptable. |
| | .3 | Keep exposed fastenings to minimum, space evenly and lay out neatly. |
| | .4 | Fastenings which cause spalling or cracking of material to which anchorage is made, are not acceptable. |
| | .5 | Do not use explosive actuated fastening devices unless approved by Departmental Representative. See section on Health and Safety Requirements in this regard. |
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|-------------------------------|----|--|
| 1.8 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. |
| | .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 and, use resilient washers with stainless steel. |
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1.9 STORAGE,
HANDLING AND
PROTECTION

- .1 Deliver, handle and store materials in manner to prevent deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled materials in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work. Provide additional cover where manufacturer's packaging is insufficient to provide adequate protection.
- .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 and 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 Immediately remove damaged or rejected materials from site.
- .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.

1.1 GENERAL

- .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .2 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .3 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

1.2 MATERIALS

- .1 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.3 CLEANING DURING CONSTRUCTION

- .1 Maintain work site and work areas in a tidy condition, free from accumulations of waste material and debris. Clean areas on a daily basis.
- .2 Keep building entrances, corridors, stairwells and tenant occupied areas of building in a clean dust free condition at all times. Conduct thorough cleaning of these areas at end of each workshift when used by workers or affected by the Work.
- .3 Provide on-site containers for collection of waste materials and debris.
- .4 Use separate collection bins, clearly marked as to purpose, for source separation and recycling of waste and debris in accordance with waste management requirements specified.
- .5 Remove waste materials, and debris from site on a minimum weekly basis.
- .6 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.
- .7 Provide dust barriers, dividers, seals on doors and employ other dust control measures as required to ensure that dust and dirt, generated by work, are not transmitted to

1.3 CLEANING DURING .7
CONSTRUCTION
(Cont'd)

(Cont'd)
other areas of building. Should dust migrate into tenant occupied areas of building, employ such means as may be necessary to immediately clean all contaminated surfaces to the satisfaction of the Departmental Representative.

.1 See Section 01 50 00 for requirements on dust control and for erection of dust partitions.

- .8 Immediately clean all dust, dirt, smears, scuffs and soiled surfaces in lobbies, corridors, stairwells and within tenant occupied areas resulting from the Work.

.1 Perform cleaning, dusting and washing operations, carpet vaccuming (including shampooing if deemed required by Departmental Representative) and floor washing as necessary to thoroughly clean all soiled surfaces.

- .9 Remove snow and ice from access doors used by workforce

1.4 FINAL CLEANING

- .1 In preparation for acceptance of the completed work perform final cleaning.

- .2 Remove grease, dust, dirt, stains, labels, fingerprints, marks and other foreign materials, from interior and exterior finished surfaces. Clean and polish surfaces including glass, mirrors, hardware, wall tile, stainless steel, chrome, baked enamel, plastic laminate, mechanical and electrical fixtures.

- .3 Replace items with broken pieces, scratches or disfigured.

- .4 Clean lighting reflectors, lenses, and other lighting surfaces.

- .5 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

- .6 Wax, seal, shampoo or prepare floor finishes as recommended by manufacturer.

- .7 Inspect finishes, fitments and equipment. Ensure specified workmanship and operation.

- 1.4 FINAL CLEANING .8 Broom clean and wash exterior paved surfaces
(Cont'd) and walks; rake clean other surfaces of
grounds.
- .9 Remove debris and surplus materials from
crawl areas, roof areas and other accessible
concealed spaces.
- .10 Clean equipment, washroom and kitchen
fixtures to a sanitary condition. Replace
filters of mechanical equipment.

1.1 RELATED SECTIONS .1 Environment Procedures: Section 01 35 43

1.2 GENERAL .1 Carry out work placing maximum emphasis on the areas of:
.1 Waste reduction;
.2 Diversion of waste from landfill and;
.3 Material Recycling.

1.3 WASTE MANAGEMENT PLAN .1 Prior to commencement of work, prepare waste Management Workplan.
.2 Workplan to include:
.1 Waste audit.
.2 Waste reduction practices.
.3 Material source separation process.
.4 Procedures for sending recyclables to recycling facilities.
.5 Procedures for sending non-salvageable items and waste to approved waste processing facility or landfill site.
.6 Training and supervising workforce on waste management at site.
.3 Workplan to incorporate waste management requirements specified herein and in other sections of the Specifications.
.4 Develop Workplan in collaboration with all subcontractors to ensure all waste management issues and opportunities are addressed.
.5 Submit copy of Workplan to Departmental Representative for review and approval.
.1 Make revisions to Plan as directed by Departmental Representative.
.6 Implement and manage all aspects of Waste Management Workplan for duration of work.
.7 Revise Plan as work progresses addressing new opportunities for diversion of waste from landfill.

- 1.4 WASTE AUDIT
- .1 At project start-up, conduct waste audit of:
 - .1 Site conditions identifying salvageable and non-salvageable items and waste resulting from demolition and removal work.
 - .2 Projected waste resulting from product packaging and from material leftover after installation work.
 - .2 Develop written list. Record type, composition and quantity of various salvageable items and waste anticipated, reasons for waste generation and operational factors which contribute to waste.
- 1.5 WASTE REDUCTION
- .1 Based on waste audit, develop waste reduction program.
 - .2 Structure program to prioritize actions, with waste reduction as first priority, followed by salvage and recycling effort, then disposal as solid waste.
 - .3 Identify materials and equipment to be:
 - .1 Protected and turned over to Departmental Representative when indicated.
 - .2 Salvaged for resale by Contractor.
 - .3 Sent to recycling facility.
 - .4 Sent to waste processing/landfill site for their recycling effort
 - .5 Disposed of in approved landfill site.
 - .4 Reduce construction waste during installation work. Undertake practices which will minimize waste and optimize full use of new materials on site, such as:
 - .1 Use of a central cutting area to allow for easy access to off-cuts;
 - .2 Use of off-cuts for blocking and bridging elsewhere.
 - .3 Use of effective and strategically placed facilities on site for storage and staging of left-over or partially cut materials (such as gypsum board, plywood, ceiling tiles, insulation etc...) to allow for easy incorporation into work whenever possible avoiding unnecessary waste.
 - .5 Develop other strategies and innovative procedures to reduce waste such as minimizing the extent of packaging used for delivery of materials to site etc.

