

**PART 1 GENERAL**

**1.1 WORK COVERED BY CONTRACT DOCUMENTS**

- .1 Work of this Contract comprises the Electrical Service Upgrade, located at the Wabush Airport in Wabush, NL; and further identified as Project R.111141.001.
- .2 Work includes but not limited to selective demolition and Electrical Distribution Upgrades.

**1.2 CONTRACT METHOD**

- .1 Construct Work under stipulated price contract.
- .2 Relations and responsibilities between Contractor and subcontractors and suppliers assigned by Departmental Representative are as defined in Conditions of Contract. Assigned Subcontractors shall, in addition:
  - .1 Furnish to Contractor, bonds covering faithful performance of subcontracted work and payment of obligations thereunder when Contractor.
  - .2 Purchase and maintain liability insurance to protect Contractor from claims for not less than limits of liability which is required to provide to the departmental representative.

**1.3 SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Project construction progress schedule in accordance with Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart.
- .3 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements
- .4 Submit site-specific and Work Plan Health and Safety Plan in accordance with Section 01 35 29- Health and Safety Requirements.

**1.4 WORK BY OTHERS**

- .1 Not Used

**1.5 WORK SEQUENCE**

- .1 Construct Work in stages to accommodate Departmental Representative's continued use of premises during construction.
- .2 Co-ordinate Progress Schedule and co-ordinate with Owner Occupancy during construction.
- .3 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .4 Required stages:

- .1 Electrical Service Upgrades
- .2 Building Electrical Distribution Shutdowns
- .3 Commissioning
- .5 Maintain fire access/control.
- .6 Protect workers and public safety.

#### **1.6 CONTRACTOR USE OF PREMISES**

- .1 Limit use of premises for storage and Work, to allow:
  - .1 Owner occupancy.
- .2 Co-ordinate use of premises under direction of Departmental Representative.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 Refer to Section 01 52 00 - Construction Facilities, Section 01 56 00 - Temporary Barriers and Enclosures and 01 55 26 Traffic Controls, for temporary facilities, access roads and parking areas, traffic regulations, and utilities.
- .5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .7 Ensure that operations conditions of exiting work at completion are still the same, equal to or better than that which existed before new work started.

#### **1.7 OWNER OCCUPANCY**

- .1 Departmental Representative will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with Departmental Representative in scheduling operations to minimize conflict and to facilitate Departmental Representative usage.

#### **1.8 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1 Execute work with least possible interference or disturbance to building operations, and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

#### **1.9 EXISTING SERVICES**

- .1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to operations.

- .3 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.
- .4 Submit schedule for approval by Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .5 Provide temporary services Departmental Representative to maintain critical building and tenant services.
- .6 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .7 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .8 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .9 Record locations of maintained, re-routed and abandoned service lines.

#### **1.10 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy of each document as follows:
  - .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 specified.

#### **PART 2 PRODUCTS**

##### **2.1 NOT USED**

- .1 Not used.

#### **PART 3 EXECUTION**

##### **3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

**PART 1        GENERAL**

**1.1            ACCESS AND EGRESS**

- .1      Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

**1.2            USE OF SITE AND FACILITIES**

- .1      Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2      Maintain existing services to building and provide for personnel and vehicle access.
- .3      Where security is reduced by work provide temporary means to maintain security.
- .4      Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .5      Closures: protect work temporarily until permanent enclosures are completed.

**1.3            ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1      Execute work with least possible interference or disturbance to building operations and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

**1.4            EXISTING SERVICES**

- .1      Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2      Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

**1.5            SPECIAL REQUIREMENTS**

- .1      Carry out noise generating Work Monday to Friday from 18:00 to 07:00 hours and on Sundays, Saturdays, and statutory holidays.
- .2      Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .3      Keep within limits of work and avenues of ingress and egress.
- .4      Deliver materials outside of peak traffic hours 17:00 to 07:00 and 13:00 to 15:00 unless otherwise approved by Departmental Representative.

**1.6            SECURITY**

- .1      Where security has been reduced by Work of Contract, provide temporary means to maintain security.

**1.7 BUILDING SMOKING ENVIRONMENT**

- .1 Comply with smoking restrictions. Smoking is not permitted.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1            ADMINISTRATIVE**

- .1     Schedule and administer bi-weekly project meetings throughout the progress of the work and at the call of the Departmental Representative.
- .2     Prepare agenda for meetings.
- .3     Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative.
- .4     Preside at meetings.
- .5     Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .6     Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants, Departmental Representative and affected parties not in attendance and, Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

### **1.2            PRECONSTRUCTION MEETING**

- .1     Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2     Departmental Representative, Senior representatives of User Groups, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3     Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4     Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5     Agenda to include:
  - .1     Appointment of official representative of participants in the Work.
  - .2     Schedule of Work: in accordance with Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart.
  - .3     Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .4     Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
  - .5     Delivery schedule of specified equipment.
  - .6     Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
  - .7     Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
  - .8     Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
  - .9     Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
  - .10    Commissioning in accordance with Section 01 91 13.

- .11 Monthly progress claims, administrative procedures, photographs, hold backs.
- .12 Appointment of inspection and testing agencies or firms.
- .13 Insurances, transcript of policies.

### **1.3 PROGRESS MEETINGS**

- .1 During course of Work and 2 weeks prior to project completion, schedule progress meetings Bi-weekly, biweekly meetings will alternate between teleconference and on-site.
- .2 Contractor, major Subcontractors involved in Work, Departmental Representative are to be in attendance.
- .3 Notify parties minimum 5 days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.
- .5 Agenda to include the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Work progress since previous meeting.
  - .3 Field observations, problems, conflicts.
  - .4 Problems which impede construction schedule.
  - .5 Review of off-site fabrication delivery schedules.
  - .6 Corrective measures and procedures to regain projected schedule.
  - .7 Revision to construction schedule.
  - .8 Progress schedule, during succeeding work period.
  - .9 Review submittal schedules: expedite as required.
  - .10 Maintenance of quality standards.
  - .11 Review proposed changes for affect on construction schedule and on completion date.
  - .12 Other business.

## **PART 2 PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

## **PART 3 EXECUTION**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 DEFINITIONS**

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

### **1.2 REQUIREMENTS**

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.



#### **1.4 MASTER PLAN**

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return revised schedules within 5 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

#### **1.5 PROJECT SCHEDULE**

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
  - .1 Award.
  - .2 Shop Drawings, Samples.
  - .3 Permits.
  - .4 Mobilization.
  - .5 Electrical.
  - .6 Shutdowns expected
  - .7 Testing and Commissioning.
  - .8 Supplied equipment long delivery items.

#### **1.6 PROJECT SCHEDULE REPORTING**

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

#### **1.7 PROJECT MEETINGS**

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

### **PART 2 PRODUCTS**

#### **2.1 NOT USED**

- .1 Not used.

**PART 3        EXECUTION**

**3.1            NOT USED**

.1        Not used.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1            ADMINISTRATIVE**

- .1        Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2        Do not proceed with Work affected by submittal until review is complete.
- .3        Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4        Where items or information is not produced in SI Metric units converted values are acceptable.
- .5        Review submittals prior to submission to Departmental Representative . This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6        Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7        Verify field measurements and affected adjacent Work are co-ordinated.
- .8        Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9        Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10       Keep one reviewed copy of each submission on site.

### **1.2            SHOP DRAWINGS AND PRODUCT DATA**

- .1        The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2        Submit drawings stamped and signed by professional engineer registered or licensed in the province of work.
- .3        Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4        Allow 10 days for Departmental Representative's review of each submission.
- .5        Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .8 Submissions include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Operating weight.
    - .8 Wiring diagrams.
    - .9 Single line and schematic diagrams.
    - .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

- .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
  - .2 Testing must have been within 3 years of date of contract award for project.
- .13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.
- .20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .21 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that the Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
  - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

**1.3            SAMPLES**

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

**1.4            PHOTOGRAPHIC DOCUMENTATION**

- .1        Submit electronic colour digital photography in jpg format, fine resolution monthly with progress statement as directed by Departmental Representative.
- .2        Project identification: name and number of project and date of exposure indicated.
- .3        Number of viewpoints: 4 locations.
  - .1        Viewpoints and their location as determined by Departmental Representative.
- .4        Frequency of photographic documentation: weekly

**PART 2        PRODUCTS**

**2.1            NOT USED**

- .1        Not Used.

**PART 3        EXECUTION**

**3.1            NOT USED**

- .1        Not Used.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1            GENERAL**

- .1 Prior to start of work, Departmental Representative will arrange for briefing of all Contractor's personnel by Airport Authority on procedures for movement of equipment and personnel, and work on, or adjacent to active runways, taxiways or parking aprons.
- .2 The Departmental Representative will coordinate a safety and security presentation for Contractor and the Contractor's personnel who will require access on site.
- .3 All Contractor's personnel authorized to use airport for accessing the work site will be issued a special area visitor's pass. This pass must be kept on at all times during working hours.
- .4 The Contractor must be prepared to evacuate all personnel and equipment from operational surfaces and runway strip on 30 minutes notice to move. Contractor to coordinate with airport operations staff to ensure evacuated areas are approved by Departmental Representative as made safe for air operations within required timeline.

### **1.2            PROTECTION**

- .1 Do not disrupt airport operations except as permitted by Departmental Representative.
- .2 Provide temporary protection to permit safe passage of all personnel, vehicles and aircraft in vicinity of Work.
- .3 Provide barricades and signs, lighted by night or during poor visibility and flags by day where directed by the Departmental Representative. These provisions shall prevent airport personnel from inadvertently crossing into construction areas and construction personnel from crossing into operational areas.
- .4 Provide containers for debris and clean-up is performed as work progresses and at a daily rate to prevent FOD (Foreign Object Damage to Aircraft). Be diligent in preventing refuse, from Work on this project, from being windblown across the airport.
- .5 Provide wetting down of surfaces and areas to prevent FOD or dusting hazards (such as ingestion into the aircraft engine or visibility to aircraft risks).
- .6 Locate all fixed facilities & objects at horizontal distance of not less than 3.0 m from primary security fences on groundside and 1.0 m from security fence on airside.
- .7 Do not park vehicles, construction equipment or stockpile any material within 3.0 metres of any security fence on groundside and within 1.0 metres from

security fence on airside when not working on construction of new fences.

### **1.3 TEMPORARY BARRIERS AND DELINEATORS**

- .1 Contractor shall be responsible for supplying all materials, hardware or devices required to delineate the Work Site and various construction phases for safety, security and traffic control requirements, at no additional cost to the Departmental Representative.

### **1.4 CLOSURE OF AIRSIDE FACILITIES**

- .1 Carry out work requiring interruption of airport operations at time directed, with minimum of disturbance to airport operations.
- .2 Submit schedule to, and obtain approval from Departmental Representative of interruptions or closure of active airport facilities. Adhere strictly to approved schedule.
- .3 Closed facilities cannot be reopened until inspected and approved by the Departmental Representative.

### **1.5 COORDINATION OF MOVEMENT IN OPERATIONAL AREAS**

- .1 Brief Departmental Representative every day prior to starting work in area adjacent to or on active airport facilities.
- .2 Obtain Departmental Representative's approval on scheduling of Work.
- .3 Control movements of equipment and personnel as directed by Departmental Representative.
- .4 Obey signals from Airport Authority Commissionaire immediately.
- .5 Any persons who fail to comply signals from Airport Authority Commissionaire will result in immediately removal of airside access.

### **1.6 FLIGHT SAFETY**

- .1 Prior to permitting personnel to work adjacent to an active runway, taxiways, parking aprons, or working within 91 m from center line of the runway and 6 m the edge of asphalt from other active facilities(taxiway, apron), establish contact with Department Representative and obtain specific clearances. Once established on airport, maintain radio contact on work site with the Commissionaires at all times. Obey all instructions promptly and explicitly.



- .2 The contractor shall obey the direction of the Commissionaires with regards to pullbacks.
- .3 Obey all instructions promptly and explicitly.
- .4 Prior to starting work obtain necessary closure of adjacent facilities.
- .5 During working hours, supply flagmen at crossings of active facilities.
- .6 All Contractor's vehicles used on the airport must be equipped with an orange rotary beacon or must be escorted by a vehicle equipped with a beacon.

## **1.7 UNSERVICEABLE AREAS**

- .1 Mark off areas made unserviceable for aircraft by work of this Contract by providing plainly visible danger markings by day and red lights by night. Open flames in flammable fuels not permitted.
- .2 Coordinate demolition of unserviceable areas in accordance with Phasing Plan over course of construction.
- .3 Park equipment not in use and stockpile materials in areas approved by Departmental Representative so that equipment:
  - .1 Tops are below a 50 (horizontal) to 1 (vertical) ratio from ends of useable landing strip.
  - .2 Is below 20 (horizontal) to 1 (vertical) ratio from sides of aircraft traffic areas.
  - .3 Is outside limits of pullback zones.
- .4 Where directed, mark mobile equipment tops with lights. Mobile objects, excluding aircraft, on the manoeuvring area are lighted to display flashing yellow lights except for vehicles associated with an emergency situation, which display flashing red light, or flashing red and flashing yellow lights. The characteristics are as follows:
  - .1 an effective intensity of the flash ranging between 40 and 400 candelas;
  - .2 360° azimuth (horizontal) coverage;
  - .3 peak intensity from 0° to 10° above the horizontal and reduced intensity to 1/10 of peak intensity from 10° to 15° above the horizontal; and
  - .4 a flash rate of 75 (±15) flashes per minute.

## **1.8 FOD**

- .1 Foreign Object Damage (FOD) can occur anytime a foreign object comes in contact with an aircraft. Foreign objects are anything foreign to the airfield, including but not limited to: construction dust, hats, rags, pen caps, paper, rocks or mud from vehicle tires, etc.
- .2 Foreign Object Damage (FOD) control procedures will be enforced by the Departmental Representative at all times in the construction and operational

area. Keeping active taxiways and aprons adjacent to the work, clean during the Work, will be the responsibility of the Contractor.

- .3 The contractor is to routinely inspect the site for FOD during the work shifts.
- .4 Maintain at the construction site a Departmental Representative approved, sufficiently sized and powered:
  - .1 Street sweeper tractor with power broom or similar vehicle, fitted with a non-metallic motorized rotary sweeper broom, minimum width 2.4m, for FOD control and clean-up of adjacent operational surfaces affected by construction activities. Site FOD sweeps shall be conducted at the end of each working day and when directed by the Departmental Representative.
  - .2 Water truck capable of supplying enough water for dust control as well as construction needs.
- .5 Where access routes cross active runways, taxiways or parking aprons, keep crossings free of FOD mud and debris at all times. Broom clean immediately .
- .6 Routinely inspect and clean equipment as necessary to remove rocks, dirt and mud that may accumulate. Inspection and cleaning of equipment shall occur before equipment enters the airfield and before equipment transitions from airfield soil surfaces to runway, ramp or associated concrete or asphalt surfaces.

## **PART 2 PRODUCTS**

### **2.1 NOT USED**

- .1 Not used.

## **PART 3 EXECUTION**

### **3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1            SECTION INCLUDES**

- .1 Fire Safety Requirements.
- .2 Hot Work Permit.
- .3 Existing Fire Protection and Alarm Systems.

### **1.2            RELATED SECTIONS**

- .1 Section 01 35 29: Health and Safety Requirements.

#### **.1        REFERENCES**

##### **NATIONAL FIRE CODE 2015**

- .2 National Building Code 2015
- .3 CAN/CSA-W117.2, "Safety in Welding, Cutting and Allied Processes."
- .4 Applicable OHS legislation

### **1.3            DEFINITIONS**

- .1 Hot Work - applies to hot works involving open flames or producing heat or sparks, including, without being limited to, cutting, welding, soldering, brazing, grinding, adhesive bonding, thermal spraying and thawing pipes.

### **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 2015.
  - .2 National Building Code 2015.
  - .3 Provincial OHS Acts and Regulations.
  - .4 CAN/CSA-W117.2, "Safety in Welding, Cutting and Allied Processes."
- .2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise 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 Departmental Representative's directives in this regard.
- .7 Hot works shall be performed only by personnel trained in the safe use of equipment in conformance with this Section

## **1.7 HOT WORK EQUIPMENT**

- .1 Maintenance
  - .1 Hot work equipment shall be maintained in good operating condition.
- .2 Inspection
  - .1 Hot work equipment shall be examined for leakage or defects prior to each use.
  - .2 Leaks or defects found in hot work equipment shall be repaired prior to use.
- .3 Equipment Not in Use
  - .1 All valves shall be closed and gas lines bled when Class 2 gas hot work

- equipment is not in use.
- .2 Electric hot work equipment shall be de-energized when not in use.
- .4 Compressed Gas Equipment
  - .1 The design and installation of oxygen-fuel gas equipment shall conform to NFPA 51, "Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes."
  - .2 Unalloyed copper piping shall not be used for acetylene gas.
  - .3 Oil or grease shall not be used with equipment for oxygen.
  - .4 Cylinders of Class 2 gases shall conform to Part 3.

## **1.8 PREVENTION OF FIRES**

- .1 Location of Operations
  - .1 Except as provided in Sentence (2), hot work shall be carried out in an area free of combustible and flammable contents, with walls, ceilings and floors of noncombustible construction or lined with noncombustible materials.
  - .2 When it is not practicable to undertake hot work in an area described in Sentence (1),
    - .1 combustible and flammable materials within a 15 m distance from the hot work shall be protected against ignition in conformance with Article 4 below
    - .2 a fire watch shall be provided during the hot work and for a period of not less than 60 min after its completion.
    - .3 a final inspection of the hot work area shall be conducted 4 h after completion of work.
  - .3 When there is a possibility of sparks leaking onto combustible materials in areas adjacent to the area where hot work is carried out,
    - .1 openings in walls, floors or ceilings shall be covered or closed to prevent the passage of sparks to such adjacent areas, or
    - .2 Sentence (2) shall apply to such adjacent areas.
  - .4 Protection of Combustible and Flammable Materials
    - .1 Any combustible and flammable material, dust or residue shall be:
      - .1 removed from the area where hot work is carried out, or
      - .2 protected against ignition by the use of noncombustible materials.
- .2 Combustible materials or building surfaces that cannot be removed or protected against ignition as required in Sentence (1) shall be thoroughly wetted where hot work is carried out. Any process or activity that produces flammable gases or vapours, combustible dusts or combustible fibres in quantities sufficient to create a fire or explosion hazard shall be interrupted and the hazardous conditions shall be removed before any hot work is carried out.

## **1.9 HOT WORK PROCEDURES**

- .1 Develop and implement safety procedures and work practices 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 competent 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.

#### **1.10 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 60 minute – minimum time period of fire 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.

#### **1.11 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 firefighting
- .3 Costs incurred, from the fire department, Facility Departmental Representative and tenants, 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.

**1.12 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.

**END OF SECTION**

## **PART 1            GENERAL**

### **1.1                SECTION INCLUDES**

- .1 Procedures to isolate and lockout electrical facility and other equipment from energy sources.

### **1.2                RELATED SECTIONS**

- .1 Section 01 35 29: Health and Safety

### **1.3                REFERENCES**

- .1 CSA C22.1- 21, Canadian Electrical Code
- .2 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

### **1.4                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.



- .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.

## **1.5 COMPLIANCE REQUIREMENTS**

- .1 Comply with the following in regards to isolation and lockout of electrical facilities and equipment:
  - .1 Canadian Electrical Code 2021.
  - .2 Federal and Provincial Occupational Health and Safety Acts and Regulations.
  - .3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.
  - .4 Procedures specified herein.
  - .5 CSA Z 460-13 (R2018) Control of Hazardous Energy – Lock out and other methods
  - .6 CSA Z 462-18 Workplace Electrical Safety
- .2 In event of conflict between any provisions noted above, the most stringent provision will apply.

## **1.6 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.

## **1.7 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:
  - .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 shutdown 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. Provide temporary power to other equipment that needs to be remain operational if a shutdown is not possible.
- .8 Conduct hazard assessment as part of the process in accordance with health and safety requirements specified Section 01 35 29.
- .9 When entire sections of the facility need to be locked-out to do full demolition a separate temporary construction power distribution is to be provided for this purpose.

## 1.8 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.
- .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 shall 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 Ensuring 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 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.

## **1.9 CONFORMANCE**

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

## **1.10 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.

**END OF SECTION**

## **PART 1            GENERAL**

### **1.1                SECTION INCLUDES**

- .1 Section 01 35 24: Special Procedures on Fire Safety Requirements.
- .2 Section 01 35 25: Special Procedures on Lockout Requirements.

### **1.2                DEFINITIONS**

- .1 Competent Person: means a person who is:
  - .1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
  - .2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
  - .3 Knowledgeable about potential or actual danger to health or safety associated with the Work.
- .2 Medical Aid Injury: any injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.
- .3 PPE: personal protective equipment.
- .4 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.
- .5 Incident - occurrence, condition, or situation arising in the course of work that resulted in or could have resulted in injury, illness, property damage, environmental issues or fatality.

### **1.3                SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00.
- .2 Submit Site-Specific Health and Safety Plan prior to commencement of Work.
  - .1 Submit within 10 work days of notification of Bid Acceptance. Allow for 5-10 days for Department review and recommendations prior to the commencement of work. Provide electronic copies.
  - .2 Departmental Representative will review Health and Safety Plan and provide comments.
  - .3 Revise the Plan as appropriate and resubmit within 10 work days after receipt of comments.
  - .4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational

Health and Safety of the Work.

- .5 Submit revisions and updates made to the Plan during the course of Work.
- .3 Submit name of designated Health and Safety Site Representative and support documentation specified in the Safety Plan.
- .4 Submit building permit, compliance certificates and other permits obtained.
- .5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other Department of Labour organization.
  - .1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.
- .6 Submit copies of reports or directions issued by Federal or Provincial authorities within 24 hours after the visit to the Departmental Rep.
- .7 Submit copies of incident reports (incident, accident, injury, near-miss, fire, explosion, chemical spill or damage to property occurring at the work site) 24 hours after the event to the Departmental Representative.
- .8 Submit documented plans as prescribed through Public Health requirements, directions, orders and declarations. Include industry best practices when preparing the plan and revise/update accordingly and in a timely manner as per Public Health requirements and recommended industry best practices. (Covid 19 – a source of advice can be found in the link below  
<https://www.cca-acc.com/wp-content/uploads/2020/06/CCA-COVID-19-Standardized-Protocols-for-All-Canadian-Construction-Sites-05-26-20.pdf>)

#### 1.4 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act for Province of Newfoundland and Labrador, and Occupational Health & Safety Regulations made pursuant to the Act.
- .2 Comply with Provincial/Federal Public Health requirements, directions, and declarations. Prepare documented plans as prescribed by Public Health and/or industry best practices in consultation with the Departmental Representative.
- .3 Canadian Standards Association (CSA):
  - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .4 Observe construction safety measures of:
  - .1 NBC 2015, Division B, Part 8.
  - .2 NFC 2015,
  - .3 Municipal by-laws and ordinances.