1.6 MATERIAL SOURCE .1
SEPARATION PROCESS

- .1 Develop and implement material source separation process at commencement of work as part of mobilization and waste management at site.
- .2 Provide on-site facilities to collect, handle and store anticipated quantities of reusable, salvageable and recyclable materials.
 - .1 Use suitable containers for individual collection of items based on intended purpose.
 - .2 Locate to facilitate deposit but without hindering daily operations of existing building tenants.
 - .3 Clearly mark containers and stockpiles as to purpose and use.
- .3 Perform demolition and removal of existing building components and equipment following a systematic deconstruction process.
 - .1 Separate materials and equipment at source, carefully dismantling, labelling and stockpiling alike items for the following purposes:
 - .1 Reinstallation into the work where indicated.
 - .2 Salvaging reusable items not needed in project which Contractor may sell to other parties. Sale of such items not permitted on site.
 - .3 Sending as many items as possible to locally available recycling facility.
 - .4 Segregating remaining waste and debris into various individual waste categories for disposal in a "non-mixed state" as recommended by waste processing/landfill sites.
- .4 Isolate product packaging and delivery containers from general waste stream. Send to recycling facility or return to supplier/manufacturer.
- .5 Send leftover material resulting from installation work for recycling whenever possible.
- .6 Establish methods whereby hazardous and toxic waste materials, and their containers, encountered or used in the course work are properly isolated, stored on site and disposed in accordance with applicable laws and regulations from authorities having jurisdiction.

1.6 MATERIAL SOURCE .7 Isolate and store existing materials and
SEPARATION PROCESS equipment identified for re-incorporation into
(Cont'd) the Work. Protect against damage.

1.7 WORKER TRAINING .1 Provide adequate training to workforce,
AND SUPERVISION through meetings and demonstrations, to
emphasize purpose and worker responsibilities
in carrying out the Waste Management Plan.

.2 Waste Management Coordinator: designate
full-time person on site, experienced in waste
management and having knowledge of the purpose
and content of Waste Management Plan to:

.1 Oversee and supervise waste management
during work.

.2 Provide instructions and directions to
all workers and subcontractors on waste
reduction, source separation and disposal
practices.

.3 Post a copy of Plan in a prominent location
on site for review by workers.

1.8 CERTIFICATION OF .1 Submit to Departmental Representative, copies
MATERIAL DIVERSION of certified weigh bills from authorized waste
processing sites and sale receipts from
recycling/reuse facilities confirming receipt
of building materials and quantity of waste
diverted from landfill.

.2 Submit data at pre-determined project
milestones as determined by Departmental
Representative.

.3 Compare actual quantities diverted from
landfill with projections made during waste
audit.

1.9 DISPOSAL .1 Burying or burning of rubbish and waste
REQUIREMENTS materials is prohibited.

.2 Disposal of waste, volatile materials,
mineral spirits, oil, or paint thinner into
waterways, storm, or sanitary sewers is
prohibited.

1.9 DISPOSAL
REQUIREMENTS
(Cont'd)

- .3 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.
- .4 Contact the authority having jurisdiction prior to commencement of work, to determine what, if any, demolition and construction waste materials have been banned from disposal in landfills and at transfer stations. Take appropriate action to isolate such banned materials at site of work and dispose in strict accordance with provincial and municipal regulations.
- .5 Transport waste intended for landfill in separated condition, following rules and recommendations of Landfill Operator in support of their effort to divert, recycle and reduce amount of solid waste placed in landfill.
- .6 Collect, bundle and transport salvaged materials to be recycled in separated categories and condition as directed by recycling facility. Ship materials only to approved recycling facilities.
- .7 Sale of salvaged items by Contractor to other parties not permitted on site.

1.1 RELATED
SECTIONS

.1 Section 01 78 00 - Closeout Submittals.

1.2 INSPECTION AND
DECLARATION

- .1 Contractor's Inspection: Coordinate and perform, in concert with subcontractors, an inspection and check of all Work. Identify and correct deficiencies, defects, repairs and perform outstanding items as required to complete work in conformance with Contract Documents.
- .1 Notify Departmental Representative in writing when deficiencies from Contractor's inspection have been rectified and that Work is deemed to be complete and ready for Departmental Representative's inspection of the completed work.
- .2 Departmental Representative's Inspection: Accompany Departmental Representative during all substantial and final inspections of the Work.
- .1 Address defects, faults and outstanding items of work identified by such inspections.
- .2 Advise Departmental Representative when all deficiencies identified have been rectified.
- .3 Note that Departmental Representative will not issue a Certificate of Substantial Performance of the work until such time that Contractor performs following work and turns over the specified documents:
- .1 Project record as-built documents;
- .2 Final Operations and Maintenance manuals;
- .3 Maintenance materials, parts and tools;
- .4 Compliance certificates from applicable authorities;
- .5 Reports resulting from designated tests;
- .6 Demonstration and training complete with user manuals;
- .7 Manufacturer's Guarantee certificates.
- .8 Testing, adjusting and balancing of equipment and systems complete with submission of test reports.
- .9 Commissioning of equipment and systems specified.
- .4 Correct all discrepancies before Departmental Representative will issue the Certificate of Completion.

1.1 RELATED
SECTIONS

- .1 Section 01 79 00 - Demonstration and Training.

1.2 PROJECT RECORD
DOCUMENTS

- .1 Departmental Representative will provide 2 white print sets of contract drawings and 2 copies of Specifications Manual specifically for "as-built" purposes.
- .2 Maintain at site one set of the contract drawings and specifications to record actual as-built site conditions.
- .3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Departmental Representative upon request.
- .4 As-Built Drawings:
.1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of work, neatly transfer notations to second set (also by use of red ink).
.2 Submit both sets to Departmental Representative prior to application for Certificate of Substantial Performance.
.3 Stamp all drawings with "As-Built Drawings". Label and place Contractor's signature and date.
.4 Show all modifications, substitutions and deviations from what is shown on the contract drawings or in specifications.
.5 Record following information:
.1 Depths of various elements of foundation in relation to first floor level.
.2 Horizontal and vertical location of exterior underground utilities and appurtenances referenced to permanent surface improvements.
.3 Horizontal and vertical location of various elements in relation to Geodetic Datum;
.4 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure;
.5 Field changes of dimension and detail;
.6 Location of all capped or terminated services and utilities.

1.2 PROJECT RECORD .4
DOCUMENTS
(Cont'd)

As-Built Drawings:(Cont'd)

.5 Record following information:(Cont'd)

.7 Chases for mechanical, electrical and other services;

.8 Ceiling and floor elevations;

.9 Reflected ceiling plan condition showing finished layout of all ceiling-mounted services and devices;

.10 Plumbing, heating, air conditioning and ventilation, sprinkler and electrical service installation locations; all to be dimensioned and referenced to building columns or load bearing walls;

.11 All structural steel installations to be fully dimensioned;

.12 All design elevations, sections, floor plans and details dimensioned and marked-up to consistently report finished installation conditions;

.13 Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings;

.14 All change orders issued over the course of the contract must be documented on the finished as-built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.

.5 As-built Specifications: legibly mark in red each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.

.2 Changes made by Addenda and Change Orders.

.3 Mark up both copies of specifications; stamp "as-built", sign and date similarly to drawings as per above clause.

.6 Maintain As-built documents current as the contract progresses. Departmental Representative will conduct reviews and inspections of the documents on a regular basis. Failure to maintain as-builts current and complete to satisfaction of the Departmental Representative shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.