- .5 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.
- .6 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.
- .7 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

## **1.5 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons and environment adjacent to the site to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.

## **1.6 SITE CONTROL AND ACCESS**

- .1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.
  - .1 Departmental Representative will provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.
- .2 Isolate Work Site from other areas of the premises by use of appropriate means.
  - .1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment. See Section 01 56 00 for minimum acceptable requirements.
  - .2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.
  - .3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.
- .3 Provide safety orientation session to persons granted access to WorkSite. Advise of hazards and safety rules to be observed while on site. Maintain records of such orientation on site for review and audit by the DR or their authorized inspector.
- .4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.

- .5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm. Provide security guard where adequate protection cannot be achieved by other means.

## **1.7 PROTECTION**

- .1 Give precedence to safety and health of persons and protection of environment over cost and schedule considerations for Work.
- .2 Should unforeseen or peculiar safety related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

## **1.8 FILING OF NOTICE**

- .1 File Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work. Departmental Representative will assist in locating address if needed.

## **1.9 PERMITS**

- .1 Is responsible to pay all fees to obtain all permits required to conduct the work.
- .2 Is responsible to provide authorities with plans and information for acceptance certificates and the costs arising from same.
- .3 Is responsible to provide inspections certificates as evidence that work conforms to requirements of Authorities Having Jurisdiction (AHJ)
- .4 Post permits, licenses and compliance certificates, specified in section 01 41 00, at Work Site.
- .5 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.

## **1.10 HAZARD ASSESSMENTS**

- .1 Perform a documented site specific Project hazard assessment for the Work. Include any site issues / hazards / concerns identified arising from the site visit that must be considered.
- .2 Carryout initial assessment prior to commencement of Work with further assessments completed and documented as needed during progress of work, including when new trades and subcontractors arrive on site.
- .3 Record results and address in Health and Safety Plan.
- .4 Share information and controls identified from original and updated Project hazard

assessments with project workers. Record this information sharing complete with names and dates. Keep documentation on site for entire duration of the Work.

#### **1.11 PROJECT/SITE CONDITIONS**

- .1 Following are potential health, environmental and safety hazards at the site for which Work may involve contact with:
  - .1 Refer to Section 028200.02 and Annex A for existing hazardous substances or contaminated building materials
- .2 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered during Work.
- .3 Include above items in the hazard assessment of the Work.
- .4 MSDS Data sheets of pertinent hazardous and controlled products stored on site can be obtained from Departmental Representative.

#### **1.12 FIRE PROTECTION AND ALARM SYSTEMS**

- .1 Attend pre-construction health and safety meeting, convened and chaired by departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:
  - .1 Superintendent of Work.
  - .2 Designated Health & Safety Site Representative.
  - .3 Subcontractors.
- .2 Conduct pre shift tool box talks with the crew and conduct regularly scheduled (minimum bi-weekly) safety meetings during the Work.
- .3 Keep documents on site for review by DR or their authorized rep.

#### **1.13 HEALTH AND SAFETY PLAN**

- .1 Prior to commencement of Work, develop a written Site Specific Safety Plan for the Project. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.
  - .1 Items to include in the Site Specific Safety Plan;
    - .1 Name of the designated Site Safety Rep showing proof of his/her competence and reporting relationship in Contractor's company. This person is expected to be on site during all work execution.
    - .2 A copy of a current WCB Letter of Good Standing
    - .3 Details as to how WHMIS 2015 / GHS will be managed on site.
    - .4 Details as to how the Project work areas will be delineated/protected from other areas of the premises.(fences, signs). Must be project specific.



- .5 Details as to how Safety orientations will be managed. Include a summary of what topics are covered in the safety orientation described in this section?
- .6 A copy of a Notice of Project that was sent to the Provincial OHS regulator.
- .7 Project site specific hazard assessment.
- .8 Details as to how tool box and safety meetings will be held and recorded.
- .9 An organizational chart illustrating supervision and subs that are assigned to this Project?
- .10 On-site Emergency Response Plans that cover all potential emergency situations that could arise. This should harmonize with the facility if possible. Emergency Contacts: name and telephone number of officials from:
  - .1 General Contractor and subcontractors.
  - .2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.
  - .3 Local emergency resource organizations.
- .11 List of critical work activities which have a risk of endangering health and safety of Facility users and/or others.
- .12 Details as to how the subcontractors documented safety program will be reviewed and managed prior to allowing them to work on site.
- .13 Details as to how the site safety inspection program will be managed. Include frequency, assignment of responsibility as well as standard inspection form to be used.
- .14 Basic PPE requirements as well as specialized PPE requirements; minimum being hard hat, safety footwear, safety glasses and high visibility vest.
- .15 General safety rules as well as the disciplinary protocols to be taken for noncompliance.
- .16 Details as to how Incident investigations will be managed. Include procedure and incident form.
- .2 Post copy of the Plan, and updates, prominently on Work Site.

#### **1.14 SAFETY SUPERVISION**

- .1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work.
- .2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority

to:

- .1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work
- .2 Monitor and enforce Contractor's site-specific Health and Safety Plan.
- .3 Conduct site safety orientation session to persons granted access to Work Site.
- .4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.
- .5 Stop the Work as deemed necessary for reasons of health and safety.
- .3 Health & Safety Site Representative must:
  - .1 Be qualified and competent person in occupational health and safety.
  - .2 Have site-related working experience specific to activities of the Work.
  - .3 Be on Work Site at all times during execution of the Work.
  - .4 All supervisory personnel assigned to the Work shall also be competent persons.
  - .5 Inspections:
    - .1 Conduct regularly scheduled safety inspections of the Work on a minimum weekly basis. Record deficiencies and remedial action taken.
    - .2 Follow-up and ensure corrective measures are taken.
    - .3 Share inspection reports with crews / subs
  - .6 Cooperate with the Facility's and / or the PSPC Occupational Health and Safety representative.
  - .7 Keep inspection reports and supervision related documentation on site.

## **1.15 TRAINING**

- .3 Use only skilled workers on Work Site who are deemed competent and are trained in occupational health and safety procedures and practices pertinent to their assigned task.
- .4 Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licensed workers. Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties.
- .5 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.
- .6 When unforeseen or peculiar safety-related hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

**1.16 MINIMUM SITE SAFETY RULES**

- .1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; the company shall establish rules to govern the conduct and actions of their employees. These rules should leave no room for discretion and argument. The rules must be enforced and action should be taken every time a rule is violated.
- .2 Brief persons of the documented disciplinary protocols to be taken for noncompliance. Post rules on site.

**1.17 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.

**1.18 INCIDENT REPORTING**

- .1 Investigate and report all incidents to Departmental Representative.
- .2 Notify the Departmental representative as soon as reasonably practicable following the incident.
- .3 Ensure the Authority having Jurisdiction is notified as prescribed by applicable legislation.
- .4 Submit report in writing.

**1.19 HAZARDOUS PRODUCTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).
- .2 Keep MSDS data sheets for all products delivered to site.
  - .1 Post on site.
  - .2 Submit copy to Departmental Representative.
- .3 For interior work in an occupied Facility, post additional copy in one or more publicly accessible locations.

**1.20 BLASTING**

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

**1.21 POWDER ACTUATED DEVICES**

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

**1.22            CONFINED SPACES**

- .1        Abide by occupational health and safety regulations regarding work in confined spaces.

**1.23            SITE RECORDS**

- .1        Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.
- .2        Upon request, make available to Departmental Representative or authorized Safety Officer for inspection.

**1.24            POSTING OF DOCUMENTS**

- .1        Ensure applicable items, articles, notices and orders are posted in a conspicuous location on the Work Site in accordance with Acts and Regulations of the Province of Newfoundland. See local legislation for specifics.
- .2        Post other documents as specified herein, including:
  - .1    Site specific Health and Safety Plan.
  - .2    WHMIS data sheets.

**END OF SECTION**

## **PART 1        GENERAL**

### **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 Continuous escort of un-cleared workers by security personnel;
  - .2 Specific rules and regulations as specified in this section and as directed by Departmental Representative to be stringently followed.
- .2 It is the Contractor's responsibility to:
  - .1 Become familiar with and abide by security rules and regulations;
  - .2 Brief all workers and sub-contractors in respect of the security regulations and ensure that they abide by all rules and directives.
- .3 The Departmental Representative will coordinate pre-construction meeting between Contractor, Building 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 Obtain and pay for the services of security personnel, employed by the Canadian Corps of Commissionaires to provide escort and security supervision of all un-cleared workers during the work of this contract in areas identified as Airside access for a period of 10 days minimum based on 10 Hours per day.
- .2 Commissionaires employed on this project must have a current reliability Security Clearance status issued by PWGSC.
- .3 Provide minimum of two (2) Commissionaires 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 Departmental Representative for each work phase;
  - .2 Maintain security control list of workers authorized to be on site as determined by Contractor and 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.

- .4 Provide additional commissionaires when required to perform supervision or escort function as may be needed due to Contractor's work operations in order that no worker is left unsupervised on premises.
- .5 Ensure Commissionaire(s) are present on site for entire work shift including work breaks and time period after work shifts until all workers have left site.
- .6 Commissionaire must 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.
- .7 Escort and supervision of workers by Commissionaire is required at all times regardless as to whether work shifts are in the daytime or during off hours.
- .8 Commissionaire shall report directly to 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.
- .9 Ensure Commissionaire is fitted and wears approved safety hard hat, safety footwear and other personnel protective equipment appropriate to work in accordance with applicable Health and Safety Section 01 35 29.

### **1.3 SECURITY PASSES**

- .1 Visitor Tags are required for all personnel requiring access inside the building beyond the main public lobby.
- .2 Tags will be provided by Facility Security to Contractor for distribution to authorized workers which are 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 hours.
- .4 The Contractor is responsible to obtain visitor tags before work commences, including those required by his sub-contractors, and to 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 visitor 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. Departmental Representative will deduct from final contract payment, \$100.00 for each pass not returned regardless of the reason the pass is not returned.
- .7 Immediately report any lost, stolen or destroyed passes to the Departmental Representative.

### **1.4 SECURITY CONTROL LIST**

- .1 Provide a list of employee names from workforce and from sub-contractors who will be present at site during the course of work.
- .2 List to include names, addresses and telephone number of all persons.
- .3 Submit copy 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 Security Personnel, Departmental Representative or Facility Management.

## **1.5 BUILDING ACCESS**

- .1 Keys and door security access cards necessary for access to restricted areas may be issued at the discretion of the Building Manager and 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 sub-contractor.
- .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 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.

## **1.6 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 work shift.
  - .1 Notify Building Security when security doors will be used and stringently follow all directives to ensure building security is effectively maintained.
- .2 When work must be carried out during "off-hours" or beyond the work hours previously agreed upon at start of work, provide notice as soon as possible in order to minimize the impact on Building Security.

## **PART 2 PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

## **PART 3 EXECUTION**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1            SUMMARY**

- .1        This Section references to laws, by laws, ordinances, rules, regulations, codes, orders of Authority Having Jurisdiction, and other legally enforceable requirements applicable to Work and that are; or become, in force during performance of Work.

### **1.2            REFERENCES TO REGULATORY REQUIREMENTS**

- .1        Department of Justice Canada (Jus)
  - .1            SOR/2018-196 Prohibition of Asbestos and Products Containing Asbestos Regulations.
  - .2            Perform Work in accordance with National Building Code of Canada (NBC 2015) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
  - .3            Specific design and performance requirements listed in specifications or indicated on Drawings may exceed minimum requirements established by referenced Building Code; these requirements will govern over the minimum requirements listed in Building Code
    - .1            Meet or exceed requirements of:
      - .1            Contract documents.
      - .2            Specified standards, codes and referenced documents.