1.3 REVIEWED
SHOP DRAWINGS

- .1 Provide a complete set of all shop drawings reviewed for project to incorporate into each copy of the Operations & Maintenance manuals.
- .2 Submit full sets at same time and as part of the contents of the Operation and Maintenance manuals specified.

1.4 OPERATIONS &
MAINTENANCE MANUAL

- .1 O&M Manual - Definition: an organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of the specifications.
- .2 Manual Language: final manuals to be in English.
- .3 Number of copies required:
 - .1 Submit 2 interim copies of the manual for review and inspection by Departmental Representative. Make revisions and additions as directed and resubmit.
 - .2 Upon review and acceptance by Departmental Representative, submit 4 final copies. Interim copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.
- .4 Submission Date: submit complete operation and maintenance manual to Departmental Representative 6 weeks prior to application for Certificate of Substantial Performance of the work.
- .5 Binding:
 - .1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.
 - .2 Use vinyl, hard covered, 3 "D" ring binders, loose leaf, sized for 215 x 280 mm paper, with spine pocket.
 - .3 Where multiple binders are needed, correlate data into related consistent groupings.
 - .4 Identify contents of each binder on spine.

1.4 OPERATIONS &
MAINTENANCE MANUAL
(Cont'd)

- .5 Binding:(Cont'd)
 - .5 Organize and divide data following same numerical system as the section numbers of the Specification Manual.
 - .6 Dividers: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each individual product and system and give description of product or component.
 - .7 Type lists and notes. Do not hand write.
 - .8 Drawings, diagrams and manufacturers' literature must be legible. Provide with reinforced, punched binder tab. Bind in with text; fold larger drawings to size of text pages.
 - .6 Manual Contents:
 - .1 Cover sheet containing:
 - .1 Date submitted.
 - .2 Project title, location and project number.
 - .3 Names and addresses of Contractor, and all Sub-contractors.
 - .2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.
 - .3 List of maintenance materials.
 - .4 List of spare parts.
 - .5 List of special tools.
 - .6 Original or certified copy of warranties and product guarantees.
 - .7 Copy of approval documents and certificates issued by Inspection Authorities.
 - .8 Copy of reports and test results performed by Contractor as specified.
 - .9 Product Information (PI Data) on materials, equipment and systems as specified in various sections of the specifications.
- Data to include:
- .1 List of equipment including manufacturer's name, supplier, local source of supplies and service depot(s). Provide full addresses and telephone numbers.
 - .2 Nameplate information including equipment number, make, size, capacity, model number and serial number.
 - .3 Parts list.
 - .4 Installation details.
 - .5 Operating instructions.
 - .6 Maintenance instructions for equipment.

1.4 OPERATIONS &
MAINTENANCE MANUAL
(Cont'd)

- .6 Manual Contents:(Cont'd)
 - .9 (Cont'd)
 - .7 Maintenance instructions for finishes.
 - .7 Shop drawings:
 - .1 Include complete set of reviewed shop drawings into each copy of the operations and maintenance manual.
 - .2 Fold and bind material professionally in a manner that corresponds with the specification section numbering system.
 - .3 When large quantity of data is submitted, place into separate binders of same size as O&M binders.
 - .8 Equipment and Systems Data: the following list indicates the type of data and extent of information required to be included for each item of equipment and for each system:
 - .1 Description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
 - .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
 - .3 Include installed colour coded wiring diagrams.
 - .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
 - .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 - .6 Servicing and lubrication schedule, and list of lubricants required.
 - .7 Manufacturer's printed operation and maintenance instructions.
 - .8 Sequence of operation by controls manufacturer.
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1.4 OPERATIONS &
MAINTENANCE MANUAL
(Cont'd)

- .8 Equipment and Systems Data:(Cont'd)
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports.
- .15 Additional requirements as specified in individual specification sections.
- .9 Materials and Finishes Maintenance Data:
- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. 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.

1.5 SPARE PARTS,
TOOLS AND MAINTENANCE
MATERIALS

- .1 Provide spare parts, special tools and extra materials for maintenance purposes in quantities specified in individual specification sections.
- .2 Tag all items with associated function or equipment.
- .3 Provide items of same manufacture and quality as items in Work.

1.5 SPARE PARTS, .4
TOOLS AND MAINTENANCE
MATERIALS
(Cont'd)

Deliver to site in well packaged condition.
Store in location as directed by Departmental
Representative.

- .5 Clearly mark as to contents indicating:
- .1 Part number.
 - .2 Identification of equipment or system
for which parts are applicable.
 - .3 Installation instructions or intended
use as applicable.
 - .4 Name, address and telephone number of
nearest supplier.
- .6 Prepare and submit complete inventory list of
items supplied. Include list within
Maintenance Manual.

<u>1.1 RELATED SECTIONS</u>	.1	Operations and Maintenance Manual: Section 01 78 00.
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<u>1.2 DESCRIPTION</u>	.1	Demonstrate scheduled operation and maintenance of equipment and systems to Owner's personnel prior to date of final inspection.
	.2	Departmental Representative will provide a list of Owner's personnel to receive instructions,
	.3	Cooperate with Departmental Representative in coordinating time and attendance of Owner's personnel with manufacturer's training Representative(s).

<u>1.3 QUALITY CONTROL</u>	.1	Ensure that only personnel from own forces, Subcontractors or Suppliers competent and fully knowledgeable in the particular material component, equipment or system installation are used to provide training and demonstrations.
	.2	When specified in individual Sections, obtain the manufacturers authorized Representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.
	.3	Upon request, provide evidence to Departmental Representative of individual Trainor's knowledge and qualifications.

<u>1.4 SUBMITTALS</u>	.1	Submit schedule of time, date and complete list of equipment and systems for which demonstration and training sessions will be provided. Submit schedule a minimum of 2 weeks prior to designated dates, for Departmental Representative's approval.
	.2	Submit report within 1 week after completion of demonstration, that demonstration and instructions have been satisfactorily completed. Provide time and date of when each

- 1.4 SUBMITTALS (Cont'd) .2 (Cont'd)
demonstration was actually given, with list of persons present.
- 1.5 CONDITIONS FOR DEMONSTRATIONS .1 Prior to carrying out demonstration and training, ensure that equipment has been inspected and tested, is fully operational, has been performance verified and TAB has been carried out.
- .2 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.
- 1.6 PREPARATION .1 Verify that conditions for demonstration and instructions comply with requirements.
- .2 Verify that designated personnel are present.
- 1.7 DEMONSTRATION AND INSTRUCTIONS .1 Include the following items within the demonstration and training:
- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each of equipment.
- .2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
- .3 Review contents of manual in detail to explain all aspects of operation and maintenance.
- .4 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.
- .5 Provide other specific training and instructions as specified in trade sections.
-

1.8 TIME ALLOCATED .1 Observe the allocated time period specified
FOR INSTRUCTIONS in trade sections. Provide additional time
when required to ensure all personnel fully
understand all aspects of the information and
instructions being provided. Allow for
questions by participants.