### **1.3            HAZARDOUS MATERIAL DISCOVERY**

- .1        Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative.
- .2        PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Departmental Representative.
- .3        Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Departmental Representative.

### **1.4            BUILDING SMOKING ENVIRONMENT**

- .1        Comply with smoking restrictions and municipal by-laws.

### **1.5            QUALITY ASSURANCE**

- .1        Regulatory Requirements: Except as otherwise specified, Constructor shall apply for, obtain, and pay fees associated with, permits, licenses, certificates, and approvals required by regulatory requirements and Contract Documents, based on General Conditions of Contract and the following:
  - .1            Regulatory requirements and fees in force on date of Bid submission, and



- .2 A change in regulatory requirements or fees scheduled to become effective after date of tender submission and of which public notice has been given before date of tender submission

## **PART 2 PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

### **2.2 PERMITS**

- .1 Building Permit:
  - .1 Constructor shall apply for, obtain and pay for building permit on behalf of the Departmental representative, and other permits required for Work and its various parts.
  - .2 Constructor will require that specific Subcontractor 's obtain and pay for permits required by authorities having jurisdiction, where their Work is affected by Work requiring permits.
  - .3 Constructor shall display building permit and other permits in a conspicuous location at Place of Work.
- .2 Occupancy Permits:
  - .1 Constructor shall apply for, obtain, and pay for occupancy permits, including partial occupancy permits where required by authority having jurisdiction.
  - .2 Departmental Representative will issue appropriate instructions to Constructor for correction to Work where Contract Document deficiencies are required to be corrected in order to obtain occupancy permits, including partial occupancy permits.
  - .3 Constructor shall correct deficiencies in accordance with Departmental Representative 's instructions. Where deficiency is not corrected, Departmental Representative reserves the right to make correction and charge Constructor for costs incurred.
  - .4 Constructor shall turn occupancy permits over to Departmental Representative.

## **PART 3 EXECUTION**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**PART 1        GENERAL**

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative will pay cost of examination and replacement.

**1.2            ACCESS TO WORK**

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

**1.3            PROCEDURES**

- .1 Notify appropriate agency Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

**1.4            REJECTED WORK**

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

**1.5                EQUIPMENT AND SYSTEMS**

- .1        Submit testing reports for electrical equipment and systems.

**PART 2           PRODUCTS**

**2.1                NOT USED**

- .1        Not Used.

**PART 3           EXECUTION**

**3.1                NOT USED**

- .1        Not Used.

**END OF SECTION**

**PART 1        GENERAL**

**1.1            ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

**1.2            INSTALLATION AND REMOVAL**

- .1        Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2        Identify areas which have to be gravelled to prevent tracking of mud.
- .3        Indicate use of supplemental or other staging area.
- .4        Provide construction facilities in order to execute work expeditiously.
- .5        Remove from site all such work after use.

**1.3            SCAFFOLDING**

- .1        Scaffolding in accordance with CAN/CSA-S269.2.
- .2        Provide and maintain ladders, scaffolding and platforms.

**1.4            HOISTING**

- .1        Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2        Hoists and cranes to be operated by qualified operator.

**1.5            SITE STORAGE/LOADING**

- .1        Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2        Do not load or permit to load any part of Work with weight or force that will endanger Work.

**1.6            CONSTRUCTION PARKING**

- .1        Parking will be permitted on site provided it does not disrupt performance of Work.
- .2        Provide and maintain adequate access to project site.
- .3        Clean runways and taxi areas where used by Contractor's equipment.

**1.7            EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1        Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2        Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

## **1.8 SANITARY FACILITIES**

- .1 Permanent facilities may be used on approval of Departmental Representative.

## **1.9 PROTECTION AND MAINTENANCE OF TRAFFIC**

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .8 Dust control: adequate to ensure safe operation at all times.
- .9 Provide snow removal during period of Work.

## **1.10 CLEAN-UP**

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

## **PART 2 PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

## **PART 3 EXECUTION**

### **3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction. Ensure sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1            PROTECTION OF PUBLIC TRAFFIC**

- .1        Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2        When working on travelled way:
  - .1            Place equipment in position to minimize interference and hazard to travelling public.
  - .2            Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
  - .3            Do not leave equipment on travelled way overnight.
- .3        Close lanes of road only after receipt of written approval from Departmental Representative.
  - .1            Before re-routing traffic erect suitable signs and devices to manual of Uniform Traffic Control Devices for Streets and Highways.
- .4        Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic.
  - .1            Provide 7 m wide minimum temporary roadway for traffic in two-way sections through Work and on detours.
  - .2            Provide 5 m wide minimum temporary roadway for traffic in one-way sections through Work and on detours.
- .5        Provide gravelled detours or temporary roads as directed by Departmental Representative to facilitate passage of traffic around restricted construction area:
- .6        Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, except where other means of road access exist that meet approval of Departmental Representative.

### **1.2            INFORMATIONAL AND WARNING DEVICES**

- .1        Provide and maintain signs, and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2        Supply and erect signs, delineators, barricades and miscellaneous warning devices to Manual of Uniform Traffic Control Devices for Streets and Highways
- .3        Place signs and other devices in locations recommended in Manual of Uniform Traffic Control Devices for Streets and Highways.

- .4 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.
- .5 Continually maintain traffic control devices in use:
  - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
  - .2 Remove or cover signs which do not apply to conditions existing from day to day.

### **1.3 CONTROL OF PUBLIC TRAFFIC**

- .1 Provide competent flag personnel, trained in accordance with, and properly equipped to Manual of Uniform Traffic Control Devices for Streets and Highways for situations as follows:
  - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
  - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
  - .3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
  - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
  - .5 For emergency protection when other traffic control devices are not readily available.
  - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.

## **PART 2 PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

## **PART 3 EXECUTION**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**



**PART 1        GENERAL**

**1.1            INSTALLATION AND REMOVAL**

- .1        Provide temporary controls in order to execute Work expeditiously.
- .2        Remove from site all such work after use.

**1.2            GUARD RAILS AND BARRICADES**

- .1        Provide secure, rigid guard rails and barricades around deep excavations.

**1.3            ACCESS TO SITE**

- .1        Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

**1.4            PUBLIC TRAFFIC FLOW**

- .1        Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

**1.5            FIRE ROUTES**

- .1        Maintain access to property including overhead clearances for use by emergency response vehicles.

**1.6            PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

- .1        Protect surrounding private and public property from damage during performance of Work.
- .2        Be responsible for damage incurred.

**1.7            PROTECTION OF BUILDING FINISHES**

- .1        Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2        Provide necessary screens, covers, and hoardings.
- .3        Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.
- .4        Be responsible for damage incurred due to lack of or improper protection.

**1.8            WASTE MANAGEMENT AND DISPOSAL**

- .1        Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

**PART 2        PRODUCTS**

**2.1            NOT USED**

.1        Not Used.

**PART 3        EXECUTION**

**3.1            NOT USED**

.1        Not Used.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1            QUALITY**

- .1        Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2        Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3        Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4        Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .5        Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6        Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

### **1.2            AVAILABILITY**

- .1        In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

### **1.3            STORAGE, HANDLING AND PROTECTION**

- .1        Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2        Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3        Store products subject to damage from weather in weatherproof enclosures.
- .4        Store cementitious products clear of earth or concrete floors, and away from walls.
- .5        Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6        Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

#### **1.4 TRANSPORTATION**

- .1 Pay costs of transportation of products required in performance of Work.

#### **1.5 MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

#### **1.6 QUALITY OF WORK**

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

#### **1.7 CO-ORDINATION**

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

#### **1.8 REMEDIAL WORK**

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

**1.9 LOCATION OF FIXTURES**

- .1 Consider location of electrical items indicated as approximate.
- .2 Inform Departmental Representative of conflicting installation. Install as directed.

**1.10 EXISTING UTILITIES**

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1            ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Submit written request in advance of cutting or alteration which affects:
  - .1            Structural integrity of elements of project.
  - .2            Integrity of weather-exposed or moisture-resistant elements.
  - .3            Efficiency, maintenance, or safety of operational elements.
  - .4            Visual qualities of sight-exposed elements.
  - .5            Work of Departmental Representative or separate contractor.
- .3        Include in request:
  - .1            Identification of project.
  - .2            Location and description of affected Work.
  - .3            Statement on necessity for cutting or alteration.
  - .4            Description of proposed Work, and products to be used.
  - .5            Alternatives to cutting and patching.
  - .6            Effect on Work of Departmental Representative or separate contractor.
  - .7            Written permission of affected separate contractor.
  - .8            Date and time work will be executed.

### **1.2            MATERIALS**

- .1        Required for original installation.
- .2        Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

### **1.3            PREPARATION**

- .1        Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2        After uncovering, inspect conditions affecting performance of Work.
- .3        Beginning of cutting or patching means acceptance of existing conditions.
- .4        Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5        Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

### **1.4            EXECUTION**

- .1        Execute cutting, fitting, and patching to complete Work.
- .2        Fit several parts together, to integrate with other Work.
- .3        Uncover Work to install ill-timed Work.

- .4 Remove and replace defective and non-conforming Work.
- .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .7 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .8 Restore work with new products in accordance with requirements of Contract Documents.
- .9 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1            SUMMARY**

- .1        This Section includes requirements for management of construction waste and disposal, which forms the Contractor's commitment to reduce and divert waste materials from landfill and includes the following:
  - .1        Preparation of a Draft Construction Waste Management Plan that will be used to track the success of the Construction Waste Management Plan against actual waste diversion from landfill.
  - .2        Preparation of a Construction Waste Management Plan that provides guidance on a logical progression of tasks and procedures to be followed in a pollution prevention program to reduce or eliminate the generation of waste, the loss of natural resources, and process emissions through source reduction, reuse, recycling, and reclamation.
  - .3        Preparation of a Construction Waste Management Report containing detailed information indicating total waste produced by the project, types of waste material and quantity of each material, and total waste diverted and diversion rates indicated as a percentage of the total waste produced.
- .2        Departmental Representative has established that this project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors be employed by the Contractor.

### **1.2            DEFINITIONS**

- .1        Clean Waste: Untreated and unpainted; not contaminated with oils, solvents, sealants or similar materials.
- .2        Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, re modeling operations, repair and demolition
- .3        Hazardous: Exhibiting the characteristics of hazardous substances including properties such as ignitability, corrosiveness, toxicity or reactivity.
- .4        Non hazardous: Exhibiting none of the characteristics of hazardous substances, including properties such as ignitability, corrosiveness, toxicity, or reactivity.
- .5        Non toxic: Not poisonous to humans either immediately or after a long period of exposure.
- .6        Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- .7        Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- .8        Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form; recycling does not include burning, incinerating, or thermally destroying waste.



- .9 Return: To give back reusable items or unused products to vendors for credit.
- .10 Reuse: To reuse a construction waste material in some manner on the project site.
- .11 Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- .12 Sediment: Soil and other debris that has been eroded and transported by storm or well production run off water.
- .13 Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- .14 Toxic: Poisonous to humans either immediately or after a long period of exposure.
- .15 Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- .16 Volatile Organic Compounds (VOC's): Chemical compounds common in and emitted by many building products over time through outgassing:
  - .1 Solvents in paints and other coatings;
  - .2 Wood preservatives; strippers and household cleaners;
  - .3 Adhesives in particleboard, fiberboard, and some plywood; and foam insulation.
  - .4 When released, VOC's can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.
- .17 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

### **1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination: Coordinate waste management requirements with all Divisions of the Work for the project, and ensure that requirements of the Construction Waste Management Plan are followed.
- .2 Preconstruction Meeting: Arrange a pre-construction meeting in accordance with Section 01 31 19- Project Meetings before starting any Work of the Contract attended by the Departmental Representative and to discuss the Construction Waste Management Plan and to develop mutual understanding of the requirements for a consistent policy towards waste reduction and recycling.

### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide required information in accordance with Section 01 33 00- Submittal Procedures.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:

### **1.5 PROJECT CLOSEOUT SUBMISSIONS**

- .1 Diversion Documentation: Submit as constructed information in accordance with Section 01 78 00- Closeout Submittals as follows:

### **1.6 QUALITY ASSURANCE**

- .1 The following sources may be useful in developing the Draft Construction Waste Management Plan:

- .1 Recycling Haulers and Markets: Investigate local haulers and markets for recyclable materials, and incorporate into CWM Plan.
- .2 Waste-to-Energy Systems: Investigate local waste-to-energy incentives where systems for diverting materials from landfill for reuse or recycling are not available.

## **1.7 DELIVERY, STORAGE AND HANDLING**

- .1 Storage Requirements: Implement a recycling/reuse program that includes separate collection of waste materials as appropriate to the project waste and the available recycling and reuse programs in the project area.
- .2 Handling Requirements: Clean materials that are contaminated before placing in collection containers and ensure that waste destined for landfill does not get mixed in with recycled materials:
  - .1 Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
  - .2 Arrange for collection by or delivery to the appropriate recycling or reuse facility.
- .3 Hazardous Waste and Hazardous Materials: Handle in accordance with applicable regulations.

## **PART 2 PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

## **PART 3 EXECUTION**

### **3.1 (CWM PLAN) IMPLEMENTATION**

- .1 Manager: Contractor is responsible for designating an on site party or parties responsible for instructing workers and overseeing and documenting results of the CWM Plan for the project.
- .2 Distribution: Distribute copies of the CWM Plan to the job site foreman, each Subcontractor, the Departmental Representative and other site personnel as required to maintain CWM Plan.
- .3 Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, composting and return methods being used for the project to Subcontractor 's at appropriate stages of the project.
- .4 Separation Facilities: Lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, composting and return:
  - .1 Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
  - .2 Hazardous wastes shall be separated, stored, and disposed of in accordance with local regulations.

- .5 Progressive Documentation: Submit a monthly summary of waste generated by the project to ensure that waste diversion goals are on track with project requirements:
  - .1 Submission of waste summary can coincide with application for progress payment, or similar milestone event as agreed upon between the Contractor and Departmental Representative.
  - .2 Monthly waste summary shall contain the following information:
    - .1 The amount in tonnes or m3 and location of material landfilled,
    - .2 The amount in tonnes or m3 and location of materials diverted from landfill, and
    - .3 Indication of progress based on total waste generated by the project with materials diverted from landfill as a percentage.

### 3.2 SUBCONTRACTOR'S RESPONSIBILITY

- .1 Subcontractor 's shall cooperate fully with the Contractor to implement the CWM Plan.
- .2 Failure to cooperate may result in the Departmental Representative not achieving their environmental goals, and may result in penalties being assessed by the Contractor to the responsible Subcontractor 's.

### 3.3 SAMPLE CONSTRUCTION WASTE MANAGEMENT FORMS

- .1 Sample waste tracking form below can be used by the Contractor to establish their own forms for recording management of construction waste:

Material Stream	Diverted Waste by Report Date	Total	Units				
Sept	Oct	Nov	Dec				
Material Streams Contributing to Credit	Plastic	1.25	2.5	10	5	18.75	m3
Carpet	2.5	2.5	2.5	0	7.5	m3	
Paper/Cardboard	5	2.5	2.5	5	15	m3	
Clean Wood	0	25	0	1.25	26.25	m3	
Metal	1.25	2.5	5.5	7	16.25	m3	
Gypsum Board	2.5	2.5	4	5	14	m3	
Brick/Concrete	10.5	2.5	5.5	8.75	27.25	m3	
Asphalt Shingles	10	0	0	0	10	m3	
Total Diverted Waste	135	m3					
Material Streams not Contributing to Credit	Landfill	10.75	7.5	15	10	43.25	m3
Screen Fines (ADC)	5	1.25	0	2.5	8.75	m3	

150 mm Minus (ADC	1.25	1.25	5	5.5	13	m3			
Total Landfill/ADC Waste		65	m3						
Total Waste	200	m3							
Percent Diverted	67.5	%							

**END OF SECTION**

**PART 1        GENERAL**

**1.1            ADMINISTRATIVE REQUIREMENTS**

- .1    Acceptance of Work Procedures:
  - .1    Contractor's Inspection: Contractor : conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    - .1    Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    - .2    Request Departmental Representative inspection.
  - .2    Departmental Representative Inspection:
    - .1    Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
    - .2    Contractor to correct Work as directed.
  - .3    Completion Tasks: submit written certificates in English that tasks have been performed as follows:
    - .1    Work: completed and inspected for compliance with Contract Documents.
    - .2    Defects: corrected and deficiencies completed.
    - .3    Equipment and systems: tested, adjusted, balanced and fully operational.
    - .4    Certificates required by Fire Commissioner and Utility companies: submitted.
    - .5    Operation of systems: demonstrated to Departmental Representative's personnel.
    - .6    Commissioning of all systems: completed in accordance with 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS and copies of final Commissioning Report submitted to Departmental Representative.
    - .7    Work: complete and ready for final inspection.
  - .4    Final Inspection:
    - .1    When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor
    - .2    When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

**PART 2        PRODUCTS**

**2.1            NOT USED**

- .1    Not Used.

**PART 3        EXECUTION**

**3.1            NOT USED**

.1        Not Used.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1            ADMINISTRATIVE REQUIREMENTS**

- .1    Pre-warranty Meeting:
  - .1        Convene meeting one week prior to contract completion with Departmental Representative, contractor's representative in accordance with Section 01 31 19 - Project Meetings to:
    - .1            Verify Project requirements.
    - .2            Review warranty requirements, manufacturer's installation instructions.
  - .2        Departmental Representative to establish communication procedures for:
    - .1            Notifying construction warranty defects.
    - .2            Determine priorities for type of defects.
    - .3            Determine reasonable response time.
  - .3        Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
  - .4        Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

### **1.2            ACTION AND INFORMATIONAL SUBMITTALS**

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

### **1.3            FORMAT**

- .1    Organize data as instructional manual.
- .2    Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3    When multiple binders are used correlate data into related consistent groupings.
  - .1            Identify contents of each binder on spine.
- .4    Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5    Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .6    Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7    Text: manufacturer's printed data, or typewritten data.

- .8 Drawings: provide with reinforced punched binder tab.
  - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in dwg format on USB.

#### **1.4 CONTENTS - PROJECT RECORD DOCUMENTS**

- .1 Table of Contents for Each Volume: provide title of project;
  - .1 Date of submission; names.
  - .2 Addresses, and telephone numbers of Consultant and Contractors with name of responsible parties.
  - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
  - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .6 Training: refer to Section 01 79 00 - Demonstration and Training.

#### **1.5 AS -BUILT DOCUMENTS AND SAMPLES**

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



- .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

## **1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS**

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

## **1.7 EQUIPMENT AND SYSTEMS**

- .1 For each item of equipment and each system include description of unit or system, and component parts.
  - .1 Give function, normal operation characteristics and limiting conditions.
  - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .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.

- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Include manufacturer's printed operation and maintenance instructions.
- .7 Include sequence of operation by controls manufacturer.
- .8 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .9 Provide installed control diagrams by controls manufacturer.
- .10 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.
- .11 Additional requirements: as specified in individual specification sections.

## **1.8 MAINTENANCE MATERIALS**

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

**1.9 DELIVERY, STORAGE AND HANDLING**

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

**1.10 WARRANTIES AND BONDS**

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.
- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
  - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
  - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
  - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
  - .4 Verify that documents are in proper form, contain full information, and are notarized.
  - .5 Co-execute submittals when required.
  - .6 Retain warranties and bonds until time specified for submittal.
- .7 Warranty is from Date of Substantial Performance.
- .8 Include information contained in warranty management plan as follows:
  - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
  - .2 Provide list for each warranted equipment, item, feature of construction or system indicating:
    - .1 Name of item.
    - .2 Model and serial numbers.
    - .3 Location where installed.

- .4 Name and phone numbers of manufacturers or suppliers.
- .5 Names, addresses and telephone numbers of sources of spare parts.
- .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
- .7 Cross-reference to warranty certificates as applicable.
- .8 Starting point and duration of warranty period.
- .9 Summary of maintenance procedures required to continue warranty in force.
- .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
- .11 Organization, names and phone numbers of persons to call for warranty service.
- .12 Typical response time and repair time expected for various warranted equipment.
- .3 Contractor's plans for attendance at 9 month post-construction warranty inspections from the date of substantial completion.
- .4 Procedure and status of tagging of equipment covered by extended warranties.
- .5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .9 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .10 Written verification to follow oral instructions.
  - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

#### **1.11 WARRANTY TAGS**

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

**PART 2        PRODUCTS**

**2.1            NOT USED**

.1        Not Used.

**PART 3        EXECUTION**

**3.1            NOT USED**

.1        Not Used.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1            ADMINISTRATIVE REQUIREMENTS**

- .1     Demonstrate scheduled operation and maintenance of equipment and systems to Department Representative's personnel two weeks prior to date of interim completion.
- .2     Departmental Representative: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.
- .3     Preparation:
  - .1        Verify conditions for demonstration and instructions comply with requirements.
  - .2        Verify designated personnel are present.
  - .3        Ensure testing, adjusting, and balancing has been performed in accordance with Section 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS and equipment and systems are fully operational.
- .4     Demonstration and Instructions:
  - .1        Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the designated location.
  - .2        Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
  - .3        Review contents of manual in detail to explain aspects of operation and maintenance.
  - .4        Prepare and insert additional data in operations and maintenance manuals when needed during instructions.
- .5     Time Allocated for Instructions: ensure amount of time required for instruction of each item of equipment or system as follows:

### **1.2            ACTION AND INFORMATIONAL SUBMITTALS**

- .1     Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2     Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Departmental Representative's approval.
- .3     Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .4     Give time and date of each demonstration, with list of persons present.
- .5     Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

### **1.3            QUALITY ASSURANCE**

- .1     When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:
  - .1        Instruct Departmental Representative's personnel.

- .2 Provide written report that demonstration and instructions have been completed.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1            SUMMARY**

- .1    Section Includes:
  - .1        General requirements relating to commissioning of project's components and systems, specifying general requirements to PV of components, equipment, sub-systems, systems, and integrated systems.
- .2    Acronyms:
  - .1        AFD - Alternate Forms of Delivery, service provider.
  - .2        BMM - Building Management Manual.
  - .3        Cx - Commissioning.
  - .4        EMCS - Energy Monitoring and Control Systems.
  - .5        O&M - Operation and Maintenance.
  - .6        PI - Product Information.
  - .7        PV - Performance Verification.
  - .8        TAB - Testing, Adjusting and Balancing.

### **1.2            COMMISSIONING OVERVIEW**

- .1    Section 01 91 13.13 - Commissioning Plan.
- .2    For Cx responsibilities refer to Section 01 91 13.13 - Commissioning Plan.
- .3    Cx to be a line item of Contractor's cost breakdown.
- .4    Cx activities supplement field quality and testing procedures described in relevant technical sections.
- .5    Cx is conducted in concert with activities performed during each stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities includes transfer of critical knowledge to facility operational personnel.
- .6    Departmental Representative will issue a Certificate of Substantial Performance when:
  - .1        Completed Cx documentation has been received, reviewed for suitability and approved by Departmental Representative.
  - .2        Equipment, components and systems have been commissioned.
  - .3        O&M training has been completed.