- 1 RELATED SECTIONS
- .1 Operations and Maintenance Manuals: Section 01 78 00
 - .2 Demonstration and Training: Section 01 79 00
- 2 BACKGROUND INFORMATION
- .1 Commissioning (or the commissioning process), as understood by PWGSC, is a planned program of activities conducted in concert with other activities performed during each stage of project delivery.
 - .1 The commissioning process identifies issues during the Planning and Design stages which are addressed during the Construction and Occupancy Stages of a Facility to ensure that the built facility is constructed and proven to operate satisfactorily under all weather, environmental and occupancy conditions to meet operational and user requirements.
 - .2 Commissioning activities during the Construction stage incorporates a third party verification process and a transfer of critical operational knowledge to Facility personnel.
 - .2 Commissioning to occur during the construction stage and the early period of facility occupancy stage.
- 3 DEFINITIONS
- .1 For the purpose of this contract, the various terms listed below, as they relate directly or indirectly to the commissioning process, shall be deemed to have the following meaning.
 - .2 Commissioning Process: a planned program of tasks, activities and procedures carried out systematically during the Construction and Occupancy Stages in accordance with the commissioning objectives to:
 - .1 Verify whether the fully installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and;
 - .2 Ensure that appropriate documentation is compiled to effectively train O& M staff and prepare a comprehensive Building Management Manual (BMM).
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- .3 Commission (i.e., to commission a building component or system): tests and checks conducted by Commissioning Agent on all systems and integrated systems of Facility; carried out only after they are fully installed, functional and Contractor's Performance Verification responsibilities have been completed and approved.
 - .1 Contractor provides assistance during this process by operating equipment and systems, by troubleshooting and making adjustments as may be required.
 - .2 Systems are run under their full operation and under various modes to determine if they function correctly, consistently, at peak efficiency and interactively with each other as intended in accordance with Contract Documents and design criteria.
 - .3 During these checks, adjustments may be made enhancing performance to meet environmental or user requirements.
- .4 Commissioning Agent: an appointed person, representing the Departmental Representative, responsible for the development of a Commissioning Plan and managing its implementation by overseeing and coordinating various activities and responsibilities to be performed by members of the Commissioning Team.
 - .1 In this project, the Commissioning Agent is part of the engineering consultant firm engaged by PWGSC to prepare the final design and contract documents for this Work.
 - .2 Commissioning Agent plays a lead role in support to the Departmental Representative to ensure that the commissioning objectives are achieved.
- .5 Commissioning Manager: a PWGSC departmental employee providing advice and guidance on commissioning requirements to the Commissioning Agent in support to the Departmental Representative.
- .6 Commissioning Plan: The document which describes the organization, scheduling, allocation of resources, required documentation, target dates, and team roles and responsibilities for verification that the built works meet Contract Document and design criteria requirements.

- .7 Contractor: means the General Contractor, however it also refers to any personnel from subcontractors, including the controls and TAB specialists, suppliers and manufacturer's technical persons which Contractor employs to carry out his/her designated commissioning duties and activities. The Contractor is responsible for the performance of their subcontractors.
- .8 Design Consultant: persons from the civil, architectural, mechanical and electrical design disciplines of the engineering firm(s) which have been engaged by the Departmental Representative to prepare the final design and produce the contract documents. Design Consultant also has specifically identified commissioning activities for this project.
- .9 Design Criteria: All those factors included in the design of a Facility prescribed by the tenant needs or as determined by the Design Consultant as necessary in order to meet all Facility functional and user operational requirements.
- .10 Installation/Start-up Checks (sometimes referred to as pre-functional checks): a written compilation of checks and inspections to be performed by Contractor during the pre-start-up and start-up of a particular equipment or system component.
- .1 Checklist sheets are produced which include the following data:
- .1 Product manufacturer's installation instructions and recommended checks and;
- .2 Special procedures as specified in relevant sections of Specifications;
- .3 Other items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.
- .2 Standard Installation/Start-up Checklist sheets prepared by equipment manufacturer are acceptable for use. However, supplement with additional data representative of specific project conditions as deemed required by Commissioning Agent.
- .3 Use Checklist sheets for all equipment installation. Document in writing on checklist the various checks made, deficiencies noted and corrective action taken.

- .4 Installer to sign Checklist sheets upon completion, certifying that stated checks and inspections have been performed.
 - .5 Use of Installation/Start-up Checklists is not considered part of the commissioning process but will be stringently used for all equipment pre-start and start-up procedures.
 - .6 Return completed Installation/Start-up Checklist sheets after use to Commissioning Agent for retention. Checklists are required by Commissioning Agent when Facility is commissioned and will be included in the BMM manual at completion of project.
 - .7 Contractor to submit blank forms to Commissioning Agent before performing start-up. Sample forms (see forms 01 91 32A through H) may be used to develop equipment specific forms.
- .11 Performance Verification: (sometimes referred to Functional Testing) checks, running dynamic tests and adjustments carried out by Contractor on equipment and systems, upon their installation, to ensure they operate correctly, efficiently and function independently and interactively with other systems as intended in accordance with contract documents and manufacturer's recommendations.
- .1 Performance Verification will not be considered part of the commissioning process. It is however considered an essential and integral part of Contractor's responsibilities in the equipment installation process which must be stringently conducted, successfully completed and approved by Departmental Representative before a piece of equipment or system is considered fully installed and functional.
 - .2 Facility components and systems will not be commissioned by Commissioning Agent until performance verification has been completed and approved.
- .12 Performance Verification Report Sheets (PV sheets): forms developed by Commissioning Agent for Contractor's use to record measured data and readings taken during functional testing and Performance Verification procedures (see 01 91 36a through E). Equipment specific forms will be issued by Commissioning Agent after shop drawing review.

- .13 Product Information (PI Data): a compilation of data gathered on a particular piece of equipment, typically produced by manufacturer, which includes nameplate information, installation/startup instructions, parts list, operating instructions, maintenance guidelines and other pertinent technical data and recommended checks that is necessary to prepare for start-up and functional testing and used during operation and maintenance of such equipment. This documentation is included in the Building Management Manual(BMM) at completion of work.

4 COMMISSIONING OBJECTIVES

- .1 A Commissioning Plan has been prepared by the Commissioning Agent, on behalf of PWGSC, which identifies, among other issues, specific commissioning activities to be carried out by the commissioning team during the Construction of the project.
- .2 The commissioning activities have the following objectives:
 - .1 Collect data on equipment and systems being supplied and document their installation;
 - .2 Conduct checks and tests on fully installed building components, equipment, systems and integrated systems to:
 - .1 Verify whether they operate in accordance with requirements of Contract Documents;
 - .2 Verify performance against design criteria and user requirements and measure peak capacities;
 - .3 Prepare a Building Management Manual (BMM) which contains operations and maintenance data, as-built record documents, commissioning reports, training data and other critical information for future use by Facility operational staff;
 - .4 Ensure transfer of knowledge on the operations, maintenance and management of the Facility to Tenant and Operational personnel by means of appropriate training.
- .3 Work to achieve the above objectives requires a collaborative effort from all members of the commissioning team.
 - .1 Contractor's commissioning activities and responsibilities are described in Clause 8 below.