### **1.3            NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS**

- .1    Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within



the unfunctional system, including related systems as deemed required by Departmental Representative to ensure effective performance.

- .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

#### **1.4 PRE-CX REVIEW**

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

#### **1.5 CONFLICTS**

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

#### **1.6 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit no later than 4 weeks after award of Contract:
    - .1 Name of Contractor's Cx agent.
    - .2 Draft Cx documentation.

- .3 Preliminary Cx schedule.
- .2 Request in writing to Departmental Representative for changes to submittals and obtain written approval at least 8 weeks prior to start of Cx.
- .3 Submit proposed Cx procedures to Departmental Representative where not specified and obtain written approval at least 8 weeks prior to start of Cx.
- .4 Provide additional documentation relating to Cx process required by Departmental Representative.

## **1.7 COMMISSIONING DOCUMENTATION**

- .1 Refer to Section 01 91 13.16 - Commissioning Forms: Installation Check Lists and Product Information (PI)/Performance Verification (PV) Forms for requirements and instructions for use.
- .2 Departmental Representative to review and approve Cx documentation.
- .3 Provide completed and approved Cx documentation to Departmental Representative.

## **1.8 COMMISSIONING SCHEDULE**

- .1 Provide detailed Cx schedule as part of construction schedule in accordance with Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart.
- .2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:
  - .1 Approval of Cx reports.
  - .2 Verification of reported results.
  - .3 Repairs, retesting, re-commissioning, re-verification.
  - .4 Training.

## **1.9 COMMISSIONING MEETINGS**

- .1 Convene Cx meetings following project meetings: 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart) and as specified herein.
- .2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.
- .3 Continue Cx meetings on regular basis until commissioning deliverables have been addressed.
- .4 At 60 % construction completion stage. Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart. Departmental Representative to call a separate Cx scope meeting to review progress, discuss schedule of equipment start-up activities and prepare for Cx. Issues at meeting to include:
  - .1 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.
  - .2 Determine the degree of involvement of trades and manufacturer's representatives in the commissioning process.
- .5 Thereafter Cx meetings to be held until project completion and as required during equipment start-up and functional testing period.
- .6 Meeting will be chaired by Contractor who will record and distribute minutes.

- .7 Ensure subcontractors and relevant manufacturer representatives are present at 60 % and subsequent Cx meetings and as required.

#### **1.10 STARTING AND TESTING**

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

#### **1.11 WITNESSING OF STARTING AND TESTING**

- .1 Provide 14 days notice prior to commencement.
- .2 Departmental Representative to witness of start-up and testing.
- .3 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

#### **1.12 MANUFACTURER'S INVOLVEMENT**

- .1 Factory testing: manufacturer to:
  - .1 Coordinate time and location of testing.
  - .2 Provide testing documentation for approval by Departmental Representative.
  - .3 Arrange for Departmental Representative to witness tests.
  - .4 Obtain written approval of test results and documentation from Departmental Representative before delivery to site.
- .2 Obtain manufacturers installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Departmental Representative
  - .1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.
  - .2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.
- .3 Integrity of warranties:
  - .1 Use manufacturer's trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.
  - .2 Verify with manufacturer that testing as specified will not void warranties.
- .4 Qualifications of manufacturer's personnel:
  - .1 Experienced in design, installation and operation of equipment and systems.
  - .2 Ability to interpret test results accurately.
  - .3 To report results in clear, concise, logical manner.

#### **1.13 PROCEDURES**

- .1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.
- .2 Conduct start-up and testing in following distinct phases:
  - .1 Included in delivery and installation:

- .1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.
  - .2 Visual inspection of quality of installation.
- .2 Start-up: follow accepted start-up procedures.
- .3 Operational testing: document equipment performance.
- .4 System PV: include repetition of tests after correcting deficiencies.
- .5 Post-substantial performance verification: to include fine-tuning.
- .3 Correct deficiencies and obtain approval from Departmental Representative after distinct phases have been completed and before commencing next phase.
- .4 Document require tests on approved PV forms.
- .5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:
  - .1 Minor equipment/systems: implement corrective measures approved by Departmental Representative.
  - .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Departmental Representative.
  - .3 If evaluation report concludes that major damage has occurred, Departmental Representative shall reject equipment.
    - .1 Rejected equipment to be remove from site and replace with new.
    - .2 Subject new equipment/systems to specified start-up procedures.

#### **1.14 START-UP DOCUMENTATION**

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

#### **1.15 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS**

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

- .4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.

#### **1.16 TEST RESULTS**

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

#### **1.17 START OF COMMISSIONING**

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

#### **1.18 INSTRUMENTS/EQUIPMENT**

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

#### **1.19 COMMISSIONING PERFORMANCE VERIFICATION**

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

#### **1.20 WITNESSING COMMISSIONING**

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

#### **1.21 AUTHORITIES HAVING JURISDICTION**

- .1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.
- .2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.

- .3 Provide copies to Departmental Representative within 5 days of test and with Cx report.

#### **1.22 EXTRAPOLATION OF RESULTS**

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

#### **1.23 EXTENT OF VERIFICATION**

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

#### **1.24 REPEAT VERIFICATIONS**

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

#### **1.25 SUNDRY CHECKS AND ADJUSTMENTS**

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

#### **1.26 DEFICIENCIES, FAULTS, DEFECTS**

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

#### **1.27 COMPLETION OF COMMISSIONING**

- .1 Upon completion of Cx leave systems in normal operating mode.

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

#### **1.28 ACTIVITIES UPON COMPLETION OF COMMISSIONING**

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

#### **1.29 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS**

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

#### **1.30 OCCUPANCY**

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

#### **1.31 INSTALLED INSTRUMENTATION**

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

#### **1.32 PERFORMANCE VERIFICATION TOLERANCES**

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

#### **1.33 OWNER'S PERFORMANCE TESTING**

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

### **PART 2 PRODUCTS**

#### **2.1 NOT USED**

- .1 Not Used.

**PART 3        EXECUTION**

**3.1            NOT USED**

.1        Not Used.

**END OF SECTION**



## **PART 1        GENERAL**

### **1.1            SUMMARY**

- .1    Section Includes:
  - .1        Description of overall structure of Plan and roles and responsibilities of commissioning team.
- .2    Related Requirements

### **1.2            GENERAL**

- .1    Provide a fully functional facility :
  - .1        Systems, equipment and components meet user's functional requirements before date of acceptance, and operate consistently at peak efficiencies and within specified energy budgets under normal loads.
  - .2        Facility user and O&M personnel have been fully trained in aspects of installed systems.
  - .3        Optimized life cycle costs.
  - .4        Complete documentation relating to installed equipment and systems.
- .2    Term "Cx" in this section means "Commissioning".
- .3    Use this Cx Plan as master planning document for Cx:
  - .1        Outlines organization, scheduling, allocation of resources, documentation, pertaining to implementation of Cx.
  - .2        Communicates responsibilities of team members involved in Cx Scheduling, documentation requirements, and verification procedures.
  - .3        Sets out deliverables relating to O&M, process and administration of Cx.
  - .4        Describes process of verification of how built works meet design requirements.
  - .5        Produces a complete functional system prior to issuance of Certificate of Occupancy.
  - .6        Management tool that sets out scope, standards, roles and responsibilities, expectations, deliverables, and provides:
    - .1            Overview of Cx.
    - .2            General description of elements that make up Cx Plan.
    - .3            Process and methodology for successful Cx.
- .4    Acronyms:
  - .1        Cx - Commissioning.
  - .2        BMM - Building Management Manual.
  - .3        EMCS - Energy Monitoring and Control Systems.
  - .4        WHMIS Safety Data Sheets (SDS).
  - .5        PI - Product Information.
  - .6        PV - Performance Verification.
  - .7        TAB - Testing, Adjusting and Balancing.

- .8 WHMIS - Workplace Hazardous Materials Information System.
- .5 Commissioning terms used in this Section:
  - .1 Deferred Cx - Cx activities delayed for reasons beyond Contractor's control due to lack of occupancy, weather conditions, need for heating/cooling loads.

### **1.3 DEVELOPMENT OF 100% CX PLAN**

- .1 Cx Plan to be 95% completed before added into Project Specifications.
- .2 Cx Plan to be 100% completed within 8 weeks of award of contract to take into account:
  - .1 Approved shop drawings and product data.
  - .2 Approved changes to contract.
  - .3 Contractor's project schedule.
  - .4 Cx schedule.
  - .5 Contractor's, sub-contractor's, suppliers' requirements.
  - .6 Project construction team's and Cx team's requirements.
- .3 Submit completed Cx Plan to Departmental Representative and obtain written approval.

### **1.4 REFINEMENT OF CX PLAN**

- .1 During construction phase, revise, refine and update Cx Plan to include:
  - .1 Changes resulting from Client program modifications.
  - .2 Approved design and construction changes.
- .2 Revise, refine and update every 4 weeks during construction phase. At each revision, indicate revision number and date.
- .3 Submit each revised Cx Plan to Departmental Representative for review and obtain written approval.
- .4 Include testing parameters at full range of operating conditions and check responses of equipment and systems.

### **1.5 COMPOSITION, ROLES AND RESPONSIBILITIES OF CX TEAM**

- .1 Departmental Representative to maintain overall responsibility for project and is sole point of contact between members of commissioning team.
  - .1 Departmental Representative is responsible for:
    - .1 Organizing Cx.
    - .2 Monitoring operations Cx activities.
    - .3 Witnessing, certifying accuracy of reported results.
    - .4 Witnessing and certifying tests.
    - .5 Ensuring implementation of final Cx Plan.
    - .6 Performing verification of performance of installed systems and equipment.
  - .2 Construction Team: contractor, subcontractors, suppliers and support disciplines, is responsible for construction/installation in accordance with Contract Documents, including:

- .1 Developing BMM.
- .2 Testing.
- .3 TAB.
- .4 Performance of Cx activities.
- .5 Implementation of Training Plan.
- .6 Delivery of training and Cx documentation.
- .7 Assigning one person as point of contact with Departmental Representative and Departmental Representative for administrative and coordination purposes.
- .3 Contractor's Cx agent implements specified Cx activities including:
  - .1 Demonstrations.
  - .2 Training.
  - .3 Testing.
  - .4 Preparation, submission of test reports.
- .4 Property Manager: represents lead role in Operation Phase and onwards and is responsible for:
  - .1 Receiving facility.
  - .2 Day-To-Day operation and maintenance of facility.

## **1.6 CX PARTICIPANTS**

- .1 Employ the following Cx participants to verify performance of equipment and systems:
  - .1 Installation contractor/subcontractor:
    - .1 Equipment and systems except as noted.
  - .2 Equipment manufacturer: equipment specified to be installed and started by manufacturer.
    - .1 To include performance verification.
  - .3 Ensure that Cx participant:
    - .1 Could complete work within scheduled time frame.
    - .2 Available for emergency and troubleshooting service during first year of occupancy by user for adjustments and modifications outside responsibility of O&M personnel, including:
      - .1 Redistribution of electrical services.
  - .4 Provide names of participants to Departmental Representative and details of instruments and procedures to be followed for Cx 3 months prior to starting date of Cx for review and approval.

## **1.7 EXTENT OF CX**

- .1 Commission electrical systems and equipment:
  - .1 Medium Voltage
    - .1 Medium voltage equipment.
    - .2 Medium voltage distribution systems.