- .4 Commissioning activities performed by the Commissioning Agent and the Design Consultant does not replace checks, tests, adjustments, balancing and other performance verification procedures to be carried out by the Contractor as an integral part of performing the Work of this contract as specified in other sections of the Specifications.

5 SYSTEMS TO BE COMMISSIONED

- .1 The following systems and controls, complete with associated equipment and components, will be commissioned by the Commissioning Agent and requires related commissioning activities to be performed by Contractor as specified herein and in section(s):
- .1 Computer Room AC systems (CRAC-#)
 - .2 Air Conditioning Systems (AC-#)
 - .3 Heating Controls
 - .4 Plumbing Fixtures
 - .5 Fire Dampers
 - .6 TAB
 - .7 Branch Circuit Panelboards
 - .8 Disconnects - Fused and Unfused
 - .9 Dry-Type Transformers
 - .10 Emergency Lighting Battery Unit
 - .11 Exit Sign
 - .12 Exterior Lighting
 - .13 Fire Alarm
 - .14 Interior Lighting
 - .15 Wiring Devices
 - .16 Heating Fixtures - Electric
 - .17 Elevator

6 COMMISSIONING TEAM

- .1 A commissioning team will be assembled to carryout various functions needed to effectively commission the Facility. Contractor will be part of this team with duties and responsibilities as specified in this section and in other sections of the Specifications.
- .2 Members of the Commissioning Team are as described in 01 91 31 - Commissioning Plan.

7 CONTRACTOR'S COMMISSIONING ACTIVITIES

- .1 Organize and arrange for the services of subcontractors, their specialists and manufacturer's technical representatives to perform Contractor's commissioning activities.
-

- .2 Confirm personnel forming part of the Commissioning Team are qualified and knowledgeable of installed equipment and systems and with design intent.
 - .3 Develop in conjunction with the Commissioning Agent a commissioning schedule as specified in clause 11.
 - .4 Notify Departmental Representative in writing when Facility is ready for be commissioned. Give 14 calendar day notice.
 - .5 Commissioning will only commence once that full documentation has been received and installed equipment and systems have undergone successful performance verification.
 - .6 Note that Certificate of Substantial Completion will only be issued when:
 - .1 All commissioning documentation has been received and found suitable by Departmental Representative;
 - .2 Designated equipment and systems have been commissioned and;
 - .3 Training has been completed.
 - .7 Performance faults:
 - .1 Equipment and systems found not operating correctly or not performing as intended during commissioning shall be re-verified by checking 100% of all equipment and components of the un-functional system, including related controls as required to rectify the deficiencies and ensure correct performance.
 - .2 Costs to conduct additional tests and inspections, as deemed required by Departmental Representative, to determine acceptability and proper performance of such item to be paid for by Contractor.
 - .8 Prior to Facility being Commissioned:
 - .1 Submit commissioning documentation as specified in clause 13 below.
 - .2 Submit the Installation/Start-up Checklist sheets to Commissioning Agent for review prior to conducting the pre-start and start-up of any piece of equipment. Incorporate additional start-up instructions onto checklist as determined by the Commissioning Agent's review.
-

- .3 Conduct the pre-start and start-up of all equipment by following and filling out the approved Installation/Start-up Checklists.
 - .4 Conduct Performance Verification on all installed equipment and systems. Use and fill out the PV Report Sheets provided.
 - .5 Upon completion of start-up and performance verification process, submit signed copy of Checklist and PV sheets to Commissioning Agent as affidavit that required checks and tests were successfully conducted.
 - .6 Record performance measurements and data reading on PV sheets and return to Commissioning Agent for compilation.
 - .7 Give Departmental Representative and Commissioning Agent a minimum of five (5) days notice for start-up and performance verification of equipment and systems which must be witnessed by Commissioning Agent as determined by Commissioning Agent beforehand on PV sheets.
 - .8 Provide missing information and data as identified by Commissioning Agent and Departmental Representative during documentation review.
 - .9 Submit above noted documentation before Commissioning will proceed.
 - .10 Address deficiencies in Work identified during performance verification of equipment and systems. Conduct additional performance verification thereafter.
 - .11 Arrange for special tools and devices, identified at commissioning meeting(s), as deemed required to assist with commissioning.
 - .12 Provide access ladders, two way radios and other equipment required by Team when facility will be commissioned.
- .9 When Facility is being Commissioned:
- .1 Provide qualified tradespersons to be present at site to assist Commissioning Agent.
 - .2 Assist in commissioning systems specified and as follows:
 - .1 Operate designated building component, mechanical/electrical equipment and system under all modes of operation and conduct checks and tests as directed by Commissioning Agent.
 - .2 Check and verify that building component, equipment, systems and integrated systems, including their controls, are

functioning and responding correctly and interactively with each other.

.3 Test systems independently and then in unison with other related systems.

.4 Conduct all Commissioning checks and tests in presence of and witnessed by Commissioning Agent and Departmental Representative.

.5 Assist Design Consultant and other members of the commissioning team who will also be present to commission Facility.

.3 Specific procedures used to commission Facility will be provided by Commissioning Agent which includes:

.1 Sequential order of building component and system to be tested.

.2 Running systems under various anticipated modes and demands (example: high and low cooling or heating loads, duplicating outside temperature conditions, fire alarm and power failure conditions).

.3 Running building controls through all sequences of operation to verify and confirm that equipment and systems are responding as designed and intended.

.4 Operating designated equipment at peak capacities, recording output data against design criteria.

.4 Run component or systems as long as necessary to effectively commission all items as deemed required by Commissioning Agent and Departmental Representative.

.5 Monitor equipment and system responses.

.6 Record test results, measurements and other data on commissioning forms provided by Commissioning Agent.

.7 Assist in analyzing results. Identify system deficiencies and components not responding as intended.

.8 Correct deficiencies and system non-conformance issues. Adjust, calibrate or fine tune system components as required. Debug system software as may be required.

.9 Retest systems when directed to confirm compliance.

.10 Upon completion of Facility Commissioning:

.1 Provide training to maintenance & operational personnel as specified.

.2 Turn over any filled-in checks sheets or reports resulting from commissioning.