- .2 Low voltage below 750 V:
  - .1 Low voltage equipment.
  - .2 Low voltage distribution systems.

## **1.8 DELIVERABLES RELATING TO O&M PERSPECTIVES**

- .1 General requirements:
  - .1 Compile English documentation.
  - .2 Documentation to be computer-compatible format ready for inputting for data management.
- .2 Provide deliverables:
  - .1 Warranties.
  - .2 Project record documentation.
  - .3 Inventory of spare parts, special tools and maintenance materials.
  - .4 Maintenance Management System (MMS) identification system used.
  - .5 WHMIS information.
  - .6 WHMIS Safety Data Sheets (SDS).
  - .7 Electrical Panel inventory containing detailed inventory of electrical circuitry for each panel board. Duplicate of inventory inside each panel.

## **1.9 DELIVERABLES RELATING TO THE CX PROCESS**

- .1 General:
  - .1 Start-up, testing and Cx requirements, conditions for acceptance and specifications form part of relevant technical sections of these specifications.
- .2 Definitions:
  - .1 Cx as used in this section includes:
    - .1 Cx of components, equipment, systems, subsystems, and integrated systems.
    - .2 Factory inspections and performance verification tests.
- .3 Deliverables: provide:
  - .1 Cx Specifications.
  - .2 Startup, pre-Cx activities and documentation for systems, and equipment.
  - .3 Completed installation checklists (ICL).
  - .4 Completed product information (PI) report forms.
  - .5 Completed performance verification (PV) report forms.
  - .6 Results of Performance Verification Tests and Inspections.
  - .7 Description of Cx activities and documentation.
  - .8 Training Plans.
  - .9 Cx Reports.
  - .10 Prescribed activities during warranty period.

- .4 Departmental Representative to witness and certify tests and reports of results provided to Departmental Representative.

#### **1.10 PRE-CX ACTIVITIES AND RELATED DOCUMENTATION**

- .1 Items listed in this Cx Plan include the following:
  - .1 Pre-Start-Up inspections: by Departmental Representative prior to permission to start up and rectification of deficiencies to Departmental Representative's satisfaction.
  - .2 Departmental Representative to use approved check lists.
  - .3 Departmental Representative will monitor some of these pre-start-up inspections.
  - .4 Include completed documentation with Cx report.
  - .5 Conduct pre-start-up tests: conduct pressure, static, flushing, cleaning, and "bumping" during construction as specified in technical sections. To be witnessed and certified by Departmental Representative and does not form part of Cx specifications.
  - .6 Departmental Representative will monitor some of these inspections and tests.
  - .7 Include completed documentation in Cx report.
- .2 Pre-Cx activities - ELECTRICAL:
  - .1 Medium voltage distribution systems:
    - .1 Requires independent testing agency to perform pre- energization and post-energization tests.
  - .2 Low voltage distribution systems under 750 V:
    - .1 Requires independent testing agency to perform pre- energization and post-energization tests.

#### **1.11 START-UP**

- .1 Start up components, equipment and systems.
- .2 Departmental Representative to monitor some of these start-up activities.
  - .1 Rectify start-up deficiencies to satisfaction of Departmental Representative
  - .2 Performance Verification (PV):
  - .3 Approved Cx Agent to perform.
    - .1 Repeat when necessary until results are acceptable to Departmental Representative.
  - .4 Use procedures modified generic procedures to suit project requirements.
  - .5 Departmental Representative to witness and certify reported results using approved PI and PV forms.
  - .6 Departmental Representative to approve completed PV reports and provide to Departmental Representative.
  - .7 Departmental Representative verify up to 30 % of reported results at random.
  - .8 Failure of randomly selected item shall result in rejection of PV report or report of system startup and testing.

**1.12 CX ACTIVITIES AND RELATED DOCUMENTATION**

- .1 Perform Cx by specified Cx agency using procedures developed by the Departmental Representative and approved by the Departmental Representative.
- .2 Departmental Representative to monitor Cx activities.
- .3 Upon satisfactory completion, Cx agency performing tests to prepare Cx Report using approved PV forms.
- .4 Departmental Representative to witness, certify reported results of, Cx activities and forward to Departmental Representative.
- .5 Departmental Representative reserves right to verify a percentage of reported results at no cost to contract.

**1.13 INSTALLATION CHECK LISTS (ICL)**

- .1 Refer to Section 01 91 13.16 - Commissioning Forms: Installation Check Lists and Product Information (PI)/Performance Verification (PV) Forms.

**1.14 PRODUCT INFORMATION (PI) REPORT FORMS**

- .1 Refer to Section 01 91 13.16 - Commissioning Forms: Installation Check Lists and Product Information (PI)/Performance Verification (PV) Forms.

**1.15 PERFORMANCE VERIFICATION (PV) REPORT**

- .1 Refer to Section 01 91 13.16 - Commissioning Forms: Installation Check Lists and Product Information (PI)/Performance Verification (PV) Forms.

**1.16 DELIVERABLES RELATING TO ADMINISTRATION OF CX**

- .1 General:
  - .1 Because of risk assessment, complete Cx of occupancy, weather and seasonal-sensitive equipment and systems in these areas before building is occupied.

**1.17 CX SCHEDULES**

- .1 Prepare detailed critical path Cx Schedule and submit to Departmental Representative for review and approval same time as project Construction Schedule. Include:
  - .1 Milestones, testing, documentation, training and Cx activities of components, equipment, subsystems, systems and integrated systems, including:
    - .1 Design criteria, design intents.
    - .2 Cx agents' credentials: 60 days before start of Cx.
    - .3 Cx procedures: 3 months after award of contract.
    - .4 Cx Report format: 3 months after contract award.
    - .5 Submission of list of instrumentation with relevant certificates: 21 days before start of Cx.
    - .6 Testing after successful start-up, correction of deficiencies and verification of normal and safe operation.
    - .7 Notification of intention to start Cx: 14 days before start of Cx.
    - .8 Identification of deferred Cx.

- .9 Implementation of training plans.
- .10 Cx reports: immediately upon successful completion of Cx.
- .2 Detailed training schedule to demonstrate no conflicts with testing, completion of project and hand-over to Property Manager.
- .3 6 months in Cx schedule for verification of performance in all seasons and wear conditions.
- .2 After approval, incorporate Cx Schedule into Construction Schedule.
- .3 Departmental Representative, Contractor, and Contractor's Cx agent will monitor progress of Cx against this schedule.

#### **1.18 CX REPORTS**

- .1 Submit reports of tests, witnessed and certified by Departmental Representative who will verify reported results.
- .2 Include completed and certified PV reports in properly formatted Cx Reports.
- .3 Before reports are accepted, reported results to be subject to verification by Departmental Representative

#### **1.19 TESTS TO BE PERFORMED BY DEPARTMENTAL REPRESENTATIVE/USER**

- .1 None is anticipated on this project.

#### **1.20 FINAL SETTINGS**

- .1 Upon completion of Cx to satisfaction of Departmental Representative lock control devices in their final positions, indelibly mark settings marked and include in Cx Reports.

### **PART 2 PRODUCTS**

#### **2.1 NOT USED**

- .1 Not Used.

### **PART 3 EXECUTION**

#### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **PART 1        GENERAL**

### **1.1            SUMMARY**

- .1        Section Includes:
  - .1            Commissioning forms to be completed for equipment, system and integrated system.

### **1.2            INSTALLATION/START-UP CHECK LISTS**

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

### **1.3            PRODUCT INFORMATION (PI) REPORT FORMS**

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

### **1.4            PERFORMANCE VERIFICATION (PV) FORMS**

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



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

## **1.5 SAMPLES OF COMMISSIONING FORMS**

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

## **1.6 CHANGES AND DEVELOPMENT OF NEW REPORT FORMS**

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

## **1.7 COMMISSIONING FORMS**

- .1 Use Commissioning forms to verify installation and record performance when starting equipment and systems.
- .2 Strategy for Use:
  - .1 Departmental Representative provides Contractor project-specific Commissioning forms with Specification data included.
  - .2 Contractor will provide required shop drawings information and verify correct installation and operation of items indicated on these forms.
  - .3 Confirm operation as per design criteria and intent.
  - .4 Identify variances between design and operation and reasons for variances.
  - .5 Verify operation in specified normal and emergency modes and under specified load conditions.
  - .6 Record analytical and substantiating data.
  - .7 Verify reported results.
  - .8 Form to bear signatures of recording technician and reviewed and signed off by Departmental Representative.
  - .9 Submit immediately after tests are performed.
  - .10 Reported results in true measured SI unit values.
  - .11 Provide Departmental Representative with originals of completed forms.
  - .12 Maintain copy on site during start-up, testing and commissioning period.
  - .13 Forms to be both hard copy and electronic format with typed written results in Building Management Manual in accordance with Section 01 92 00 - Facility Operation.

**1.8            LANGUAGE**

- .1        To suit the language profile of the awarded contract.

**PART 2        PRODUCTS**

**2.1            NOT USED**

- .1        Not Used.

**PART 3        EXECUTION**

**3.1            NOT USED**

- .1        Not Used.

**END OF SECTION**

## Static Verification



NAME:

COMPANY:

ADDRESS:

CUSTOMER:

PROJECT:

FILE NUMBER:

DATE: DD / MM / YYYY

## MANUFACTURER

SERIAL NO.

EQUIP. TEMPERATURE

°C

Indicates Temperature Corrected Reading to 20°C

[illegible][illegible]

OVERPOTENTIAL TESTS		MEG-OHMS		MICRO-AMPS	INSULATION TCF		
BUS SECTION TESTED	KV	TIME (min)		A-GND	B-GND	C-GND	N-GND

# METAL ENCLOSED BUSWAYS

## Static Verification



REVISION #: \_\_\_\_\_

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

FILE NUMBER: \_\_\_\_\_

DATE: DD / MM / YYYY


### NAMEPLATE DATA

MANUFACTURER		RATED AMPS	
TYPE		SERIAL NO.	
RATED VOLTS		WITHSTAND RATING (kA)	
CATALOG NO.			

### ADDITIONAL NAMEPLATE

--	--	--	--

DESCRIPTION	INSPECTED	N/A	COMMENTS
* BUSWAY DATA COMPARES WITH DRAWINGS & SPECIFICATIONS			
PHYSICAL & MECHANICAL CONDITION			
ANCHORAGE & ALIGNMENT			
GROUNDING			
PHYSICAL ORIENTATION (ADEQUATE COOLING)			
WEEP-HOLE PLUGS & JOINT SHIELDING			
VENTILATION OPENINGS			
CORRESPONDS WITH SINGLE LINE DIAGRAM			
HEATERS			
PHASING			

\* ACCEPTANCE TESTING ONLY

### ELECTRICAL CONNECTIONS VERIFIED BY:

<input type="checkbox"/>	CONNECTION TIGHTNESS
<input type="checkbox"/>	THERMOGRAPHIC SURVEY
<input type="checkbox"/>	MEASURED RESISTANCE

# METAL ENCLOSED BUSWAYS

## Static Verification



REVISION #: \_\_\_\_\_

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

FILE NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_ DD / MM / YYYY

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

# METAL ENCLOSED BUSWAYS

## Start-Up



REVISION #: \_\_\_\_\_

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

FILE NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_ DD / MM / YYYY

**SHEET INTENTIONALLY LEFT BLANK FOR INDIVIDUAL TO POPULATE AS NEEDED**

### GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

# METAL ENCLOSED BUSWAYS

## Functional Performance Testing



REVISION #: \_\_\_\_\_

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

FILE NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_ DD / MM / YYYY

**SHEET INTENTIONALLY LEFT BLANK FOR INDIVIDUAL TO POPULATE AS NEEDED**

### GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

# OUTDOOR BUS STRUCTURES

## Static Verification



REVISION #: \_\_\_\_\_

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

FILE NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_ DD / MM / YYYY

### NAMEPLATE

MANUFACTURER		RATED AMPS	
TYPE		SERIAL NO.	
RATED VOLTS		WITHSTAND RATING (kV)	
CATALOG NO.			