8 COMMISSIONING
ACTIVITIES OF OTHER
TEAM MEMBERS

- .1 Commissioning Agent:
 - .1 Represents the Departmental Representative during the commissioning process.
 - .2 Coordinates activities of the commissioning team members to ensure that commissioning activities are carried out properly and in a timely manner.
 - .3 Prepares commissioning schedule in concert with Contractor.
 - .4 Chairs commissioning meetings.
 - .5 Works with Contractor, subcontractors, equipment suppliers, Design Consultant resources, PWGSC and Tenant Representatives to resolve technical problems which may arise during the process.
 - .6 Witnesses Contractor's pre-start, start-up and performance verification procedures for certain equipment and systems specified when deemed required due to their critical nature and function in the Facility.
 - .7 Verifies that Installation/Start-up Checklists and Performance Verification checks and tests are used and stringently followed by Contractor.
 - .8 Assists Contractor in coordination of training activities for facility staff.
 - .9 Submits final commissioning report to Departmental Representative.
 - .2 Design Consultant:
 - .1 Prepares in concert with Commissioning Agent the Commissioning Plan.
 - .2 Reviews Contractor's Installation/Start-up Checklists for completeness, incorporating supplement data not addressed on checklist. Provides to Contractor checklist for products which manufacturer does not provide installation and start-up instructions.
 - .3 Develops performance verifications report sheets for use by Contractor to record actual data and measurements against design data criteria.
 - .4 Includes, on performance verification report sheets, design data and anticipated performance values for equipment and systems to undergo verification.
-

- .5 Compiles commissioning documentation submitted by Contractor. Prepares final Building Management Manuals.
- .6 Assists Commissioning Agent in witnessing pre-start, start-up and performance verification activities.
- .7 Approves type and method of calibration for instruments used by Contractor to conduct performance verification and commissioning tests.
- .8 Assists Commissioning Agent in reviewing and analyzing tests results.
- .9 Participate in the training sessions provided by Contractor to tenant O&M staff by giving introductory information on design philosophy, design intent and systems designs,
- .10 Assist in the resolution of issues relating to commissioning.

.3 Tenant Representative:

- .1 Participates with other team members to ensure that systems as installed meet the operational and functional requirements.
- .2 Periodically attends commissioning meetings as required.
- .3 Attends final commissioning activities.
- .4 Assists in resolving technical problems by providing additional details on operational requirements.

.4 Facility Operations and Maintenance Staff:

- .1 Participates in the commissioning process to obtain early introduction to the facility systems and to provide early operator feedback.
- .2 Prime interest is in the familiarization and training of appropriate maintenance staff.
- .3 Staff may attend certain critical equipment start-up and performance verification activities and provide comments and practical suggestions on issues which may arise during actual operation, maintenance and repair of the equipment and systems.
- .4 Attends commissioning meetings periodically, depending on issues being discussed.
- .5 Identifies the appropriate staff which must receive the O & M training.

9 COMMISSIONING
MEETINGS

- .1 General briefing on commissioning will be conducted at first project construction meeting at commencement of work.

.1 Issues discussed will include scope and extent of commissioning and clarify responsibilities of commissioning team members.

.2 All team members must attend, including subcontractors of equipment and systems to be commissioned.

.2 Include commissioning as one agenda item at each construction meeting held and chaired by Contractor during construction. Give subject due consideration for each material and equipment supplied and for all matters of Work.

.3 Whenever possible meetings will be held immediately following the construction meetings.

.4 Meeting will be chaired by Contractor, who will record and distribute minutes.

.5 Confirm all subcontractors and relevant manufacturer representatives are present at meetings as deemed required.

10 COMMISSIONING SCHEDULE

.1 Address commissioning activities within the construction work schedule. Clearly identify allocated time period for commissioning and training activities.

.2 Develop commissioning schedule in conjunction with Commissioning Agent. Indicate allocated time period and anticipated dates for:

.1 Submission of commissioning documentation, including O&M Manuals.

.2 Equipment and system start-up and performance verification, making them ready to be commissioned.

.3 Allocated period to commission designated building components and systems.

.4 Training period.

.5 Work during Warranty period.

.3 Submit schedule to Departmental Representative for review.

11 TRAINING

.1 Commence process of familiarizing Tenant and O&M personnel in the early stages of work on purpose and operation of various equipment and systems.

Continue process throughout the entire construction duration.

- .1 Provide informal briefings during occasional site visits, at planned commissioning meetings and during the final commissioning site activities.
 - .2 Conduct formal demonstration and training sessions only after all identified systems have been commissioned by Commissioning Agent and Departmental Representative has given approval to proceed with the training process.
 - .3 Provide training and demonstration on all new equipment, sub-systems, systems and integrated systems.
 - .4 Carry out training in accordance with requirements of section 01 79 00.
 - .5 Submit written agenda of training session(s) four (4) weeks beforehand for review by Commissioning Agent and Departmental Representative.
 - .6 Coordinate content with Commissioning Agent. Design Consultant will provide introductory presentation giving general outline of each system design and intended function.
 - .7 Submit training manuals for review two (2) weeks prior to actual training.
 - .8 Keep required tools and O&M Manual on site for training and system demonstration.
 - .9 As a minimum, the training sessions to cover the following information:
 - .1 Introduction.
 - .2 Description of the system with factory personnel being involved at appropriate times.
 - .3 Instructions on start-up procedures including seasonal procedures, system check-lists and emergency procedures.
 - .4 Operational procedures, including occupancy considerations, seasonal change-over, manual and automatic operations and emergency modes.
 - .5 Instruction on system shutdowns, including checklists.
 - .6 Instructions on all aspects of system maintenance, including routine servicing, lubrication, overhaul and factory servicing.
-

.7 Information concerning the scope of warranties and their use.

.8 A description of spare parts in stock and their service.

.9 A description of normal tools required for servicing the systems/equipment.

- .10 Submit typewritten record of training sessions given and list of attendees. Use forms of format approved by Departmental Representative.

12 COMMISSIONING
DOCUMENTATION

- .1 Submit the following documentation for use during commissioning and for incorporation thereafter into a Building Management Manual (BMM):

.1 Operations and Maintenance Manuals, Project Record Documents and other data as specified in Section 01 78 00. Data to include:

.1 Equipment Product Information (PI Data) complete with:

- .1 Nameplate info,
- .2 Installation instructions,
- .3 Operating procedures and
- .4 Maintenance guidelines.

- .2 Reviewed shop drawings,
- .3 As-built record drawings and Specifications.

.2 Completed Installation/Start-up Checklist sheets used.

.3 Performance Verifications checks and tests procedures and completed report sheets used.

.4 Copy of any static and dynamic test and reports conducted.

.5 TAB report and other reports as specified in various trade sections.

- .2 Above documentation is required by Commissioning Agent to commission Facility. Submit data minimum three (3) weeks before commencement of commissioning.

- .3 Documentation to include detailed information and number of copies as specified for maintenance manuals of section 01 78 00.

- .4 Commissioning Agent and Design Consultant will compile above documentation and produce a BMM manuals for operation/maintenance staff and tenant use.

1 PURPOSE OF THE
COMMISSIONING PLAN

- .1 The purpose of the construction phase commissioning plan is to:
- .1 Provide direction for the commissioning process during construction, particularly providing resolution for issues and providing details that cannot be, or were not, fully developed during design, such as scheduling, participation of various parties of this particular project, actual lines of reporting and approvals, coordination, etc.
- .2 This plan does not provide a detailed explanation of required testing procedures. The detailed testing requirements and procedures are found in the Specifications. Additionally, this plan does not provide extensive narrative on all commissioning concepts, as may be provided in other commissioning guides.

2 COMMISSIONED
SYSTEMS

- .1 See Section 01 91 13 for list of systems that will be commissioned in this project. All general references to equipment in this document refer only to equipment that is to be commissioned.

3 CONSTRUCTION/CX
TEAM DATA (PRIMARY
PARTIES)

Team Member	Co. & Contact Names	Voice, office, cell, fax, email, address
Owner	PWGSC	
Project Leader		
Project Manager (PM)	Joan Muisse	
Property Manager	Louis Turgeon	
General Contractor	TBD	
Mechanical Contractor	TBD	
Commissioning Authority	TBD	TBD
Architect	TBD	TBD
Mechanical Designer/Eng.	TBD	TBD
Electrical Designer/Eng.	TBD	TBD
Mechanical Contractor HVAC Site Superintendent	TBD	TBD
Piping Contractor	TBD	TBD
Sheet Metal Contractor	TBD	TBD

Team Member	Co. & Contact Names	Voice, office, cell, fax, email, address
Electrical Contractor	TBD	TBD
Site Supervisor	TBD	TBD
TAB Contractor	TBD	TBD
Controls Contractor	TBD	TBD

4 TEAM MEMBERS AND DESCRIPTION OF ROLES

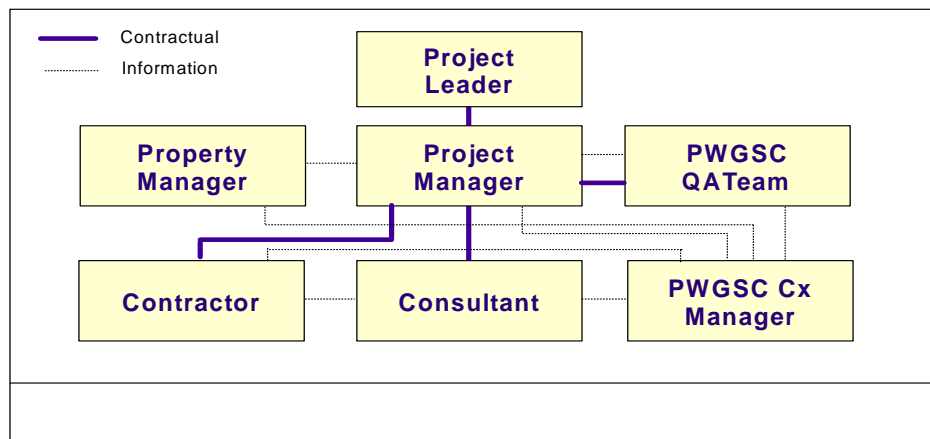


Figure 1.1: Commissioning Organization: Small Construction Projects

- .1 The **Project Leader** is responsible for initiating the project on behalf of the portfolio manager, accepting the facility from the project manager, and handing it over to the property manager for operation. The project leader is also responsible for securing project funding.
- .2 The **Project Manager** has overall responsibility for managing the project and demonstrating to the client that the installed systems and overall facility meet the requirements of the RFP and the project brief.
- .3 The **PWGSC Design Quality Assurance Team** reviews all aspects of design, from the development of the RFP to the conceptual design report, proposed design solutions, quality assurance, quality control, quality management, detailed design, working documents, and the final evaluation, including value for money and adherence to standards.
- .4 The **PWGSC Commissioning Manager** provides planning and technical advice on O&M matters, coordinates commissioning activities during all

project stages, ensures O&M concerns are addressed, provides quality assurance, reviews commissioning documentation at all stages of project delivery, and verifies the accuracy of commissioning forms. The commissioning manager communicates with other team members through the project manager. The project manager generally delegates authority to the commissioning manager in matters relating to commissioning while retaining overall responsibility for the project. The commissioning manager is also responsible for getting input from the property manager and the O&M staff.

- .5 The **Design Consultant** is the Design Consultant and Commissioning Agent (CA). The Consultant develops the commissioning plan, design intent and proposed design solutions; prepares commissioning specifications and other commissioning documentation; witnesses and certifies the performance of all commissioning activities; organizes and monitors all activities as per the contract agreement; and is responsible for design, construction, and warranty-related commitments.
- .6 The **Contractor** carries out start-up and performance verification activities and performs acceptance tests and related procedures. This individual coordinates commissioning activities, conducts commissioning meeting, refines the commissioning plan, develops the commissioning schedule, assembles maintenance manuals, and organizes training.
- .7 The **Property Manager** is responsible for assigning operation personnel to witness systems and equipment testing and to participate in training. The property manager is also responsible for the day-to-day management and operation of the completed facility after it has been accepted from the project leader.

5 COMMISSIONING
SCOPING MEETING

- .1 Meetings are to be as described in 01 91 13.

6 SITE OBSERVATION

- .1 The CA and the Consultant will make periodic visits to the site, as necessary, to witness equipment and system installations.

7 MISCELLANEOUS

- .1 The CA may review construction meeting minutes,

MEETINGS

change orders or Site instructions for the same purpose.

- .2 Later during construction, necessary meetings between various commissioning team parties will be scheduled by the CA, through the GC, as required.

8 SUBMITTALS
AND PROCEDURES

- .1 The CA may review submittals for commissioning requirements.

9 INSTALLATION
CHECKLISTS, TESTS
AND STARTUP

- .1 Prefunctional checklists (PC) are important to ensure that the equipment and systems are hooked up and operational and that functional performance testing may proceed without unnecessary delays. Each piece of equipment receives full prefunctional checkout by the Contractor. No sampling strategies are used. In general, the prefunctional testing for a given system, must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.
- .2 Prefunctional checklists, installation /start-up checks are to be as described in 01 91 13.
- .3 Prefunctional checklists to consist of startup and verification tests, plus any additional tests described in the attached forms or technical specification sections.
- .4 Prefunctional tests to include those recommended by the equipment manufacturer, or in the absence of specific recommendations by the manufacturer as agreed by the Contractors and commissioning authority.
 - .1 Document prefunctional tests in writing by the installing technician. The CA will not witness much of the prefunctional checklisting, except for testing of larger or more critical pieces of equipment and some spot-checking.
 - .2 Submit the prefunctional checklists to the CA for review and inclusion in the commissioning binder.
 - .3 Start-up plan:
 - .1 The Contractor will submit to the CA manufacturer installation, startup and checkout data, including actual field checkout sheets used by the field technicians from the contractor.
 - .2 Execution of Checklists and Startup:
 - .1 Four (4) weeks prior to startup, the Subs and vendors

schedule startup and initial checkout with the GC and CA. The startup and initial checkout are directed and executed by the Sub or vendor. The CA, and GC if necessary, observe, the procedures. For components of equipment, (e.g., radiant panels, fans, heat pumps, etc.), the CA observes a sampling of the prefunctional and start-up procedures. To document the process of startup and checkout, the site technician performing the line item task initials and dates each paragraph of procedures in the "Startup Plan" and checks off items on the prefunctional and manufacturer field checkout sheets, as they are completed. Only individuals having direct knowledge of a line item being completed shall check or initial the forms. The Subs and vendors execute the checklists and tests and submit a signed copy of the completed start-up and prefunctional tests and checklists to the CA. Further details are found in the Specifications Section 01 91 13. The CA may review prefunctional checklists in progress, as necessary.