### ADDITIONAL NAMEPLATE

--	--	--	--

DESCRIPTION	INSPECTED	N/A	COMMENTS
* BUS STRUCTURE DATA COMPARES WITH DRAWINGS & SPECIFICATIONS			
PHYSICAL & MECHANICAL CONDITION			
ANCHORAGE & ALIGNMENT			
GROUNDING			
SUPPORT INSULATORS			

### ELECTRICAL CONNECTIONS VERIFIED BY:

- ☐ CONNECTION TIGHTNESS  
☐ THERMOGRAPHIC SURVEY  
☐ MEASURED RESISTANCE

EQUIP. TEMPERATURE \_\_\_\_\_ °C

Indicates Temperature Corrected Reading to 20°C

BOLTED CONNECTION RESISTANCE	<input type="checkbox"/> MICRO-OHMS	<input type="checkbox"/> MILLI-OHMS	RESISTANCE TCF				
FROM	TO		PHASE A	PHASE B	PHASE C	NEUTRAL	GROUND

INSULATION TESTS	<input type="checkbox"/> MEG-OHMS	<input type="checkbox"/> MICRO-AMPS	INSULATION TCF			
BUS SECTION TESTED	KV	TIME (min)	A-GND	B-GND	C-GND	N-GND



# OUTDOOR BUS STRUCTURES

## Static Verification



REVISION #: \_\_\_\_\_

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

FILE NUMBER: \_\_\_\_\_

DATE: DD / MM / YYYY

OVERPOTENTIAL TESTS	<input type="checkbox"/> MEG-OHMS	<input type="checkbox"/> MICRO-AMPS	INSULATION TCF			
BUS SECTION TESTED	KV	TIME (min)	A-GND	B-GND	C-GND	N-GND

### GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

# OUTDOOR BUS STRUCTURES

## Start-Up



REVISION #: \_\_\_\_\_

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

FILE NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_ DD / MM / YYYY

**SHEET INTENTIONALLY LEFT BLANK FOR INDIVIDUAL TO POPULATE AS NEEDED**

### GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

# OUTDOOR BUS STRUCTURES

## Functional Performance Testing



REVISION #: \_\_\_\_\_

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

FILE NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_ DD / MM / YYYY

**SHEET INTENTIONALLY LEFT BLANK FOR INDIVIDUAL TO POPULATE AS NEEDED**

### GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

# SWITCHGEAR SWITCHBOARD ASSEMBLIES

## Static Verification



REVISION #: \_\_\_\_\_

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

FILE NUMBER: \_\_\_\_\_

DATE: DD / MM / YYYY

### NAMEPLATE DATA

MANUFACTURER		SERIAL NO.	
CATALOG NO.		RATED AMPS	
RATED VOLTS		TYPE	
WITHSTAND RATING (Ka)			

### ADDITIONAL NAMEPLATE

--	--	--	--

DESCRIPTION	INSPECTED	N/A	COMMENTS
*SWITCHGEAR DATA COMPARES WITH DRAWINGS & SPECIFICATIONS			
PHYSICAL & MECHANICAL CONDITION			
ANCHORAGE & ALIGNMENT			
GROUNDING			
REQUIRED CLEARANCES			
CLEANLINESS			
FUSE & BREAKER SIZE CORRESPOND WITH DRAWINGS			
CT'S AND PT'S CORRESPOND WITH DRAWINGS			
OPERATION & SEQUENCE OF INTERLOCKS			
LUBRICATION			
INSULATORS			
BARRIER & SHUTTER INSTALLATION/OPERATION			
ACTIVE COMPONENTS & INDICATING DEVICES			
FILTERS AND VENTS			
INSTRUMENT TRANSFORMERS			
CONTROL POWER TRANSFORMERS			
HEATERS			
PHASING (DOUBLE-ENDED OR DUAL SOURCE S/G)			

\* ACCEPTANCE TESTING ONLY

### ELECTRICAL CONNECTIONS VERIFIED BY:



CONNECTION TIGHTNESS

# SWITCHGEAR SWITCHBOARD ASSEMBLIES

## Static Verification



REVISION #: \_\_\_\_\_

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

FILE NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_ DD / MM / YYYY

☐  
☐

THERMOGRAPHIC SURVEY

MEASURED RESISTANCE

### GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

# SWITCHGEAR SWITCHBOARD ASSEMBLIES

## Start-Up



REVISION #: \_\_\_\_\_

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

FILE NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_ DD / MM / YYYY

**SHEET INTENTIONALLY LEFT BLANK FOR INDIVIDUAL TO POPULATE AS NEEDED**

### GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

# SWITCHGEAR SWITCHBOARD ASSEMBLIES

## Functional Performance Testing



REVISION #: \_\_\_\_\_

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

FILE NUMBER: \_\_\_\_\_

DATE: DD / MM / YYYY

### NAMEPLATE DATA

MANUFACTURER

SERIAL NO.

EQUIP. TEMPERATURE

°C

Indicates Temperature Corrected Reading to 20°C

BOLTED CONNECTION RESISTANCE		<input type="checkbox"/>	MICRO-OHMS	<input type="checkbox"/>	MILLI-OHMS	RESISTANCE TCF			
FROM	TO		PHASE A	PHASE B	PHASE C	NEUTRAL	GROUND		

INSULATION TESTS		<div></div> MEG-OHMS	<div></div> MICRO-AMPS	RESISTANCE TCF					
BUS SECTION TESTED	KV	TIME (MINS)	A-GND	B-GND	C-GND	N-GND	A - B	B - C	C - A

OVERPOTENTIAL TESTS	<div></div>	MEG-OHMS		<div></div>	MICRO-AMPS		RESISTANCE TCF			
BUS SECTION TESTED	KV	TIME (MINS)		A-GND	B-GND	C-GND	N-GND			

### GENERAL COMMENTS:

# SWITCHGEAR SWITCHBOARD ASSEMBLIES

## Functional Performance Testing



REVISION #: \_\_\_\_\_

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

FILE NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_ DD / MM / YYYY

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POSITION/TITLE	SIGNATURE	DATE



## **PART 1        GENERAL**

### **1.1            SUMMARY**

- .1    Section Includes:
  - .1        This section is limited to portions of the Building Management Manual (BMM) provided to Departmental Representative by Contractor.
- .2    Acronyms:
  - .1        BMM - Building Management Manual.
  - .2        Cx - Commissioning.
  - .3        HVAC - Heating, Ventilation and Air Conditioning.
  - .4        PI - Product Information.
  - .5        PV - Performance Verification.
  - .6        TAB - Testing, Adjusting and Balancing.
  - .7        WHMIS - Workplace Hazardous Materials Information System.

### **1.2            GENERAL REQUIREMENTS**

- .1    Standard letter size paper 216 mm x 279 mm.
- .2    Methodology used to facilitate updating.
- .3    Drawings, diagrams and schematics to be professionally developed.
- .4    Electronic copy of data to be in a format accepted and approved by Departmental Representative.

### **1.3            APPROVALS**

- .1    Prior to commencement, co-ordinate requirements for preparation, submission and approval with Departmental Representative.

### **1.4            GENERAL INFORMATION**

- .1    Provide Departmental Representative the following for insertion into appropriate Part and Section of BMM:
  - .1        Complete list of names, addresses, telephone and fax numbers of contractor, sub-contractors that participated in delivery of project - as indicated in Section 1.2 of BMM.
  - .2        Summary of architectural, structural, fire protection, mechanical and electrical systems installed and commissioned - as indicated in Section 1.4 of BMM.
    - .1            Including sequence of operation as finalized after commissioning is complete as indicated in Section 2.0 of BMM.
  - .3        Description of building operation under conditions of heightened security and emergencies as indicated in Section 2.0 of BMM.
  - .4        System, equipment and components Maintenance Management System (MMS) identification - Section 2.1 of BMM..

- .5 Information on operation and maintenance of architectural systems and equipment installed and commissioned - Section 2.0 of BMM.
- .6 Information on operation and maintenance of fire protection and life safety systems and equipment installed and commissioned - Section 2.0 of BMM.
- .7 Information on operation and maintenance of mechanical systems and equipment installed and commissioned - Section 2.0 of BMM.
- .8 Operating and maintenance manual - Section 3.2 of BMM.
- .9 Final commissioning plan as actually implemented.
- .10 Completed commissioning checklists.
- .11 Commissioning test procedures employed.
- .12 Completed Product Information (PI) and Performance Verification (PV) report forms, approved and accepted by Departmental Representative.
- .13 Commissioning reports.

## **1.5 CONTENTS OF OPERATING AND MAINTENANCE MANUAL**

- .1 For detailed requirements refer to Section 01 78 00 - Closeout Submittals.
- .2 Departmental Representative to review and approve format and organization within 12 weeks of award of contract.
- .3 Include original manufactures brochures and written information on products and equipment installed on this project.
- .4 Record and organize for easy access and retrieval of information contained in BMM.
- .5 Include completed PI report forms, data and information from other sources as required.
- .6 Inventory directory relating to information on installed systems, equipment and components.
- .7 Approved project shop-drawings, product and maintenance data.
- .8 Manufacturer's data and recommendations relating: manufacturing process, installation, commissioning, start-up, O&M, shutdown and training materials.
- .9 Inventory and location of spare parts, special tools and maintenance materials.
- .10 Warranty information.
- .11 Inspection certificates with expiration dates, which require on-going re-certification inspections.
- .12 Maintenance program supporting information including:
  - .1 Recommended maintenance procedures and schedule.
  - .2 Information to removal and replacement of equipment including, required equipment, points of lift and means of entry and egress.

## **1.6 SUPPORTING DOCUMENTATION FOR INSERTION INTO SUPPORTING APPENDICES**

- .1 Provide Departmental Representative supporting documentation relating to installed equipment and system, including:
  - .1 General:

- .1 Finalized commissioning plan.
- .2 WHMIS information manual.
- .3 Approved "as-built" drawings and specifications.
- .4 Procedures used during commissioning.
- .5 Cross-Reference to specification sections.
- .2 Architectural and structural:
  - .1 Inspection certificates, construction permits.
  - .2 PV reports.
- .3 Fire prevention, suppression and protection:
  - .1 Test reports.
  - .2 Smoke test reports.
  - .3 PV reports.
- .4 Mechanical:
  - .1 Installation permits, inspection certificates.
  - .2 TAB and PV reports.
  - .3 Copies of posted instructions.
- .5 Electrical:
  - .1 Installation permits, inspection certificates.
  - .2 PV reports.
  - .3 Electrical work log book.
  - .4 Charts and schedules.
  - .5 Locations of cables and components.
  - .6 Copies of posted instructions.

## **1.7 LANGUAGE**

- .1 English binders.

## **1.8 USE OF CURRENT TECHNOLOGY**

- .1 Use current technology for production of documentation. Emphasis on ease of accessibility at all times, maintain in up-to-date state, compatibility with user's requirements.
- .2 Obtain Departmental Representative's approval before starting Work.

## **PART 2 PRODUCTS**

### **2.1 NOT USED**

- .1 Not used.

**PART 3        EXECUTION**

**3.1            NOT USED**

.1        Not used.

**END OF SECTION**