.3 Deficiencies and Non-Conformance:

.1 The Subs clearly list any outstanding items of the initial start-up and prefunctional procedures that were not completed successfully at the bottom of the procedures form or on an attached sheet. The procedures form and deficiencies are provided to the CA within two days of test completion.

.2 The Subs and vendors must correct and retest deficiencies or uncompleted items, involving the GC and others as necessary. The installing Subs or vendors correct all areas that are deficient or incomplete according to the checklists and tests.

.4 TAB:

.1 The Contractor submits the outline of the TAB plan and approach to the CA and the controls contractor eight weeks prior to starting the TAB. Included in the

approach, is an explanation of the intended use of the building control system. The CA reviews the plan and approach for understanding and coordination issues and may comment, but does not "approve." The controls contractor reviews the feasibility of using the building control system for assistance in the TAB work.

.2 Functional performance testing does not begin until the TAB work is complete. A checklist form for reviewing the TAB plan is provided as one of the prefunctional checklists.

.3 TAB work will not begin until the control system has been prefunctionally tested and selective functional tests have been performed and approved by the CA.

.5 Controls Checkout Plan:

.1 The Contractor shall develop and submit a written step-by-step plan to the CA which describes the process they intend to follow in checking out the control system and the forms on which they will document the process. The Contractor will also meet with the TAB subcontractor prior to the start of TAB and review the TAB plan to determine the capabilities of the control system for use in TAB. The Contractor shall also provide a technician qualified to operate the controls to assist the TAB subcontractor in performing TAB.

.2 All controls prefunctional checklists, calibrations, start-up and selected functional tests of the system shall be completed and approved by the CA prior to TAB. The Contractor must execute the tests and trend logs assigned to them and remain on site for assistance for mechanical system functional tests as specified in the same sections.

10 DEVELOPMENT
OF PERFORMANCE
VERIFICATION

- .1 Overview: Performance Verification (PV) testing, also referred to as functional testing, is the dynamic testing of systems

PROCEDURES

(rather than just components) under full operation. Systems are tested under various modes, such as during low heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all of the control system's sequences of operation and components are verified to be responding as the sequences state. The commissioning agent shall witness functional test procedures, but the testing is performed by the installing contractor or vendor. Tests shall be documented and submitted to the CA by the Contractor.

- .2 Functional testing to consist of all performance testing required for each piece of commissioned equipment described in this section or technical specification sections. A detailed description of the functional and prefunctional testing procedures and process is found in the Specifications, 01 91 13, Part 3.
- .3 Functional testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone dataloggers. According to the Specifications, not all pieces of identical equipment receive in-depth testing. The CA reviews owner-contracted, factory or required owner acceptance tests and determines what further testing may be required to comply with the Specifications. Redundancy is minimized.

11 EXECUTION
OF PERFORMANCE
VERIFICATION
PROCEDURES

- .1 Overview and Process: The GC must schedule functional tests through the affected Subs and notify the PM and CA. For any given system, prior to performing functional testing, the CA shall wait until the prefunctional checklist has been submitted with the necessary signatures, confirming that the system is ready for functional testing.
 - .1 The CA will witness and document the functional testing of all equipment and systems according to the Specifications and the Cx Plan. The Subs execute the tests. The control system is tested before it is used to verify performance of other components or systems. The air balancing and water balancing is completed and debugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from

components to subsystems to systems and finally to interlocks and connections between systems. Refer to specification section 01 91 13 for additional process details.

- .2 Deficiencies and Retesting: The CA documents the results of the test. Corrections of minor deficiencies identified are made during the tests at the discretion of the CA. The CA records the results of the test on the procedure or test form. Deficiencies or non-conformance issues are noted and reported to the PM. Subs correct deficiencies, notify the CA in writing certifying correction. The GC schedules retesting through the PM. Decisions regarding deficiencies and corrections are made at as low a level as possible, preferably between CA or GC and the Sub. For areas in dispute, final authority, besides the Owner's, resides with the A/E. The CA recommends acceptance of each test to the PM. The PM gives final approval on each test.
- .3 The Owner's facilities operating staff are encouraged to attend and participate in the testing process. The CA will notify the PM, who will then notify the facility staff when the commissioning events will occur.

12 O&M MANUALS
AND WARRANTIES

- .1 Standard O&M Manuals: The CA reviews the O&M manuals, documentation and redline as-builts for systems that were commissioned to verify compliance with the Specifications. The CA recommends approval and acceptance of these sections of the O&M manuals to the PM. The CA also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated. Refer to Specifications 01 91 13 for further details.
- .2 Commissioning Record: The CA will compile a commissioning binder that represents the commissioning activities and submit it to the owner for their record.

13 TRAINING AND
ORIENTATION OF
OWNER PERSONNEL

- .1 Owner training and orientation on equipment and systems shall be provided by the Contractor in accordance with the project specifications and 01 91 13.
- .2 Submit records of the training activity, initialed by the attendees, to the CA for inclusion in the Commissioning Binder.

14 WARRANTY PERIOD

- .1 During the warranty period, seasonal testing and other deferred testing required is completed according to the Specifications. Deficiencies shall be corrected by the appropriate Subs, witnessed by facilities staff. The CA will return to the project approximately 10 months into the 12 month warranty period. During this visit(s) the CA will review with facility staff the current building operation. The CA will identify areas that may come under warranty or under the original construction contract.

15 SCHEDULE

- .1 The following sequential priorities are followed:
- .1 Equipment is not "temporarily" started (for heating or cooling), until pre-start checklist items and all manufacturer's pre-start procedures are completed and moisture, dust and other environmental and building integrity issues have been addressed.
 - .2 Functional testing is not begun until prefunctional and start-up and TAB is completed, for a given system (this does not preclude a phased approach).
 - .3 The controls system and equipment it controls are not functionally tested until all points have been calibrated and pre-functional testing completed.
 - .4 TAB is not performed until the controls system has been sufficiently functionally tested and approved by the CA for TAB work.
 - .5 TAB is not performed until the envelope is completely enclosed and ceiling complete, unless the return air is ducted.
-

16 INITIAL
COMMISSIONING
SCHEDULE SUMMARY

Task / Activity	Estimated Start Date	Estimated End Date
Initial scoping meeting and final plan	TBD	
Submittals obtained and reviewed		
Begin construction site visits/inspections		
Prefunctional forms developed and distributed		
Startup and initial checkout plans		
Startup and initial checkout executed		
TAB: Water Air		
Functional performance tests		
O&M documentation review and verification		
Training and training verification		
Final commissioning report		